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# Multivariate Statistical Quality Control Based on Ranked Set Sampling

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## Abstract

The sample of the study was formed using simple random sampling, ranked set sampling, extreme ranked set sampling and median ranked set sampling. At the end of this process, the researcher created Hotelling's  $T^2$  control charts, a multivariate statistical process control method. The performances of SRS, RSS, ERSS and MRSS sampling methods were compared to one another using these control charts. A simulation was performed to see the average run-length values for Hotelling's  $T^2$  control charts, and these findings were also used for the comparison of the sampling performances.

At the end of the study, the researcher formed a sample using median ranked set sampling and created the Hotelling's  $T^2$  control chart. As a result of this operation, the researcher found that there was an out-of-control signal in the process, while there was no such signal in other sampling methods. When the average run-length values obtained from Hotelling's  $T^2$  control charts were compared, it was seen that a shift in the process was detected by the ranked set sampling earlier, when compared to other sampling methods. This paper it can be said that the methods used are unique to the literature because they are applied to multivariate data.

**Keywords:** Statistical quality control; multivariate control charts; Hotelling  $T^2$  control charts; ranked set sampling; average run length

## 1. Introduction

Statistical process control can be defined as a procedure that uses statistical methods to check whether or not a manufacturing and service process is working normally, and that detects an abnormal incident and eliminates it by determining the reasons for it (Burnak, 1997:61). The most important purpose of the statistical process control is to eliminate the specific reasons for a change in the process and to keep it in control (İşçiçok, 2012:151). Univariate or multivariate statistical methods can be used depending on the type of the process. Thus, the difference between univariate or multivariate process control methods should be addressed primarily. Statistical process control, consists of a number of powerful tools for problem solving and improvement of quality control through reducing variability in industrial manufacturing processes.

Throughout our study of multivariate statistical methods for quality and productivity improvement, we was concerned with essentially the same problem: using data obtained from the process to draw conclusions known as inferences about how it is or has been operating. We may be concerned with sampling the process. In each case we will find it useful to the improvement of quality and productivity to collect data from the process and model it using statistical concepts and methods.

Multivariate statistical process control is defined as a methodology based on control charts, and it is used to observe multivariate processes. The number of variables included is a significant difference between the methods, but actually there are much more important differences. One of these differences is the fact that the variables obtained from the multivariate processes are often related to one another. These variables should be examined together since this type of variable is inter-dependent (Mason, Young, 2002: 6). Multivariate statistical control methods have been of great importance in foreign literature over the last couple of years, and these methods have been used in industry in particular. Control charts are often used since they make it possible to visually monitor a change in the process and can be easily used and interpreted (Eygü, 2015:80). Multivariate process control is a methodology, based on control charts, that is used to monitor the stability of a multivariate process.

Schwertman et al. (2002) used Hotelling's  $T^2$  method together with regression analysis and specified the changes

occurring in the control charts over time.

Aparisi et al. (2004) suggested that Hotelling’s  $T^2$  method can be used to determine whether or not a process is out-of-control with sample data randomly obtained from the process. They compared the average-run-length values of chi-square control charts using certain assumptions.

1.1 Hotelling’s  $T^2$  quality control chart

The multivariate quality control chart, developed by Harold Hotelling (1947), is based on  $T^2$  values with the assumption that the distribution of random variables is normal. This chart is often called the multivariate Shewhart control chart due to its resemblance to Shewhart control chart in many sources. It is also called a chi-square chart when it has a chi-square distribution with  $p$ -value degrees of freedom (Montgomery, 2009).

Consider  $p$  correlated characteristics as being measured simultaneously and these characteristics as being measured simultaneously and these characteristics follow a multivariate normal distribution with mean vector  $\mu_0 = (\mu_{0.1}, \mu_{0.2}, \dots, \mu_{0.p})$ , and covariance matrix  $\Sigma_0$  when the process is in control, where  $\mu_{0,j}$  is the mean for the  $j$ th characteristic and  $\Sigma_0$  is a  $p \times p$  matrix consisting of the variances and covariances of the  $p$  characteristics. When an  $i$ th sample of size  $n$  is taken, we have  $n$  values of each characteristic and it is possible to calculate the  $\bar{X}_i$  vector, which represents the  $i$ th sample mean vector for the  $p$  characteristics. The charting statistic

$$T_i^2 = n(\bar{X}_i - \mu_0)' \Sigma^{-1} (\bar{X}_i - \mu_0) \tag{1}$$

is called Hotelling’s  $T^2$  statistic that, when the process is in control, is distributed as a chi-square variate with  $p$  degrees of freedom ( $T_i^2 \sim \chi_p^2$ ). If  $T_i^2 > \chi_{p, \alpha}^2$  is in question, the process is considered to be out-of-control.

(Aparisi, 2007).

Let’s assume that  $\mu_x$  and  $\Sigma$  parameters are known to be in normal multivariate distribution, and suppose that  $\mu_x$  is a  $Y$  observation vector obtained from a normal multivariate distribution that has a different mean vector but the same covariance matrix. This observation vector is demonstrated by

$$T_y^2 = (Y - \mu_x)' \Sigma^{-1} (Y - \mu_x) \tag{2}$$

The statistic here cannot be defined with the  $\chi^2$ , the center of which is  $\mu_x$  and  $\mu_y$ . Thus, multivariate normal distribution defined with  $(Y - \mu_x)$  vector has a mean value that is different than 0. However, the center of the  $(Y - \mu_x)$  normal vector can be determined considering the mean  $\mu_x$  and  $\mu_y$  vectors and in parallel to the  $\bar{X}_1$  and  $\bar{X}_2$  axes. If we keep

$$(Y - \mu_x) = (Y - \mu_x + \mu_y - \mu_y) = [(Y - \mu_y) + \delta] \tag{3}$$

in mind,  $\delta = (\mu_y - \mu_x)$  indicates the mean deviation figure. With this result, the distribution of  $T_y^2$  is given by

$$T_y^2 = [(Y - \mu_y) + \delta]' \Sigma^{-1} [(Y - \mu_y) + \delta] \sim \chi_{(p, \lambda)}^2 \tag{4}$$

where  $\chi_{(p, \lambda)}^2$  is a non-central chi-square distribution with  $p$  degrees of freedom. A major difference between this distribution and the central chi-square is the additional parameter  $\lambda$ , labeled the non-centrality parameter (Mason and Young, age., 2002). This parameter is demonstrated as  $\lambda = nd^2$ . When the in-control mean vector  $\mu_0$  shifts to  $\mu_1 = \mu_0 + \delta$  ( $\delta \neq 0$ ), the magnitude of this shift is often expressed by

$$d = \sqrt{(\mu_1 - \mu_0)' \Sigma^{-1} (\mu_1 - \mu_0)} = \sqrt{\delta' \Sigma^{-1} \delta} \tag{5}$$

the Mahalanobis distance and  $\mu$  is the  $p$  characteristics mean vector. The subgroup statistic  $T_i^2$  then follows a non-central chi-square distribution with  $p$  degrees of freedom and non-centrality parameter  $\lambda = nd^2$ , that is  $T_i^2 \sim \chi_{(p, \lambda)}^2$ . (Rakitzis, Antzoulakos, 2011). The average run length value of Hotelling’s  $T^2$  control chart is dependent upon the mean  $\mu$  vector and covariance matrix,  $\Sigma$ , thanks to the non-central parameter demonstrated by  $d$ . In this equation,  $\mu_0$  indicates the target mean vector. It is possible to consider average run length as a function of  $d$ . We denote in-control state with  $d = 0$ , hence we have  $\alpha = P(T^2 > UCL | d = 0)$ . When the process is out of control with shift  $d \neq 0$ , hence we have  $\beta = P(T^2 < UCL | d \neq 0)$  (Faraz & Moghadam, 2009:904). Faraz and Parsian (2006) suggested that schemes result in more rapid detection of lack of control and hence, reduce the

costs associated with nonconforming products. They showed that adding an additional warning line improves the performance of  $T^2$  control chart using variable sample size and variable sampling interval scheme.

### 1.2 Average run length (ARL)

ARL of the chart is a common measure of how well a chart performs in detecting an out-of-control process. The run length is the number of the sampling stage at which the chart first signals. Woodall (1985) explained that the run length of a control procedure is the number of samples required before an out-of-control signal is given. An out-of-control signal indicates that a shift in the mean is likely to have occurred and that action should be taken to find and correct the assignable cause of this shift. We use the average run length (ARL) to measure the performance of a control procedure, although a percentage point of the run length distribution may be a more appropriate measure in some applications. Also he said that it is often not practical to detect quickly shifts from the target value which are too small to be of practical importance. The proper choice of a control procedure depends on the selection of in-control and out-of-control regions of parameter values. Woodall and Montgomery (1999) explained that ARL is a performance measure that is widely used to evaluate control charts. In the present study, in-control ARL was used to compare the performance of the control charts. ARL is defined as the average number of observations required for the control chart to detect a change under the in-control process.

Aparisi (1996) states that ARL is commonly used to compare quality control charts. ARL indicates the number of samples to be taken before a sample indicates an out-of-control event in any process. ARL is used to determine which sample in the control charts will be out of control first. ARL is expected to be a large numerical value in a control process. However, ARL is expected to be a small value to detect a shift faster when the process is out of control (Aparisi, 2007).

The average run length (ARL) for a control procedure is defined as

$$ARL = \frac{1}{p} \quad (6)$$

where  $p$  represents the probability of being outside the control region. For a process that is in control, this probability is equal to  $\alpha$ , the probability of a Type I error. The ARL has a number of uses in both univariate and multivariate control procedures. (Mason & Young, 2002). Javaheri and Houshmand (2001) determined different covariance structures using  $p$ -dimensional multivariate data. Various amount of shift in the mean vector is induced and the resulting ARL is computed. They evaluated the effectiveness of ARL by considering five different methods including Hotelling's  $T^2$ , Shewhart Control Charts, Discriminant Analysis, Decomposition Method, and Multivariate Ridge Residual Chart.

Two cases are presented for ARL. The first is that the process mean is at the targeted values which is called controlled ARL and indicated as  $ARL_0$ . The second case is when the process mean deviates – called out-of-control ARL – and indicated as  $ARL_1$ . If the process mean is at the targeted values, the signal indicated by the control chart is false. Thus, the expected ARL value should be large in this case. When the process mean deviates, the signal indicated by the control chart is correct, thus the expected ARL value should be small (Cox, 2001).

ARL can also be used to calculate the number of mean expected observations before an out-of-control signal is present in the process, in other words when the process is in control. Thus, the ARL value can be obtained using the following Eq. (7),

$$ARL_0 = \frac{1}{\alpha} \quad (7)$$

When a shift is present in the process, another use of ARL is to calculate the number of observations of the shift before the shift itself is detected. The probability of detecting any shift, and possible deviation for the  $\beta$  value is equal to  $(1-\beta)$ . The  $\beta$  value represents Type II error probability. If a shift is present, this probability deviations can be determined using standard statistical equals. The ARL for detecting the shift is given by

$$ARL_1 = \frac{1}{1-\beta} \quad (8)$$

The probability  $(1-\beta)$  represents the power of the test of a statistical hypothesis that the mean has shifted. This result produces another major use of the ARL, which consists of comparing one control procedure to another. This is done by comparing the ARLs of the two procedures for a given process shift (Mason & Young, age., 2002). As will be seen, the probability  $\beta$  is a function of the distributional parameters  $\mu$ ,  $\mu_0$ , and  $\Sigma_0$  of the

distribution of the vector of quality measurements,  $X$ , only through the value  $d$ , where  $d = \sqrt{(\bar{x} - \mu_0)' \Sigma^{-1} (\bar{x} - \mu_0)}$  with  $\mu$  the out-of-control value of the mean vector provided  $\Sigma = \Sigma_0$  (Champ and Aparisi, 2008:155).

1.3 Ranked set sampling (RSS)

Patil et al. (1999) suggested that RSS is a sampling method in which the selected units are ordered first and measurements are performed on these units later, without the necessity to measure all units; thus, the population parameters are estimated. Estimations made with this method use different characteristics such as objectivity and consistency.

In the RSS method recommended by George A. McIntyre (1952), sampling is selected by following the steps below:

- First, a random sample of size  $n^2$  units is selected from the target population, and divided randomly into the sample which consists of  $n$  sets, each of size  $n$ . The units within each set are then ranked with respect to a variable of interest.
- Units in the sets are ordered from the smallest to the largest using an inexpensive and easy measurement – so that a precise measurement is not required. This process can be visually conducted or a variable can be used for this purpose that can be measured with little expense.
- The first unit is selected from the first set – in which the units have been ordered. The second unit is selected from the second set, and the  $n^{\text{th}}$  unit is selected from the  $n^{\text{th}}$  set.
- The procedure continues in this manner until the largest unit has been selected from  $n^{\text{th}}$  set. The cycle may be repeated  $r$  times until  $nr$  units have been measured.

Samples with a size of  $n$  are taken at low size to facilitate visual ordering. For RSS, literature recommends  $n=2, 3, 4, 5$  or  $6$ . When a sample with greater size is needed, the sampling selection is performed  $r$  times to obtain an RSS with a magnitude of  $nr$ .

Balakrishnan and Cohen (1991) explained unbiased estimator of the population mean by RSS as follows:

$$\bar{X}_{SK} = \frac{1}{rn} \sum_{j=1}^r \sum_{i=1}^n X_{i[i:n]j} \tag{9}$$

To this end, we let  $X_{i[i:n]j}$  indicates the  $i^{\text{th}}$  row statistics of the  $i^{\text{th}}$  set with  $n$  magnitude at the  $j^{\text{th}}$  repetition with the assumption that no error has been made ( $j=1,2,\dots,r, i=1,2,\dots,n$ ). Ordered statistics will be different from one another in this sampling.

Variance of  $\bar{X}_{SK}$  is defined as:

$$Var(\bar{X}_{SK}) = \frac{1}{n^2 r} \sum_{i=1}^n \sigma_{(i:n)}^2 \quad \text{and} \quad \sigma_{(i:n)}^2 = E \left[ X_{(i:n)} - E(X_{(i:n)}) \right]^2 \tag{10}$$

$\sigma_{(i:n)}^2$  is the variance of the  $i^{\text{th}}$  row of statistics in a random sample with size  $n$ .

Champ and Aparisi (2008) explained sampling is a simple addition to a control chart that significantly increases the ability of the chart in detecting various changes in the process. This is the case with the sampling control chart based on Hotelling’s  $T^2$  statistics introduced with paper. They differ only in how they use the second sample to make a decision about the process.

1.4 Extreme ranked set sampling (ERSS)

In cases where the size of the sample is great, it will be easier to determine the largest and smallest units with visual ordering. Thus, ERSS design has been recommended in place of RSS in these situations.

Samawi et al. (1996) stated that ERSS was performed using the following steps:

- $n$  samples at  $n$  magnitude are randomly selected.
- Units in each set are ordered considering the variable processed with visual or inexpensive methods. It is accepted that this ordering is as good as precise measurement. Sampling selection in ERSS varies depending on  $n$  (whether it is odd or even).
- If the set size  $n$  is even, select from  $n/2$  sets the smallest unit and from the other  $n/2$  sets, the largest unit for actual measurement.

- If the set size is odd, select from  $(n-1)/2$  sets the smallest unit, from the other  $(n-1)/2$  the largest unit and from one set the median of the set for actual measurement. The cycle may be repeated  $r$  times to get  $nr$  units. These  $nr$  units from the ERSS data.

If  $n$  is even, estimator of the mean population is calculated using the sample having a size of  $n$  obtained with the ERSS equals to:

$$\bar{X}_{USK} = \frac{1}{n} \left[ \sum_{i=1}^{n/2} X_{i[1,n]} + \sum_{i=(n/2)+1}^n X_{i[n,n]} \right] \tag{11}$$

with variance

$$Var(\bar{X}_{USK}) = \frac{1}{n^2} \left[ \sum_{i=1}^{n/2} Var(X_{i[1,n]}) + \sum_{i=(n/2)+1}^n Var(X_{i[n,n]}) \right] \tag{12}$$

If  $n$  is odd, the ERSS estimator is

$$\bar{X}_{USK} = \frac{1}{n} \left[ \sum_{i=1}^{\frac{n-1}{2}} Var(X_{i[1,n]}) + X_{\frac{n+1}{2}[\frac{n+1}{2},n]} + \sum_{i=\frac{n+1}{2}+1}^n X_{i[n,n]} \right] \tag{13}$$

with variance

$$Var(\bar{X}_{USK}) = \frac{1}{n^2} \left[ \sum_{i=1}^{\frac{n-1}{2}} Var(X_{i[1,n]}) + Var\left(X_{\frac{n+1}{2}[\frac{n+1}{2},n]}\right) + \sum_{i=\frac{n+1}{2}+1}^n Var(X_{i[n,n]}) \right] \tag{14}$$

### 1.5 Median ranked set sampling (MRSS)

The median ranked set sampling (MRSS) method aims to select  $n$  random sets each of size  $n$  from the population, and rank the units within each set with respect to a variable of interest (Jabeen, 2011). Muttlak and Al-Sabah (2003) developed various quality control charts in their study to detect the deviations from the mean value using RSS, and ERSS and MRSS – which are modifications of RSS. Control charts, RSS and the modifications to RSS were used within that study, and out-of-control points were detected with smaller samples by calculating ARL values.

Muttlak (1997) suggested that MRSS yielded better results than RSS in estimating the mean population for unimodal symmetrical distributions such as normal distribution. This design is created by selecting the median values in each set. The stages of selecting the samples with MRSS are as follows:

- $n$  samples at  $n$  magnitude are randomly selected.
- Units in each set are ordered by considering the variables processed by visual or inexpensive methods. It is accepted that this order is as good as precise measurement. The sampling selection in MRSS varies depending on  $n$  (whether it is odd or even).
- If the set size  $n$  is odd, from each set select for measurement the  $((n+1)/2)$ th smallest rank. If the set size is even, select for measurement from the first  $n/2$  sets the  $(n/2)$ th smallest rank and from the second  $n/2$  sets the  $((n+2)/2)$ th smallest rank. As we can see in both cases we will get a sample of size  $n$  measured units. The cycle may be repeated  $r$  times to get  $nr$  units. These  $nr$  units form the MRSS data.

If  $n$  is even, estimator of the mean population is calculated using the sample with  $n$  size obtained with MRSS using the following equal:

$$\bar{X}_{MSK} = \frac{1}{n} \left[ \sum_{i=1}^{n/2} Var(X_{i[n/2,n]}) + \sum_{i=n/2+1}^n Var(X_{i[(n/2)+1,n]}) \right] \tag{15}$$

with variance

$$Var(\bar{X}_{MSK}) = \frac{1}{n^2} \left[ \sum_{i=1}^{n/2} Var(X_{i[n/2,n]}) + \sum_{i=n/2+1}^n Var(X_{i[(n/2)+1,n]}) \right] \tag{16}$$

If  $n$  is odd, the MRSS estimator is



$$\bar{X}_{MSK} = \frac{1}{n} \left[ \sum_{i=1}^n X_{i \frac{1}{n+1}}, n \right] \tag{17}$$

with variance

$$Var(\bar{X}_{MSK}) = \frac{1}{n^2} \left[ \sum_{i=1}^n Var \left( X_{i \left[ \frac{n+1}{2}, n \right]} \right) \right] \tag{18}$$

**2. Application**

Statistical process control was performed in a cement plant using Hotelling’s  $T^2$  quality control chart, one of the multivariate statistical process control methods. During the application, silicon oxide (SiO<sub>2</sub>), aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), calcium oxide (CaO) and Sulphur oxide (SO<sub>3</sub>), chemicals that affect the quality of the cement produced in the plant, and endurance (N/mm<sup>2</sup>) data were collected over 28 days.

Although there are plenty of variables that affect the quality of the cement, five variables with high correlation rates were used within the study. Thus, a dataset with 100 samples was obtained from the above-mentioned variables. Multivariate statistical process control was performed using these variables.

Samples were selected from the manufacturing process using SRS, RSS, ERSS and MRSS methods, and recursion was performed 10,000 times using the simulation method. The mean of these recursions was calculated using Hotelling’s  $T^2$  statistics. ARL values were calculated with different sampling methods and compared to one another to see how successfully they detected deviations in the process mean.

*2.1 Comparing SRS, RSS, ERSS and MRSS Methods with ARL*

The ARL value was determined for Hotelling’s  $T^2$  quality control chart. The real data were collected using the SRS, RSS, ERSS and ERSS in cases of perfect and imperfect ranking to make this determination. SRS, RSS, ERSS and MRSS methods were used in each recursion, and samples were taken at a size of  $n=3$  and  $n=4$ . The ARL value was calculated to be  $1/0.0027=370$  the process in control conditions. Therefore, we realized that the control chart gives an out-of-control signal approximately once every 370 samples when the process is in control. Each method was revised in a way to make the ARL value approximately 370 when the process was in control. Each deviation valued was determined to be 0, 0.50, 1.00, 1.50, 2.00, 2.50, 3.00, 3.50 and 4.00, respectively. Hotelling’s  $T^2$  control chart values for SRS, RSS, ERSS and MRSS methods are presented in Table 1 and 2 for  $p=3, n=3$  and  $p=4, n=4$ . In addition, a certain shift magnitude and different upper control line for the  $p$  variables were presented too, to ensure that ARL is equal to 370 when the process is in control.

The ARL values of Hotelling’s  $T^2$  control chart are presented in Table 1 for  $p=3$  and  $n=3$  sampling size and for different of  $d$ .

**Table 1. Comparison of the ARL for  $p=3$**

$d$	$T^2$			
	$CL=X^2_{\beta; 0,0027}$			
	SRS	RSS	ERSS	MRSS
0.00	370.37	368.18	368.18	368.59
0.50	156.25	151.16	165.77	134.45
1.00	43.86	40.80	40.80	33.22
1.50	14.97	15.07	15.07	14.98
2.00	6.31	6.25	6.24	6.05
2.50	3.24	3.46	3.31	3.16
3.00	1.98	1.99	1.98	1.07
3.50	1.37	1.36	1.36	1.00
4.00	1.02	1.01	1.00	1.00

CL=central line; SRS=simple random sampling; RSS=ranked set sampling; ERSS=extreme ranked set sampling; MRSS=median ranked set sampling

As presented in Table 1, the ARL was found to be 134 for MRSS for a small shift magnitude of  $d=0.5$ . The MRSS method determined whether or not the process was an out-of- control with the smallest samples. Thus, a

small ARL value indicates that MRSS is more effective than other methods in the early detection of shifts with smaller samples.

Table 2 presents ARL values of Hotelling’s  $T^2$  control charts for different  $d$  for four different quality variables:  $Al_2O_3$ ,  $CaO$ ,  $SO_3$  and endurance ( $N/mm^2$ ) data over 28 days, ordered in relation to type II variable ( $SiO_2$ ) and an  $n = 4$  sampling size.

**Table 2. Comparison of the ARL for  $p=4$**

$d$	$T^2$			
	$CL=X^2_{4, 0.0027}$			
	SRS	RSS	ERSS	MRSS
0.00	369.23	365.06	370.23	370.64
0.50	158.68	144.94	150.08	138.29
1.00	44.01	40.26	43.03	38.08
1.50	14.49	13.84	13.82	12.89
2.00	6.35	6.28	6.66	5.93
2.50	3.19	3.21	3.21	2.95
3.00	1.95	1.97	1.97	1.04
3.50	1.34	1.25	1.26	1.00
4.00	1.22	1.00	1.00	1.00

CL=central line; SRS=simple random sampling; RSS=ranked set sampling; ERSS=extreme ranked set sampling; MRSS=median ranked set sampling

The researcher used the sampling methods in Table 2 to calculate the average number of samples that should be taken to determine whether or not the process is out-of-control at a sampling size of  $n=4$ . The ARL values were calculated as well. The researchers took the small shift values into consideration to see the magnitude of the samples that would be created for determining any out-of-control incidence with the assistance of Hotelling’s  $T^2$  control chart. Thus, as the table shows, the smallest sampling value to ensure a small shift magnitude of  $d=0.5$  is achieved by MRSS. It is clear that whether or not the process is out-of-control will be determined by taking approximately 138 samples. It is fair to say that the MRSS method is more effective than other methods in the early detection of whether or not the process is an out-of-control when using these magnitudes.

In the event that the process is in control – in other words if the magnitude value  $d$  is equal to zero – it is clear that the number of out-of-control signals does not increase when RSS, SRS, ERSS and MRSS methods are used. However, small declines are detected in ARL values.

Table 1 demonstrates that ARL values for  $n = 3$  and  $p = 3$  using SRS, RSS, ERSS and MRSS methods are 370, 368, 368 and 368, respectively. It also indicates that when the magnitude of the deviation in the mean process is  $d=0.5$  for  $n=3$  and  $p=3$ , the ARL values are equal to 156, 151, 165 and 134, respectively. These numbers are the approximate numbers of samples to be taken for ARL to detect for a small shift magnitude of 0.5. It is clear that the RSS method will detect the out-of-control point faster with fewer samples when compared with SRS. However, it is fair to say that MRSS is the most effective method, using the least number of samples compared to the other methods.

The researcher used the sampling methods in Table 2 to calculate the average number of samples that should be taken to determine whether or not the process is out-of-control at a sampling size of  $n=4$ . The ARL values were calculated as well. The researchers took the small shift values into consideration to see the magnitude of the samples that would be created for determining any out-of-control incidence with the assistance of Hotelling’s  $T^2$  control chart. Thus, as the table shows, the smallest sampling value to ensure a small shift magnitude of  $d=0.5$  is achieved by MRSS. It is clear that whether or not the process is out-of-control will be determined by taking approximately 138 samples. It is fair to say that the MRSS method is more effective than other methods in the early detection of whether or not the process is an out-of-control when using these magnitudes.

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2.2 Comparing SRS, RSS, ERSS and MRSS Methods Using Hotelling's  $T^2$  Control Charts

Sampling is performed with each method to obtain the values of the variables displaying normal distribution with the simulation application to find the upper control line (UCT) value. Hotelling's  $T^2$  control chart will generate an out-of-control signal if  $T^2$  is greater than UCL. Data may be generated from standard multivariate normal distribution by simulation. Data are ordered after being chosen for the population. Estimated values for the ordered data are recurred 10,000 times, and only the mean value is calculated.

Hotelling's  $T^2$  values are calculated separately for SRS, RSS, ERSS and MRSS methods at the end of this recursion. Following this calculation, the method(s) having the most stable orientation is determined. Hotelling's  $T^2$  control chart construction with  $n=3$  and  $n=4$  sampling size is presented in Charts 1 and 2.

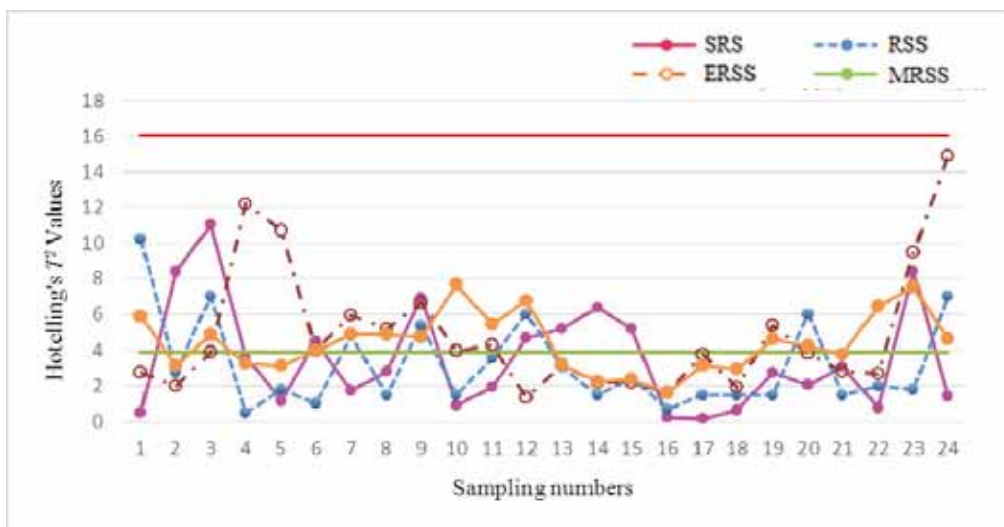


Figure 1. Hotelling's  $T^2$  control chart for SRS, RSS, ERSS and MRSS at  $n=3$

The chart demonstrates that all observation data selected with the four different methods are in the upper control line; in other words, the process is in control.

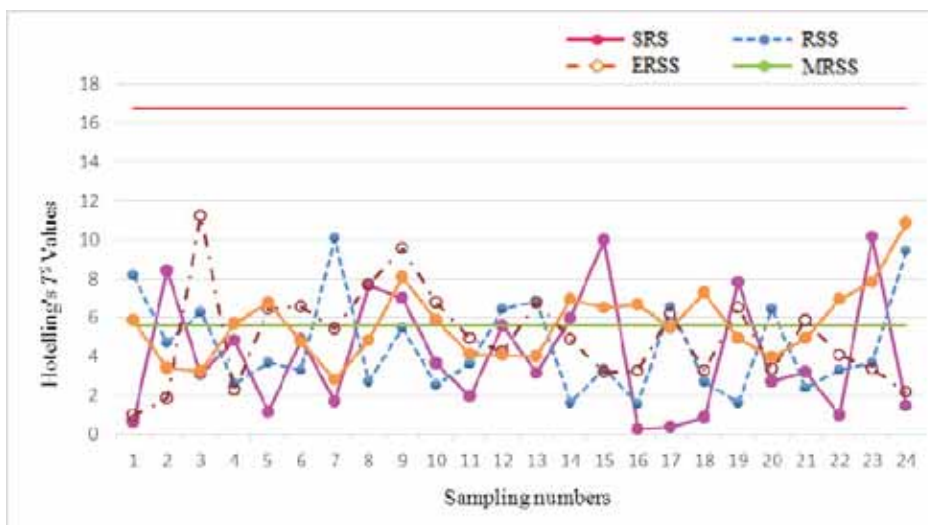


Figure 2. Hotelling's  $T^2$  control chart for SRS, RSS, ERSS and MRSS at  $n=4$

After the upper control line is calculated for the SRS, RSS, ERSS and MRSS methods for these control charts, it becomes clear that the data observed when Hotelling's  $T^2$  control chart is drawn are all in the line for each of the four methods. Although the process appears to be in control, it is seen that observation values obtained with the

SRS method are inclined to send an out-of-control signal. This is due to the fact that the observation values obtained with the SRS method give signals that are close to zero, the lower limit. The reason why the lower line is placed at zero is that an increase is seen in the  $T^2$  value when a shift is present in the process mean, and this causes the lower line to lose its importance. However, the  $T^2$  value is sensitive not only to shifts in the mean vector but also to switching in the covariance matrix. However, if the covariance matrix changes, abnormally small  $T^2$  values may be seen. Thus, the lower line point is set at zero to detect these small switches. But, it is fair to say that MRSS has a more systematic approach compared to the other methods since a couple of consecutive points always display an increase or a decline.

### 3. Conclusions

Today, multivariate statistical process control methods have become highly important in addition to the sampling methods that would be used to create sample units that would enable determining whether these processes are under control. Sampling was performed using simple random sampling, ranked set sampling, extreme ranked set sampling and median ranked set sampling methods, and Hotelling's  $T^2$  control charts – multivariate statistical process control methods – were created. The performances of the sampling methods were compared to one another using these control charts. Extensive simulation study has shown that multivariate control charts method is superior to Hotelling  $T^2$  method, sampling methods, and multivariate methods in terms of ARL performance, especially when the magnitude of shift is small. The main problem with the multivariate control charts method is, when there is a shift in more than one variable, this method not only does not catch the shift and shows that the process is in control. Also when the magnitude of shift is more than three sigma, this method gives false alarm. And in this study they differ only in how they use of the sampling methods to make a decision about the process. The ranked set sampling has been demonstrated to be an efficient sampling method. The RSS method proved to be more efficient when units are difficult and costly to measure, but are easy and cheap to rank with respect to a variable of interest without actual measurement. In this study, we used Hotelling's  $T^2$  control chart for SRS, RSS, ERSS and MRSS. Data may be generated from standard multivariate normal distribution by simulation. What's more, its modifications to develop several multivariate quality control charts for the variables of interest using the sample mean. It is clear that all the newly developed for multivariate control charts are more efficient than classical control chart, but some of them are better than others.

When a correlation was present between the variables of multivariate processes, out-of-control signals were detected when sampling was performed using RSS and MRSS methods and Hotelling's  $T^2$  control chart was created, but this signal was not detected with other sampling methods. In addition, any shift in the process was detected earlier with the use of MRSS when methods were compared to one another for their ARL values. Therefore, the researcher suggests that the MRSS method should be used to determine the shifts in the process in a timely manner since this method is more effective than the others. It enables calculating the ARL value in advance to see the number of the samples to be formed for the determination of the possible shifts in the process, and making an approximate estimation of the size of these shifts.

The results show that the sampling plan to be applied is a function of the magnitude of the process shift. For small process shifts, we should employ large sample sizes infrequently, and for large process shifts, a small sample size should be taken very frequently. This sampling method will help detect the defective products in time, and minimize the cost and loss for establishments.

### References

- Aparisi, F. (1996). Hotelling's  $T^2$  Control Chart with Adaptive Sample Sizes. *International Journal of Production Research*, 34(10), 2853-2862. <https://doi.org/10.1080/00207549608905062>
- Aparisi, F., Champ, W. C. ve Diaz, G. C. J. (2004). A Performance Analysis of Hotelling's  $T^2$  Control Chart with Supplementary Runs Rules. *Quality Engineering*, 16(3), 359-368. <https://doi.org/10.1081/QEN-120027938>
- Aparisi, F. (2007). Sampling Plans for the Multivariate  $T^2$  Control Chart. *Quality Engineering*, 10(1), 141-147. <https://doi.org/10.1080/08982119708919117>
- Balakrishnan, N., & Cohen C. (1991). *Order statistics and inference: estimation methods*. San Diego: Academic Press.
- Başar, A., & Oktay, E. (2001). *Applied Statistics I*, Erzurum: Aktif Publisher, 10th Edition.
- Burnak, N. (1997). *Total Quality Management-Statistical Process Control*. Osmangazi University Ed., Eskişehir.
- Champ, W. C., & Aparisi, F. (2008). Double Sampling Hotelling's  $T^2$  Charts. *Quality and Reliability Engineering International*, 24, 153-166. <https://doi.org/10.1002/qre.872>

- Costa, Antonio F. B. (1994).  $\bar{X}$  Charts with Variable Sample Size. *Journal of Quality Technology*, 26(3), 155-163.
- Cox, M. A. A. (2001). Towards The Implementation of a Universal Control Chart and Estimation of Its Average Run Length Using a Spreadsheet: An Artificial Neural Network is employed to Model the Parameters in a Special Case. *Journal of Applied Statistics*, 28(3), 353-364. <https://doi.org/10.1080/02664760120034090>
- Eygü, H. (2015). Application of Multivariate Statistical Process Control in Cement Industry. *Journal of Business Economics and Political Science*, 4(8), 67-82.
- Faraz, A., & Parsian A. (2006). Hotelling's  $T^2$  Control Chart With Double Warning Lines. *Statistical Papers*, 47, 569-593. <https://doi.org/10.1007/s00362-006-0307-x>
- Faraz, A., & Moghadam, M. B. (2009). Hotellin's  $T^2$  Control Chart with Two Adaptive Sample Sizes. *Quality & Quantity* 43(6), 903-913. <https://doi.org/10.1007/s11135-008-9167-x>
- Jabeen, S. (2011). Ranked Set Sampling And its Application in Quality Control, Master of Philosoph, Srinagar: Post-graduate Department of Statistics University of Kashmir, 54-61.
- Javaheri, A. ve Houshmand A. A. (2001). Average Run Length Comparison of Multivariate Control Charts. *Journal of Statistical Computation & Simulation*, 69, 125-140. <https://doi.org/10.1080/00949650108812086>
- Işığıcı, E. (2012). *Statistical Quality Control in Terms of Total Quality Management* (2rd ed.). Bursa: Ezgi Bookstore Publications.
- Kumpas, S. (2006). *Standard  $\bar{X}$ -R Graphics with  $\bar{X}$ -R Sampled in Two Stages Evaluation of Graphics Performance with ARL (Average Run Length) Help*. İstanbul Univ. Graduate School of Social Sciences.
- Patil, G. P., Sinha, A. K., & Taillie, C. (1999). Ranked set sampling. A Bibliography. *Environmental and Ecological Statistics*, 6, 91-98. <https://doi.org/10.1023/A:1009647718555>
- Pongpullponsak, A., & Sontisamran, P. (2013). Statistical Quality Control Based on Ranked Set Sampling for Multiple Characteristics. *Journal of the Science Faculty of Chiang Mai University*, 40(3), 485-498.
- Rakitzis, C. A., & Antzoulakos, L. D. (2011). Chi-square Control Charts with Runs Rules. *Methodol Computing in Applied Probability*, 13(4), 657-669. <https://doi.org/10.1007/s11009-010-9178-7>
- Mason, R. L., Tracy, N. D., & Young, J. C. (1995). Decomposition of for Multivariate Control Chart Interpretation. *Journal of Quality Technology*, 27(2), 99-108.
- Mason, R. L., & Young, J. C. (2002). *Multivariate Statistical Process Control with Industrial Applications*, ASA-SIAM Series on Statistics and Applied Probability. <https://doi.org/10.1137/1.9780898718461>
- McIntyre, G. A. (1952). A Method of Unbiased Selective Sampling Using Ranked Sets. *Australian Journal of Agricultural Research* 3, 384-390. <https://doi.org/10.1071/AR9520385>
- Montgomery, D. C. (2009). *Introduction to Statistical Quality Control* (6th ed.), New York: John Wiley.
- Muttlak, H. A. (1997). Median ranked set sampling. *Applied Statistical Science*, 6(4), 245-255.
- Muttlak, H. A., & Al-Sabah, W. S. (2003). Statistical Quality Control Based on Ranked Set Sampling. *Journal of Applied Statistics*, 30(9), 1055-1078. <https://doi.org/10.1080/0266476032000076173>
- Samawi, H. M., Ahmed, M. S., & Abu-Dayyeh. (1996). Estimation the Population Mean Using Extreme Ranked Set Sampling. *Biometrical Journal*, 38(5), 577-586. <https://doi.org/10.1002/bimj.4710380506>
- Schwertman, C. N., Ryan p.T. ve Adnan, R. (2002). A Multivariate Control Chart for Expected Changes Over Time. *Quality Engineering*, 15(2), 275-280. <https://doi.org/10.1081/QEN-120015859>
- Woodall, W. H. (1985). The Statistical Design of Quality Control Charts. *Journal of the Royal Statistical Society. Series D (The Statistician)*, 34(2), 155-160. <https://doi.org/10.2307/2988154>
- Woodall, W. H., & Montgomery, D. C. (1999). Research Issues and Ideas in Statistical Process Control. *Journal of Quality Technology*, 31(4), 376-386.

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# Emptiness and the Eight Consciousnesses: Toward a Deeper Understanding of Intuitive Judgment

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## Abstract

This paper empirically investigates whether emptiness (according to the Mādhyamaka school) has a positive association with the intuitive judgment that results from the eight consciousnesses (according to the Vijñānavāda school). A questionnaire-based quantitative approach was used to collect data from 157 professional spirit mediums. The results show that emptiness is significantly correlated with pure brightness and that pure brightness is, in turn, is significantly associated with intuitive judgment. Therefore, this paper argues that emptiness can improve or enhance the eight consciousnesses in making moral decisions. Finally, for the gap between moral judgment and action, this research provides new insight by asserting that this gap must have existed *a priori*.

**Keywords:** emptiness, eight consciousnesses, intuition, intuitive judgment

## 1. Introduction

### 1.1 Background

The Mahāyāna stream of Chinese Buddhism often distinguishes between the Mādhyamaka and Vijñānavāda, taking the former as exclusively acknowledging all phenomena of emptiness (*śūnyatā*) (Kaag, 2012) and the latter as concentrated single-mindedly on the ideation (*vijñaptimātra*) of the universe (Nedu, 2015). The concepts of the main subjects of the investigations of these schools are assumed to be in conflict (Duckworth, 2014), since the idea of emptiness is not at all present in the teachings of the Vijñānavādaschool and idealism is absent from those of the Mādhyamaka (King, 1994). Although they are distinct, these two discourses are also closely intertwined, for Vijñānavāda practitioners only analyze and describe how human experience is constructed by the mind to serve, pragmatically, the abstruse aims of the Mādhyamaka: the Prajñāpāramitā state that people undergo in attaining emptiness and freedom from cognitive obscurations and emotional obsessions (Waldron, 2006). However, one must also recognize that there was an essential development in the hermeneutics of the doctrine of emptiness in Vijñānavāda (King, 1994). This event surfaced critical issues in the effect of emptiness in Vijñānavāda. However, until recently, empirical research on the role of emptiness in Vijñānavāda was almost non-existent.

According to the Vijñānavāda school, conceptual knowledge appears at the level of mental consciousness (the sixth consciousness), which, in its turn, is determined by *manas* consciousness (the seventh consciousness). Because *manas* consciousness is responsible for the misconception of the individual self, this error will also characterize any form of conceptual knowledge that appears at the level of mental consciousness. Thus, the theory of the conditioning of decision-making states that this conditioning is affected by two factors: *manas* consciousness of individuality and the seeds of *ālayavijñāna* (the eighth consciousness) (Nedu, 2015).

### 1.2 Objectives

This paper empirically investigates whether emptiness has a positive association with the intuition that results from the eight consciousnesses (*viz.* Vijñānavāda). This analysis can provide much edification for inducing morally intuitive decisions. This task is especially challenging, because of the unfamiliarity of most readers of English with Buddhist philosophy. The research result may shift modes of thought and lead to profound differences in how we make decisions from intuition. This paper will address the concept of Vijñānavāda before describing the empirical experiments.

## 2. Literature Review

### 2.1 Emptiness (*Śūnyatā*; Sanskrit)

Mādhyamaka and Yogācāra (called Vijñānavāda in China) represent two schools of Mahāyāna Buddhism. During the seventh century, after the famous pilgrim Tripitaka Master Xuanzang (玄藏, AD 602–664) introduced a new corpus of canonical Buddhist texts, Mādhyamaka and Yogācāra were considered doctrinally contradictory to each other in the polemic circumstance of Emptiness–Existence (i.e., *kongyou* 空有) and the Buddha nature (Lee, 2016). A comprehensive explication of the notion of emptiness, as found in the philosophical literature of the Mādhyamaka school, provides a doctrinal key to unlock the deep meanings of the Prajñāpāramitā sutras (King, 1994). In the *Heart Sutra* (心經), the phrase of Prajñā-paramita implies that five aggregates of being are all empty (照見五蘊皆空), and emptiness here signifies that nothing has an independent, “Ego-nature” or “Ego-appearance” of its own (Cheng Kuan, 2015). Although Yogācārins maintained that there was something given in experience, namely, a non-objective perception, Yogācāra accepts *śūnyatā* (i.e., emptiness) (King, 1994). Thus, it is difficult to ignore the centrality of the notion of *śūnyatā* to Vijñānavāda.

*Śūnyatā* can indicate the empty, emptiness, empty space, sky, among other meanings. If *śūnyatā* is used in a cosmological sense (as empty space), it is not congruent with the ontological concept of emptiness (*śūnyatā*, lack of inherent existence) as employed in Mahāyāna philosophy or Daoist mystery (Eskildsen, 2015). *Śūnyatā* is a specialized term in Buddhism. Precisely, it signifies that nothing has an independent ego-nature or ego-appearance of its own, because everything is constituted from various amalgamated parts, and these elements are interdependent and inter-related, forming an “apparent whole,” which does not remain intact for even a short duration and is subject to the law of inconstancy. Everything changes from instant to instant, and, therefore, its ultimate ego-nature is ungraspable and unobtainable. Because the ego-appearances of things are unobtainable, it is said that the ego-nature of all beings is empty (Venerable, 2005). In other words, substances and phenomena have no fixed, unchangeable, eternal existence or “self” (Chan, 2015).

When the mind is thoroughly emptied and made calm, it merely observes things as they are without imposing its own biases and wishes. Perhaps when one observes stuff around one and calmly for what they are, one realizes that it is essential to the nature of all things to flourish and decline (Eskildsen, 2015). This situation is called pure brightness.

Pure brightness is expressed by the great concern for the spirit mediums’ purity of mind. So as not to interfere with the flow of the god’s thoughts, medium’s mind has to be calm, clear and obvious of its self (Clart, 2003).

### 2.2 Eight Consciousnesses

The basic concept of Vijñānavāda is that everything is created from the mind as ideation (*viññaptimātra*). Vijñānavāda uses the eight consciousnesses to explain the workings of the mind and the way it constructs the reality we experience (Clark, 2011). The doctrine of *Verses Delineating the Eight Consciousnesses* is used to explain each level of consciousness in this paper. *Verses Delineating the Eight Consciousnesses* (八識規矩頌), by Tripitaka Master Xuanzang (玄藏, AD 602–664), is a summary of the doctrine contained in Xuanzang’s most celebrated work, *Treatise on Consciousness Alone* (成唯識論).

#### 2.2.1 Sixth consciousness (mental consciousness).

The first five consciousnesses are the physical senses (those instantiated in the eye, ear, nose, tongue, and body), and the sixth consciousness is mental consciousness (Clark, 2011). These five senses, accompanied by their objects, are posited by valid, straightforward cognition, solely using bodily sense faculties (Berzin, 2013). Mental consciousness distinguishes all incoming data. Since the first five consciousnesses always arise together with mental consciousness, it and all the sense data are fed into the seventh consciousness (*manas*) (Clark, 2008). The character or nature of these six consciousnesses can be good, evil, or neutral (Tripitaka Master Xuanzang, 1998). On mental consciousness, it is stated in the *Verses*, “Whenever it is wholesome or unwholesome, they make distinctions and accompany it. The basic and subsidiary afflictions together with faith and other wholesome dharmas always arise jointly with the sixth consciousness.” The primary function of mental consciousness is to make distinctions, such as between good and evil or between long and short. According to *Vasubandhu*, the fundamental afflictions are greed, anger, stupidity, arrogance, doubt, and improper views. Because these primary afflictions always come together, mental consciousness colors the incoming sense data and interprets it through the senses (Clark, 2011).

#### 2.2.2 Seventh consciousness (manas consciousness).

The first six consciousnesses are separated and involve the quick registration of sense impressions. *Manas* coordinates thoughts and sensory information received from the first six consciousnesses and is capable of

reflecting, considering, and making judgments (Clark, 2011). In other words, conceptual knowledge appears at the level of mental consciousness, which is determined by *manas* consciousness (Nedu, 2015). The nature of *manas* is neutral but obscuring; therefore, *mana* will be innately contaminated by defiling afflictions (Tripitaka Master Xuanzang, 1998).

The *Verses* state, “The eight derivative afflictions, the five universal interactions, the judgment of the particular states, greed, anger, doubt, and improper views all interact and accord with it... It continuously focuses its mental activity on inquiry which results in the characteristic that is self.” The eight derivative afflictions are “lack of faith, laziness, laxness, torpor, restlessness, distraction, improper knowledge, and scatteredness.” Greed, anger, doubt, and improper views are four of the six primary afflictions. These eight derivative afflictions and four fundamental afflictions always interact with *manas*. Its primary function is to make judgments, which involves decision making based wholly on worldly knowledge, which is defiled by the self (Tripitaka Master Xuanzang, 1998). At the level of *manas*, the delusion of *I* arises, because this reflects the illusion that there is someone inside who is in charge, making decisions, acting on my preferences, and consciously pursuing my choices (Clark, 2008).

### 2.2.3 Eighth consciousness (*ālayavijnāna*).

The eighth consciousness, whose nature is a non-obscuring neutral, always arises together with the seventh consciousness (Tripitaka Master Xuanzang, 1998). *Ālayavijnāna* means the storehouse or seed consciousness, which induces transmigration or rebirth, causing the origination of a new existence (Clark, 2008). *Ālayavijnāna* receives impressions from all the functions of the other consciousnesses and accumulates potential energy for the mental and physical manifestation of life (Berzin, 2013). According to the traditional interpretation, the other seven consciousnesses are evolving or transforming consciousnesses, originating in this seed consciousness. *Ālayavijnāna* is a complexly conditioned mode of cognitive awareness that simultaneously supports and informs all occurrences of manifest consciousness (Siderits, 2005). Although it is initially immaculate in itself, *ālayavijnāna* contains a mysterious mixture of purity and defilement, good and evil. Because of this mix, the transformation of consciousness from defilement to purity can take place (Waldron, 2008).

### 2.2.4 Ninth consciousness (*amalavijñāna*).

*Amalavijñāna* is the immaculate consciousness. This pure consciousness is identified with the nature of reality. Alternatively, *amalavijñāna* may be considered the real aspect of *ālayavijnāna* (Buswell & Lopez, 2013). The concept of *amalavijñāna* ultimately derives from Tathagatagarbha thought, which similarly emphasizes the inherent purity of mind (Buswell, 1989). The intrinsic Buddha nature is called the Tathagatagarbha. According to the *Sutra of Queen Srimala of the Lion's Roar* (勝蔓經), Tathagatagarbha is eternal, unchanging, and inherently pure. If there were no Tathagatagarbha, there would be no aspiration to seek nirvana. Tathagatagarbha signifies that everyone can be Buddha. The discovery of *amalavijñāna* clears away defilements and wrong views to find the emptiness that is the source of Tathagatagarbha (Clark, 2008).

## 2.3 Hypothesis

### 2.3.1 Three Types of Intuition

Freud divided the mind into the conscious mind and the unconscious mind. Jung then split the unconscious into two layers: the personal unconscious and the collective unconscious. In introducing Buddhist concepts to Western audiences, Waldron (2006) found it useful to consider the conception of the *ālayavijnāna* as a form of Jung's collective unconscious, according to which the world is constructed through a shared language (Siderits, 2005). This paper borrows Jung's concept of intuition to express *manas*, *ālayavijnāna*, and *amalavijñāna*.

- **Personal experience intuition (manas consciousness).** The personal unconscious consists of complexes and individuals' experience (Jung, 1981). A complex is a core pattern of emotion, memories, perceptions, and wishes (Shultz & Shultz, 2009). **The personal unconscious has a similar function to *manas-vijñāna*** (Pine, 2013). Intuition from *manas* consciousness is labeled own experience intuition. Because of affliction and self-delusion, this intuition cannot make proper moral judgments.
- **Collective archetype intuition (*ālayavijñāna*).** The archetype is one element of the collective unconscious. Archetypes are unclear underlying forms from which emerge images and motifs. History, culture and personal context shape these manifest representations (Jung, 1981). Intuition from *ālayavijñāna* can be called an intuition of the collective archetype. Because of karma, this intuition cannot make proper moral judgments.
- **Collective universal intuition (*amalavijñāna*).** Another component of the collective unconscious is the universal image (Raff, 2000). The universal image is an essential thing: the most far-fetched mythological motif and symbol (Jung, 1981). Intuition from here is labeled collective universal intuition. Immaculate and



pure collective universal intuition is similar to Tathagatagarbha, which represents the core concept of *amalavijñāna*.

### 2.3.2 Hypotheses

Based on the relevant literature, the results of the studies presented above, and essential variables identified by previous research on ethics, the following hypotheses are proposed concerning the association between emptiness and intuitive judgment.

- H1. Emptiness is positively associated with pure brightness.
- H2. Pure brightness is positively associated with personal experience intuition.
- H3. Pure brightness is positively associated with collective archetype intuition.
- H4: Pure brightness is positively associated with collective universal intuition.

## 3. Methods

### 3.1 Samples

Unlike other studies that have taken students or managers as samples, this study examined particular spirit mediums. This was done for the following reason. First, mediumship indicates the ability to communicate with the souls of the dead in spiritualist sessions. The function of intuition in the intermediary state unites mediums and intermediary beings (Pilard, 2015). Since the spirit medium's experience helps others understand unconscious and conscious psychology, spirit mediums are an essential subject for the new psychology (Shamdasani, 2009). Second, according to Fontein (2006), the performances of spirit mediums can involve "responding to, and engaging with, the social, political, and moral expectations of those around them." Also, spirit mediums may have a more profound enlightenment of emptiness than most. The performance of Taiwanese spirit mediums derives from beliefs and practices from Daoism, Buddhism, and Confucianism (Marshall, 2003). They offer a direct conversation with the gods and offer practical or personal advice (Cline, 2010). More studies of Taiwan spirit mediums can be found in Sutton (1989, 1990, 2003), Paper (1995, 1996), Clart (1996, 2003), Nickerson (2001), and Marshall (2004).

### 3.2 Setting

Members of the Taiwan Mediums' Association, founded in 1989, were contacted and invited to participate in the survey. The help of the association allowed the researchers to reach a population that is widely dispersed geographically and difficult to achieve through the conventional survey method; 200 questionnaires were sent to 200 spirit mediums, each living in a different area in Taiwan. In all, 157 responded with completed questionnaires that could be used in the analyses, and 43 responses did not include answers to all items well, and thus we did not use these 43 reactions in our study. This response rate was 78.5% (157 out of 200). Because Loehl in (2004) has the requirement that the least number of samples should be over 100, our 157 responses match the minimum requirement for structural equation modeling (SEM).

### 3.3 Design and measures

This survey-based approach used one questionnaire to assess emptiness, pure brightness, and three types of intuition (see appendix). The questionnaire items were responded to on a five-point Likert-type scale: agree strongly (5), agree (4), not certain (3), disagree (2), and disagree strongly (1). The definition of each variable is as follows:

- **Pure brightness.** Pure brightness means that the mind is clear or free of any thoughts that would confuse the mind during decision-making. It also means that the mind is calm, without any emotions to agitate it (Eskildsen, 2015). This was measured using six items (see appendix).
- **Emptiness.** *Śūnyatā* means emptiness or vacuity, a highly specialized term in Buddhism. Specifically, it signifies that nothing has an independent ego-nature or ego-appearance of its own. It was measured using five items (see appendix).
- **Personal experience intuition, collective archetype intuition, and collective universal intuition.** These three types of intuition were measured using four items in PEI and three items in CAI and CUI (appendix). The reason we adopted the term clairvoyance in the collective universal intuition is that it resembles the highest faculty that has access to some ultimate reality (Pilard, 2015).

### 3.4 Procedure

Similar to the samples used by Giacalone and Jurkiewicz (2003) and Ayoun, Rowe, and Yassine (2015), the

snowball sampling technique, often used for hidden populations that are difficult for researchers to access, was employed. To ensure that a good sample would be obtained, the initial distribution of the surveys specifically targeted the Mediums’ Association, with the request that recipients pass it on to others who might be interested. Any survey forwarded to expand the sample had a good chance of reaching valid respondents, as the target population was sufficiently diversified (spread throughout Taiwan) to accommodate minor variations in dissemination. Furthermore, as an extra precaution, one question in the survey requested the respondent’s job title, to ensure that he or she was a spirit medium in a top position. Another benefit of snowball sampling in this study was that it might have encouraged participation. A survey that measures sensitive subjects, such as spirituality and ethics, may be received better from a friend or familiar colleague than an outsider.

### 3.5 Ethical Considerations

Items in the questionnaire were created by previous studies (see appendix). Before implementing the survey, the questionnaire was approved by the Chairman of the Taiwan Mediums’ Association (Mr. Gao, Tian-Wen). The participants in this questionnaire are anonymous. Because the survey was anonymous and participants were not identified by name, this project presented no foreseeable risk to participants. Participants were told that their participation is voluntary and that they can decline to answer specific questions or to end their involvement at any time without penalty. The participants were aware of that the results of this study could be published in professional and social journals. Participants were also informed that the results could also be used for educational purposes or presentation. However, no individual subject will be identified. The questionnaire was approved by the College of Business in Feng-Chia University (NO.20111018P9945756).

### 3.6 Analysis

The data were analyzed with the SPSS package, using reliability, correlation, and regression. Also, SEM and the Rival Model were also used to test validity and model fit (Hancock, 2015). The use of SEM is commonly justified in the social sciences because of its ability to impute relationships between unobserved constructs (latent variables) from observable variables (Loehlin, 2004). Table 1 shows the ideal value of the model fit index in SEM. Also, once the researcher is confident that a plausible hypothesis supports the inferred relationship, he must then rule out the plausibility of rival hypotheses (Campbell & Stanley, 1963) and models. If the model survives to this point, it may be reasonable to conclude, probabilistically, that a causal relationship has been demonstrated (McCoach et al., 2007).

Table 1. Idea value of model fit index (Bollen & Long, 1992)

$\chi^2$		Smaller is better
$\chi^2/df$		1–5
GFI	Goodness-of-fit index	>0.8
AGFI	Adjusted goodness-of-fit index	>0.8
PNFI	Parsimony-adjusted normed fit index	>0.5
CFI	Comparative fit index	>0.9
RMR	Root mean square residual	<0.08
RMSEA	Root mean square error of approximation	<0.08

## 4. Results

### 4.1 Reliability and Validity

#### 4.1.1 Reliability

All the measures were analyzed for reliability and validity. The appendix contains measured characteristics and sample measurement items. Nunnally (1978) stated that Cronbach’s  $\alpha$  denotes high reliability if it is between 0.7 and 0.98. If Cronbach’s  $\alpha$  is above 0.5, the research findings should be regarded as significant. If Cronbach’s  $\alpha$  is under 0.35, the research should be rejected (Hair, Anderson, Tatham, & Black, 1992). Cronbach’s  $\alpha$  was 0.682 for emptiness, 0.740 for pure brightness, 0.801 for personal experience intuition, 0.519 for collective archetype intuition, and 0.686 for collective universal intuition. Cronbach’s  $\alpha$  for the total 21 items was 0.857. All were over the 0.5 standard value. Therefore, the results of this survey should be considered reliable.

#### 4.1.2 Validity

- **Content Reliability:**

This paper adopts the relevant references as the research basis, cooperating with an expert spirit medium to discuss, make, pre-test, and re-correct the questionnaire. Therefore, this study should reach content validity.

• **Composite Reliability:**

Confirmatory factor analysis was used to test validity. The composite reliability values of emptiness, pure brightness, personal experience intuition, collective archetype intuition, and collective universal intuition were 0.727, 0.744, 0.805, 0.534, and 0.824, respectively. All were more than 0.5, which showed that they had good construct validity (Raines-Eudy, 2000).

4.2 Correlation

The variables for emptiness, pure brightness, personal experience intuition, collective archetype intuition, and collective universal intuition were analyzed using a correlation analysis. Demographic variables for age, years of experience and number of students were also included. Correlation analysis (Table 2) indicated that emptiness had strong correlations with pure brightness (0.571,  $p < 0.01$ ). Pure brightness had significant correlations with personal experience, collective archetype intuition, and collective universal intuition (0.181,  $p < 0.05$ ; 0.345,  $p < 0.01$ ; 0.476,  $p < 0.01$ , respectively). These results provide support for H1, H2, H3, and H4.

Table 2. Correlations

	Emptiness	Pure brightness	Personal Experience Intuition	Collective Archetype Intuition	Collective Universal Intuition
Emptiness	1				
Pure brightness	.571(**)	1			
Personal Experience Intuition	.196(*)	.181(*)	1		
Collective Archetype Intuition	.453(**)	.345(**)	.494(**)	1	
Collective Universal Intuition	.529(**)	.476(**)	.310(**)	.341(**)	1

p values: \* $< 0.05$ ; \*\* $< 0.01$ , \*\*\* $< 0.001$

4.3 Regression

• **H1 testing:**

To validate further the results, a regression analysis using emptiness was conducted for pure brightness. The F score was significant (74.944,  $p$ -value=0.000,  $< 0.05$ ),  $R^2$  was 0.326, and the adjusted  $R^2$  was 0.322 (Table 3). Therefore, H1 was supported.

Table 3. Regression Model and Results for H1

Emptiness (independent variable)	Pure brightness (dependent variable)
Standard coefficient (Beta)	0.571
$R^2$	0.326
Adjusted $R^2$	0.322
F value	74.944
p-value	0.000*

\* $< 0.001$

• **H2, H3, and H4 testing:**

Statistical significance was observed for the correlation of pure brightness with personal experience intuition (PEI), collective archetype intuition (CAI) and collective universal intuition (CUI). The independent variable here is pure brightness, and the dependent variables are PEI, CAI, and CUI. The F scores for the models had statistical significance (PEI=5.279,  $p=0.023^*$ ; CAI=20.993,  $p=0.000^{***}$ ; CUI=45.479,  $p=0.000^{***}$ ), and all beta values for the measurements of moral recognition, moral judgment, and moral intention were statistically significant (0.181, 0.345, 0.476). Thus, H2, H3, and H4 were supported.

4.4 Testing the Proposed Model

The proposed model was examined further using SEM techniques with the software AMOS. The results of SEM for PEI indicated a good fit of the model ( $\chi^2=166.140$ ,  $df=88$ ,  $\chi^2/df=1.888$ , GFI=0.882, AGFI=0.839, PNFI=0.785, CFI=0.883, RMR=0.075, RMSEA=0.075).  $\chi^2/df$  (2.025) was lower than 3. Additionally, GFI (0.882), AGFI (0.839), and PNFI (0.624) were over 0.8, 0.8, and 0.5, respectively, falling within the suggested index (Schumacker and Lomax, 2010). The CFI (Bentler, 1989), at 0.883, indicated a good fit. Overall, the proposed model performed well (Figure 1).

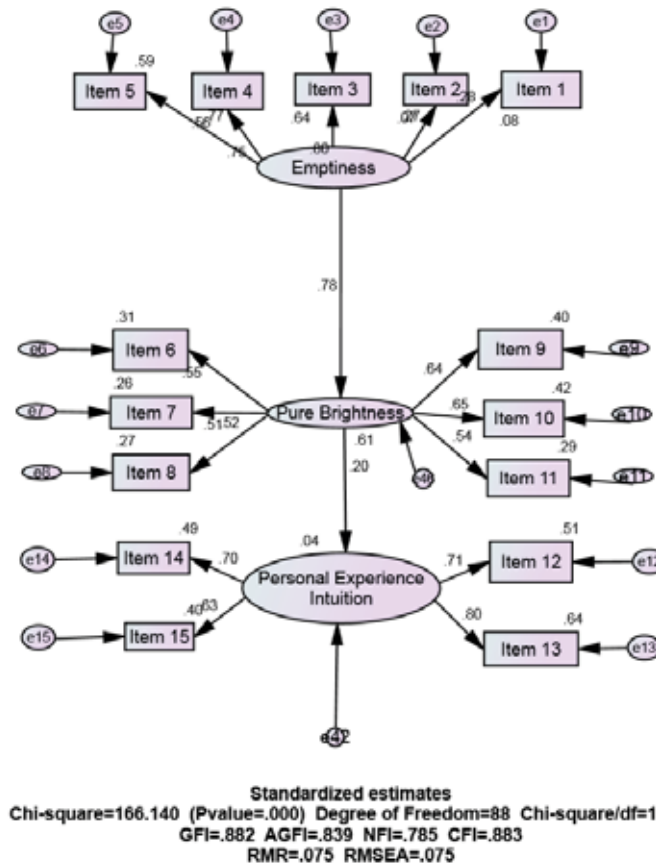


Figure 1. The SEM Model of Emptiness to Personal Experience Intuition

4.5 Testing the Rival Model

Table 4. Rival Models

	Proposed model: Hypothesis 1	Rival model 1: Hypothesis 2	Rival model 2: Hypothesis 3
Estimate	Emptiness → pure brightness <b>CR=5.395*** (p &lt; 0.001)</b>	Emptiness → pure brightness <b>CR=5.347*** (p &lt; 0.001)</b>	Emptiness → pure brightness <b>CR=5.433*** (p &lt; 0.001)</b>
Estimate	Pure brightness → personal experience intuition <b>CR=1.997 (p = 0.046* &lt; 0.05)</b>	Pure brightness → collective archetype intuition <b>CR=3.561*** (p &lt; 0.001)</b>	Pure brightness → Collective universal intuition <b>CR=4.627** (p &lt; 0.01)</b>
$\chi^2$	166.140	163.343	167.808
$\chi^2/df$	1.888 (1-3)	2.178 (1-3)	2.237(1-3)
GFI	0.882 (>0.8)	0.880 (>0.8)	0.878(>0.8)
AGFI	0.839(>0.8)	0.832 (>0.8)	0.830(>0.8)
PNFI	0.785	0.742	0.775
CFI	0.883	0.837	0.858
RMR	0.075(<0.08)	0.059(<0.08)	0.094
RMSEA	0.075(<0.08)	0.087(<0.08)	0.089

EM: emptiness; PB: pure brightness; PEI: personal experience intuition; CAI: collective archetype intuition; CUI: collective universal intuition; CR: critical ratio (i.e., t-value).

An emerging consensus in SEM is that researchers should compare rival models, not just test a proposed model (Bollen & Long, 1992). Our extremely parsimonious model posits that pure brightness will be positively associated with PEI; this implies a nomological status for CAI and CUI. This study compared (Table 4) the proposed model with two rival models on the following criteria: (1) overall fit of the model-implied covariance matrix to the sample covariance matrix, as measured by CFI, (2) the models' hypothesized parameters that are statistically significant, and (3) parsimony, as measured by the PNFI (James, Mulaik, & Brett, 1982). Because the model fit indexes of the three models were nearly the same, the proposed model and two rival models performed well.

For the estimate of the path from emptiness to pure brightness in three models, the critical ratios (t-value) were 5.395, 5.347, and 5.433, respectively. All had statistical significance because their **p is smaller than 0.001**. Thus, H1 was supported.

Regarding the path from pure brightness to each intuition, all path estimates were significant (CR=1.997; 3.561; 4.627). This finding implies that pure brightness is significantly positively associated with PEI, CAI, and CUI. Thus, H2, H3, and H4 were supported.

## 5. Discussion and Implications

### 5.1 Outline of the results

This study investigated the association between emptiness and intuitive judgment. With the use of correlation, regression, and SEM analysis, a statistically significant correlation was found between emptiness and pure brightness using a questionnaire-based survey with 157 spirit mediums. Pure brightness also had a significantly positive association with three types of intuition (PEI, CAI, and CUI). This finding indicates that emptiness has a critical role in explaining attitudes toward intuitive judgment. Thus, H1, H2, H3, and H4 were supported.

### 5.2 Limitations of the study

An investigation into the relationship between emptiness and intuition is a difficult endeavor and will be constrained by numerous limitations. Varying definitions of intuition constrain comparability of this study to similar studies. Additionally, research on the dynamic associations between emptiness and intuition can be approached using various research questions, designs, and hypotheses. The results of this study, therefore, require careful interpretation to avoid conclusions that overreach the data. Furthermore, the fact that many respondents in this research were Taiwanese must be considered when interpreting the results. Including variables of different cultural and religious backgrounds in future research may improve the understanding of the nuances of intuitional influences on ethical decision-making processes.

### 5.3 Practical Implications

As Narvaez (2010) notes, because we think in and through our bodies, our thinking is bounded and shaped by them, making our conceptual systems unconscious, metaphorical, and imaginative. Consistent with this notion, reason and intuition should intricately interweave in moral psychology and neuroscience. Moral evaluation is, therefore, not only a process of reason but also guided by metaphors of purity (Zhong & Liljenquist, 2006), influenced by affect and emotions (Haidt, 2001). However, the influence of these dynamics on intuition is largely unconscious and are not best captured by current calculative and analytic tools (Zhong, 2011).

The school of Vijñānavāda claims that the experience of knowledge is determined solely by the individual predispositions of the knowing subject (his "imprints of the linguistic constructions-**Abhilapavasana**) and not by an alleged "external reality (Nedu, 2015, p52). Thus, Vijñānavāda texts consider that fact is affected by the illusions of the determined individuality and of subjectivity, which obstruct the absolute and liberated condition of reality. The *mana*, in its essence, is responsible for the illusory appearance of the ego of the individual. Through the determining relation it exerts on the mental consciousness, the *manas* also transfers obstructed nature to mental consciousness (Nedu, 2015).

According to the concept of Mādhyamaka, Tathagatagarbha is inherently pure, and everyone has Buddha nature. However, how can this intrinsically pure nature be contaminated by extrinsic and other virulent defilements? As the *Sutra of Queen Srimala of the Lion's Roar* (勝蔓經) notes, there are defilements (such as fundamental and derivative afflictions), and there are defiled consciousnesses (such as mental consciousness and *manas* consciousness). In other words, both the mental and the *manas* consciousness should be inherently pure but have been innately contaminated by fundamental afflictions such as greed, anger, doubt, and improper views. This situation is called ignorance (*avijjā*) from or before the very beginning. Therefore, the *manas* is not moral intuition and cannot make appropriate ethical decisions if afflictions defile it. Mental consciousness will then follow its decision to act unethically. In other words, only moral intuition can result in a moral judgment and

thereby moral action. The non-moral effect is caused just by non-moral judgment, which arises from non-moral intuition. This concept is in line with moral psychology, in its assertion that moral intuitions come first and directly cause moral judgments (Shweder & Haidt, 1993).

Accordingly, the gap between judgment action is similar to that in Kant's morality, which is universal and necessary (*a priori*). This gap between judgment and action also exists *a priori*. The gap that occurs does not involve an incongruity between moral judgment and non-moral action. Instead, the gap directly displays that moral judgment is not genuinely moral and is thus able to result in non-moral action. This gap will not occur if the moral judgment is genuinely moral. Therefore, this paper argues that the gap between judgment and action is just an extended comparison between non-moral judgment and non-moral action.

## 6. Conclusion

The study reported here provides evidence that emptiness has a positive effect on intuition, no matter what intuition it is. It implies that emptiness (Mādhyamaka) can improve the decision-making process of the eight consciousnesses (Vijñānavāda). Much work has been done already to examine the link between intuitive cognition and moral judgment. However, much work is also required to understand the relationship between moral judgments and antecedent factors, such as karma or afflictions.

Although Mādhyamaka and Vijñānavāda are distinct from each other in their doctrines, this empirical study suggests their approaches are closely associated with intuitive moral judgments. This paper is not able to address all the potential vital deficiencies in the current state of moral judgment theory. However, if a new proposed theoretical model can at least adequately take into account the primary concerns of consciousness raised by Vijñānavāda, a potentially more robust model will have been developed for use by a broader range of empirical researchers.

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## References

- Allinson, C. W., & Hayes, J. (1996). The cognitive style index: A measure of intuition-analysis for organizational research. *Journal of Management Studies*, 33, 119–135. doi:10.1111/j.1467-6486.1996.tb00801.x.
- Ayoun, B., Rowe, L., & Yassine, F. (2015). Is workplace spirituality associated with business ethics? *International Journal of Contemporary Hospitality Management*, 27, 938–957. <https://doi.org/10.1108/IJCHM-01-2014-0018>.
- Badiane, K. (2015). *Intuitive judgment: A vigilant market learning capacity* [Doctoral Dissertation]. Feng Chia University, Taiwan.
- Bentler, P. M. (1989). *EQS structural equations program manual*. Los Angeles, CA: BMDP.
- Berzin, A. (2013). *English glossary of Buddhist terms*. (<https://studybuddhism.com/web/en/index.html>)
- Blasi, A. (1995). Moral understanding and the moral personality: The process of moral integration. In W. M. Kurtines, & J. L. Gewirtz (Eds.), *Moral development: An introduction* (pp. 229–253). Boston: Allyn and Bacon.
- Bollen, K. A., & Long, J. S. (1992). Tests for structural equation models. *Sociological Methods and Research*, 21, 123–131. <https://doi.org/10.1177/0049124192021002001>.
- Buswell, R. E. (1989). *The Formation of Ch'an Ideology in China and Korea: The Vajrasamadhi-Sutra, a Buddhist Apocryphon*. Princeton, NJ: Princeton University Press.
- Buswell, R. E., & Lopez, D. S. (2013). *The Princeton Dictionary of Buddhism*. Princeton, NJ: Princeton University Press.
- Campbell, D.T., & Stanley, J.C. (1963). *Experimental and quasi-experimental designs for research*. Dallas, TX: Houghton-Mifflin.
- Chan, M. G. (2015). *Activate your self-nature DNA*. Taipei: The Corporate Body of the Buddha Education Foundation. The Corporate Body of the Buddha Education Foundation.
- Cheng Kuan. (2015). *The Heart Sutra*. Taipei: The Corporate Body of the Buddha Education Foundation.
- Chin Kung. (2015). *The awakening of compassion and wisdom*. Taipei: The Corporation Republic of Hwan Dzan.

- Clark, J. (2008). The eighth consciousness of the Yogacara. *Middle Way*, 83, 67–77.
- Clark, J. (2011). The seeds of awakening. *Middle Way*, 86, 147–161.
- Clart, P. (2003). Moral Mediums: Spirit-Writing and the Cultural Construction of Chinese Spirit-Mediumship. *Negotiating Transcendence*, 25(1), 153–189. <https://doi.org/10.7202/007129ar>.
- Cline, E. M. (2010). Female Spirit Mediums and Religious Authority in Contemporary Southeastern China. *Modern China*, 36(5), 520–555. <https://doi.org/10.1177/0097700410372921>
- Duckworth, D. (2014). Onto-theology and emptiness: The nature of Buddha-nature. *Journal of the American Academy of Religion*, 82, 1070–1090. <https://doi.org/10.1093/jaarel/lfu063>.
- Eskildsen, S. (2015). Daoism, Meditation, and the Wonders of Serenity. From the Latter Han Dynasty (25-220) to the Tang Dynasty (618-907). New York: State of the University of New York.
- Fontein, J. (2006). Shared legacies of the war: spirit mediums and war veterans in Southern Zimbabwe. *Journal of Religion in Africa*, 36(2), 167–199. <https://doi.org/10.1163/157006606777070687>
- Giacalone, R. A., & Jurkiewicz, C. L. (2003). Right from wrong: The influence of spirituality on perceptions of unethical business activities. *Journal of Business Ethics*, 46, 85–97. <https://doi.org/10.1023/A:1024767511458>.
- Goleman, D., Kaufman, P., & Ray, P. (1992). *The creative spirit*. New York: Penguin Putnam.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, 108, 814–834. <https://doi.org/10.1037/0033-295X.108.4.814>.
- Hair, J. F. Jr., Anderson, R. E., Tatham, R. L., & Black, W. C. (1992). *Multivariate data analysis with reading* (3rd ed.). New York: Macmillan Publishing Company.
- Hancock, G. (2015). Fortune Cookies, Measurement Error, and Experimental Design. *Journal of Modern Applied Statistical Methods*, 2 (2), 293–305. <https://doi.org/10.1016/j.pmcj.2014.09.002>
- James, L. R., Mulaik, S. A., & Brett, J. (1982). *Causal analysis: Models, assumptions, and data*. Newbury Park, CA: Sage Publications.
- Jung, C. G. (1981). Archetypes and the collective unconscious. *Collected works* (Vol. 9). (R.F.C. Hull, Trans.). Princeton, NJ: Princeton University Press.
- Jung, C. G. (1989). *Memories, dreams, reflections*. London: Fontana Press.
- Kaag, J. J. (2012). Emptiness, selflessness, and transcendence: William James's reading of Chinese Buddhism. *Journal of Chinese Philosophy*, 39, 240–259. <https://doi.org/10.1111/j.1540-6253.2012.01716.x>.
- King, R. (1994). Early Yogācāra and its relationship with the Madhyamika school. *Philosophy East and West*, 44, 659–683. <https://doi.org/10.2307/1399757>.
- Lee, S. (2016). From criticism to approval: A reconsideration of Ji's Yogācāra position on Madhyamaka. *Asian Philosophy*, 26, 329–353. <https://doi.org/10.1080/09552367.2016.1239309>.
- Loehlin, J.C. (2004). *Latent variable models: An introduction to factor, path and structural analysis*. Hillsdale, NJ: Lawrence Erlbaum.
- Marshall, A.R. (2003). Moving the Spirit to Taiwan: New Age *Lingi* Performance. *Journal of Chinese Religions*, 31 (1), 81–99. <https://doi.org/10.1179/073776903804760120>
- Marshall, A. (2004). Taiwanese shamanic performance and dance." pp. 736–39 in Mariko Namba Walter and Evan Jane Neumann Fridman (eds.), *Shamanism: An Encyclopedia of World Beliefs, Practices, and Culture*. Santa Barbara, CA: ABC-CLIO.
- McCoach D.B., Black, A.C. & o; CONNELL, A.A. (2007), Errors of Inference in Structural Equation Modeling. *Psychology in the Schools*, 44(5), 461–470. <https://doi.org/10.1002/pits.20238>
- Narvaez, D. (2010). Moral complexity: The fatal attraction of truthiness and the importance of mature moral functioning. *Perspectives on Psychological Science*, 5, 163–181. <https://doi.org/10.1177/1745691610362351>.
- Nickerson, P. (2001). A poetics and politics of possession: Taiwanese spirit-medium cults and autonomous popular cultural space. *Positions*, 9 (1), 187–217. <https://doi.org/10.1215/10679847-9-1-87>.
- Nedu, O. (2015). A non-referential and non-cognitive theory of truth in *Vijñānavāda Buddhism*. *Hyperborea*, 2,

52–73.

- Nunnally, J. C. (1994). *Psychometric theory* (3rd ed.). New York: McGraw Hill.
- Paper, J. (1995). *The Spirits are Drunk: Comparative Approaches to Chinese Religion*. Albany: SUNY Press.
- Paper, J. (1996). Mediums and modernity: the institutionalization of ecstatic religious functionaries in Taiwan. *Journal of Chinese Religions*, 24, 105–30. <https://dx.doi.org/10.1179/073776996805307120>
- Pilard, N. (2015). *Jung and intuition: On the centrality and variety of forms of intuition in Jung and post-Jungians*. London: Karban Books Ltd.
- Pine, R. (2013). *The Lankavatara Sutra: Translation and commentary*. Berkeley, CA: Counterpoint.
- Raff, J. (2000). *Jung and the alchemical imagination (Jung on the Hudson book series)*. Newburyport, MA: Hays (Nicolas) Ltd.
- Raines-Eudy, R. (2000). Using structural equation modeling to test for differential reliability and validity : An empirical demonstration. *Structural Equation Modeling*, 7, 124–141. [https://doi.org/10.1207/S15328007SEM0701\\_07](https://doi.org/10.1207/S15328007SEM0701_07).
- Schumacker, R. E., & Lomax, R. G. (2010). *A beginner's guide to structural equation modeling* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Shamdasani, S. (Translator). (2009). *Jung. C. G. Liber Novus (the new book)*. Publisher. New York: W. W. Norton & Company.
- Shultz, D., & Shultz, S. (2009). *Theories of personality* (9th ed.). Belmont, CA: Wadsworth Publishing, Cengage Learning.
- Shweder, R. A., & Haidt, J. (1993). The future of moral psychology: Truth, intuition, and the pluralist way. *Psychological Science*, 4, 360–365. <https://doi.org/10.1111/j.1467-9280.1993.tb00582.x>.
- Siderits, M. (2005). The Buddhist Unconscious: The Alayavijñāna in the context of Indian Buddhist thought (review). *Philosophy East and West*, 55, 358–363. <https://doi.org/10.1353/pew.2005.0012>.
- Sutton, D. (1989). Ritual trance and the social order: the persistence of Taiwanese shamanism. Pp. 108–27 by Andrew E. Barnes and Peter N. Stearns (eds.), *Social History and Issues in Consciousness: Some Interdisciplinary Connections*. New York: New York Univ. Press.
- Sutton, D. (1990). Rituals of self-mortification: Taiwanese spirit mediums in comparative perspective. *Journal of Ritual Studies*, 4 (1): 99–125.
- Sutton, D. (2003). *Steps of Perfection: Exorcistic Performers and Chinese Religion in Twentieth-Century Taiwan*. Cambridge, MA: Harvard University Asia Center and Harvard Univ. Press.
- Tripitaka Master Xuanzang, (AD 596-664), 'Verses delineating the eight consciousnesses' (Ronald. Epstein, trans in 1986), *A Monthly Journal of Orthodox Buddhism*, 336, May (1998).
- Venerable, C. K. (2005). *The diamond sutra and the heart sutra*. Taipei: The Corporate Body of the Buddha Educational Foundation.
- Waldron, W. S. (2006). On selves and selfless discourse. In M. Unno (Eds.), *Buddhism and Psychotherapy Across Cultures: Essays on Theories and Practices*. (pp.105–128). Boston: Wisdom Pub.
- Waldron, W. (2008). A Buddhist theory of Unconscious Mind [ālayavijñāna]. In K. R. Rao, A. Paranjpe, & A. K. Dalal (Eds.), *Handbook of Indian psychology*. Cambridge: Foundation Books.
- Zhong, C. B. (2011). The ethical dangers of deliberative decision making. *Administrative Science Quarterly*, 56, 1–25. <https://doi.org/10.2189/asqu.2011.56.1.001>.
- Zhong, C. B., & Liljenquist, K. (2006). Washing away your sins: Threatened morality and physical cleansing. *Science*, 313, 1451–1452. <https://doi.org/10.1126/science.1130726>.
- Buddhist Dharma:  
The Heart Sutra (心經)  
Verses Delineating the eight consciousnesses (八識規矩頌)  
Sutra of Queen Srimala of the Lion's Roar (勝蔓獅子吼大方辯方廣經)



## Appendix

Construct	No	Content: all are five-point Likert-type scales	Factor Loading	Composite Reliability	Cronbach's $\alpha$	Concept Source
Emptiness	1	In a conversation, I can read others'minds	0.274	0.727	0.682	Badiane(2015,Q20)
	2	In a meeting, I suspend my opinions to listen to others	0.255			Goleman, Kaufman, & Ray(1992);Badiane (2015,Q21)
	3	I easily empty my thoughts to reach the state of perceiving as such	0.803			Badiane(2015,Q5)
	4	I have my own way to keep my mind clear and calm	0.736			Badiane(2015,Q8); Goleman et al.(1992)
	5	I have a way to regularly discipline my mind to be completely free from thoughts	0.785			Badiane(2015,Q6); Goleman et al.(1992)
Pure Brightness	6	I have experienced being completely relaxed with my mind pleasantly blank, and then, all of a sudden, the solution to a problem pops into my head	0.615	0.744	0.740	Badiane(2015,Q37); Goleman et al. (1992)
	7	There is room to hear more subtle things when I calm my mind	0.529			Badiane(2015,Q9); Goleman et al. (1992)
	8	In a meeting, I have the same emotion and attitude to different questions I am asked	0.571			Chin Kung (2015)
	9	In a meeting, I need to remain generally quiet	0.567			Chin Kung (2015)
	10	I always maintain sensitivity of the body, mind, and spirit	0.597			Chin Kung (2015)
	11	I maintain a simple lifestyle	0.550			Chin Kung (2015)
	12	I make many of my decisions on the basis of intuition	0.717			Allinson and Hayes (1996)
Personal Experience Intuition (PEI)	13	My gut feeling is just as good a basis for decision making as careful analysis	0.801	0.805	0.801	Allinson and Hayes (1996)
	14	I hardly ever go wrong when I listen to my deepest gut feelings to find an answer	0.697			Badiane(2015)
	15	I trust my gut when facing exceptional circumstances	0.630			Badiane(2015)
Collective Archetype Intuition (CAI)	16	I get the message of God's guidance by imagination	0.399	0.534	0.519	Jung (1989)
	17	When I follow my intuition to propose an idea, the discussion easily achieves consensus	0.592			Badiane(2015);
	18	I understand that my internal voice is from God or my ego	0.579			Own statement
Collective Universal Intuition (CUI)	19	I get the message of God's guidance by hearing the sound	0.896	0.824	0.686	Jung (1989)
	20	I get the message of Gold's guidance by seeing the vision	0.778			Jung (1989)
	21	My creative solutions come without reaching conscious awareness	0.657			Badiane(2015); Goleman et al. (1992)

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# The Dark Side of Social Media: A Reality Becoming More Contemporary by the Day

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Social media was started with the intention of expelling the darkness from the lives of people by way of sharing knowledge, networking and communicating with near and dear. It all started with the purpose of imparting its benefits to all and making it user friendly. But the liberation of the down trodden, intended to voice their opinions, was turned into a hysterical chaos given the liberal mindedness of the people. What started off as a source of knowledge turned people into gadget freaks, attention seeking, financial and societal deficits. Given the nature of social media combined with the need to be social has turned it into a platform to mirror the human's self-image. The world has become a ball of information enabling people to never look or stop anywhere. The world is alive and networked 24/7. The digitalization of media turned out to be a flourishing business, especially through social media, smartphones, tablets and apps. A few billion people are always online and it is expected that heaps of devices and sensors will be available on the web soon.

Social networking sites are an inseparable element of today's Internet driven world and used by innumerable people worldwide. They permit people to part ideas and opinions and help find and communicate with like-minded people, ranging from childhood friends to totally unknown people. This mode of communication exposes more than necessary information, often including intimate data visible and accessible to anyone willing to observe it. Hence privacy is often a key issue to the users. Since huge number of people are online and ready to start conversations, it is also a vulnerable attack-breeding platform for spurious attacks. They spread malware content and spam content by capitalising on the users' innate trust in their relationship network. The Internet is the focal point for data-sharing in today's digital space. A robust part of Web 2.0 is characterised by social networks. They are a great platform for people to interact with friends or discuss ideas with similar-minded people. In short, a social network is an inter-related system of separate units which share a conjoint interest and increase interface or information pooled via the network.

Social networks exist in many different facets. Some are popular in a specific geographic location .Others are popular globally, like Facebook and Twitter. Based on the spread of user base, there are dedicated or specialised groups—some for entrepreneurship, some for professional opportunities while some networks specialize in interacting and keeping in sync with old friends, some even from high school. As one of the predominant uses of social networks is to find people, all important networks provide search feature options, but with different norms. Users can search and find local friends by limiting the probe to a single town or for co-workers by placing a query about company name. Social media has become more recognized with enterprises as well. But on the other hand, IT departments are often wary of social media. Some companies are contemplating on blocking or restricting the access to social networks completely in the organization rather than discussing it with their employees and internalising them of the risks. It is next to impossible for administrators to stop users from accessing social networks from work laptops or smart phones.

Common examples of popular social media sites are

- **Facebook-** Facebook, at present, is on top of the list and is one of the most actively accessed social networks globally. Facebook is an easy networking and interaction tool for everyone. Research shows that Facebook is accessed by more than 1.7 billion people to network, contact and interact with people and also to explore things that are of importance to them. The network enables users to design the profile pages where they can introduce themselves by sharing pictures or anything of interest to them. Facebook also permits different applications to be used within the network
- **My Space-** My Space is a typical social network where people can interchange messages and suggestions. It offers easy incorporation with music and is the reason why it is often used by liberated musicians to display their own work.
- **YouTube-** YouTube is the second largest and popular search engine with more than 2 billion views per day and it is the third most-visited website worldwide, behind Google and Facebook respectively. YouTube can be logged on in 61 different languages and is being used in 75 countries. About sixty percent of the views on a video originate from outside the country where it was created. Because of the extent of availability, the exposure a business video gets on YouTube is considered one of the most effective advertising tools available on a 24/7 basis.

- **Twitter-** Twitter is a micro blog service. Twitter is a short-message collaboration and communication medium that permits users to send out messages (tweets) to people who subscribe to followers. Twitter is evolving as one of the most popular social media sites. Currently, the site boasts of 320 million active users and has provisions of using over 35 languages. Each operator can post tiny messages consisting of up to 140 characters. Other users have the option of subscribing or following a particular person's page and receive their update messages.
- **LinkedIn-** LinkedIn is a professional-focused social networking site which was launched in 2003 with the main intention of helping people network and interact professionally. The site helps marketers in finding other business associates, clients, and colleagues who are already in the market. With over 400 million registered users in as many as 200 countries, having more than four million companies with LinkedIn Pages and professionals listing at a rapid rate of two new members every second, LinkedIn holds the label of the world's biggest professional social network.

### **Alarm bells**

Social media is not negative when done safely and diligently. But with the widespread use of it, times change and the behaviour of the people too have changed. The power of social media is such that it has penetrated into deeper strata of the society resulting in open-to-all system. With social media, even fools and pranksters are capable of creating chaos using derogatory posts and ill-made visuals. People are forgetting themselves and are permitting the technology to rule them rather than the other way round. People have become more social online but have become lesser human in the real environment. People have become attention seekers and sensation lovers. Social media and the smart phones are a breakthrough for mankind. But in the quest for knowledge and staying connected, people have lost their love for life and wisdom.

With globalisation, speeds have increased and distances and physical proximities have decreased. But people are more concerned about themselves and hardly care for their fellow beings. Progress in technology has man more independent but lonelier due to lesser social interactions in offline environment. Society has become more individualistic. There is more interaction online but more emptiness and less togetherness. It is high time people find a way that binds more people together. The void in offline lives cannot be compensated through virtual meetings or interactions. Countless people exhibit their opinions and thoughts on the social web, apathetically revealing their personal lives with others in detail.

Physicians have observed a trend of social media related depression in teenagers. Researchers feel that teens who go through such phase are at an increased risk of depression and exhibit solitude resulting in seeking solace in abusive online content and display aggressive behaviour. Parents should always be vigilant in dealing with teenagers and should always monitor their online activities. Not only teenagers, but also adults display outs of anxiety when they find out that their tweets are not retweeted or when their Facebook updates are not liked.

Irrespective of the value, social networking media sites like Facebook, LinkedIn, Twitter, Tumblr, Flickr, YouTube, etc are grabbing and moulding our discernment of our external surroundings. This widespread availability of powerful communication tools have enabled people to reveal their personal as well as professional secrets. This affects the productivity of the self as well as that of the organization. It is high time people stop this kind of culture and convert it into healthier norms for a more responsible behaviour.

### **Social Media Deficits**

We are concerned about the shortcomings that social media has on our lives, those which arise or are stirred by social media. They are

- Social, socio-psychological and rational- forms of Attention -Deficit Malfunction
- Corporate and macro-economic- forms of Monetary Deficit

### **Addiction in the Attention Deficit Economy**

We have allowed many things and behaviours to blow out of proportion. Social media are a pathetic pastime which eats into our time and people have inadvertently enabled it to take control of the personal and professional lives. However, these geeky gadgets with in-built apps and many other features have eaten into the income of a majority of the users. Our penchant for social media is laden with uncertainties. Most of the social media activities are unintentional. Most of the expressions are outbursts in the form of updates or feel-goods or feel-bads. Social media behaviour is gradually shaping itself into an addiction. On a positive note, this addiction can intensify the planned activity or goal. But on the negative front, this addiction distracts from goal and people move away from the intended focus. As a matter of fact, we are not equipped to deal with it. In other way, we are unsure or are ignorant of how to deal with it. Online addiction is omnipresent. We live in attention deficit economy and not in attention economy.

The obsession with social media on mobile devices and coupled with all the hysterias, hazards, etc, that is shared every day, have turned out to be extreme such that there is an indication of irresponsible time-depletion. Consequently, a proper and plain focus, on what is actually vital has become problematic and instinct is taking edge over it. It is high time we do something rather than just dangling with our mobile social media groups via all kinds of useless apps. For reaping the real advantage of social media, we should begin by treating them in a vigilant and focussed way by being less instinctive and more thoughtful. Fortunately, an increased amount of consideration is being diverted to this development. The following negative consequences of social media are looming around everywhere.

### **1. Social media make us stupid**

The question to be asked is if internet has really made mankind smarter. The answer is a pathetic 'no'. We should ask ourselves what the social media is doing to our brains. Violence and multimedia slow our brains and make us blunt, vulnerable lifeless and dull. The reality bites when we devote so much time and attention to it and it gravely disturbs the course of in-depth thought process. Social media simply spread sensations faster than sensibilities. Since, humans assimilate everything and do not remove what is unnecessary, we are reaching a culmination where inspecting our images and interpreting all the comments left behind on the Internet consume away good amount of time. We do not erase things even though they are not worth protecting and we also do not deny ourselves the moments. We are becoming more sceptical of losing our importance if we do not periodically experience special moments and showing that off to others. In the quest to discover such moments and store them, we ourselves are transforming into mute onlookers of our own lives. We are merely observing rather than actually live through such moments. The reminiscence gains prominence rather than the real experience of the moment, while we busily build digital erections around us.

### **2. Social media are transforming us into anti-social beings**

An old saying goes- We shape our tools. But in the modern context, we are shaped by our tools. We are all so pre-occupied with our computers that we have forgotten human interaction in the real world. The computer, a mere machine, has elevated its status to that of human mind and brain. The present day humans are so hooked on to their devices and its content that they have become more social online but pitifully less or nil interaction offline. Chances are that speaking one's mind online will have the same after effects as saying those same things face-to-face and internet users have happily incorporated this element of social media.

### **3. Ego-tripping, insulating, narrow vision**

Being dumb and anti-social can be tracked into the terrains of narcissism and ego- stumbling. This development goes in parallel to many serious problems. On the basis of information disclosed in our profiles, the Internet and social media will inevitably obscure all the true traits of the self, if we do not watch out, and thus eliminates an important source of vision and innovation, leading to increased cocooning and narrow vision.

### **4. Social media are making us mentally unsound**

Humans are actually incapable of analysing and assimilating everything that reaches us via the Internet and social networking media. Our brains freeze after a certain level of assimilating data. It becomes difficult to process too many data. We become agitated, overloaded with facts and figures and we lose control and grip over our brains. In most scenario, it often inclines towards psychotic behaviour, Young people, whose brains are immature and are still in the stages of development, are unprotected and open to round the clock volley of digital content. They are full of activity with texting, messaging, Facebook, Twitter, YouTube, etc. They are glued to their computers, smartphones and gaming gadgets for hours together losing their proximity to the outside world.

### **5. Social media disintegrate our memory powers**

We are always ticking constantly from site to another on the internet. We are always rummaging through the web. Research has proved that we mostly make use our short-term memory for this activity. If there is a barrage of content, this memory shuts down. We barely use our long-term memory anymore despite the fact that this forms the basis of our personality. The over-use of tools and other assets have mainly created a negative impact on the physical parts of human development. But with the advent of computer, the scenario is different. Computers are no longer a frontier of the physical expression of humankind, but an intercessor of our inner self.

### **6. Social media are extremely manipulative**

Many posts on the social media are mere rumours doing the rounds. They lure media fanatics to resort to extreme behaviours. There are propaganda that asks its users to act or react in certain ways to show solidarity with any topic, issue, or a person. Sometimes, there is misrepresentation of facts and figures. The people who spend most of their time online are misled by these false statistics and visuals. Some videos posted on social media are so extreme in content that the people are ready for indulging in rioting, going on rampage, disrupt public life and damage public property.

### **7. Social media promote terror**

Most of the time, social media plays a pivotal role in the spreading riots. Some messenger media is capable of sending an encrypted message to a big group of people. After any major terror attack or rioting, when probed meticulously, one can see how each attack revealed on the role social media had played. Unrestricted flow of information can be used put into best use. But it can also be used for distribution of evil. And when people resort to social media for violence, we need to stop them with an iron hand.

### **8. Social media kindles our desire for sensation**

On 26 February 2011, a severe seaquake tattered off the coast of Chile leading to the death of many people. The quake impacted not only the land but also the deep seas. A tsunami was born and drifted towards Hawaii. Different social media presented simulated images and the tentative time at which the Hawaiian coast would be flooded. At the specified time, after

everyone had plugged into Twitter, nothing happened. People who used Twitter were fuming as they had waited and watched the entire day just to witness zero activity. Another earthquake resulting in tsunami on 11<sup>th</sup> of March, 2011 directed a nuclear tragedy in the Fukushima I nuclear power plant in Japan. After that, there were live telecast from people who focussed their webcam towards the after maths which was broadcast on U stream. In real time, pictures showed the despair of people in the affected area and how they were impacted by the ever-rising radiation. Some programmes received more than 10,000 views. Social media ensures that there is only a thin line between information and sensation.

### 9. Social media slams privacy and creativity

People have evolved to be at ease not only with sharing detailed information of different kinds, but also more responsively with more people, some of them even unknown. They are ready to disclose even the most cherished or trivial details of their life- be it personal or work life. They even shamelessly disclose the most intimate moments of life. This social norm has taken shape over time. One possible use of Facebook's data storehouse would be to sell data unearthed from it. Such information could be the foundation stone for any kind of business. And Facebook can do this without hurting users and regulators and lo, it has turned out to be lucrative. All of us possess multiple personalities. And that is absolutely normal, just a part of being human rather. We are like a kaleidoscope. There are many lenses through which others can observe us. All of us are multifaceted people. Social media emphasize that we are a mirror. There is one reflection which we all have. Similarly, we can also view people from any direction and results can be contrasting, yet they seem to be the same.

Irrespective of how restrictive we are and whatever be the privacy measures adopted, social media are ill-equipped to provide complete privacy. It is these gaps that attackers will take advantage of for intrusions. The attacker may capitalise on the weak security aspects of an application or software. So as an intelligent, forward thinking and a responsible user, post and share content carefully and rationally. Social media cannot be isolated from risks. Operate and access as if the material posted is a public property which is openly viewed by known and unknown people alike. Abstain from sharing anything that will put self as well as the members in contacts list and those around at risk.

The most important point to be remembered is that **everything is public on social media**. Be wary of the contents posted on social media as it cannot evade public access. So the ideal way to protect oneself is by restricting the amount of personal details posted on social media. This is applicable not only to the profile of the user, but also applies to the contents, comments or pictures posted. Always be on alert about the replies or responses from fellow users. Be very cautious on the types of contents posted about self, others and children, in particular. Do not reveal details about children as it may attract criminals to the children which may cause irreparable harm to their personalities or even lives.

### 10. Social media inspires bullying

In the past, children may have been intimidated by bullies at school or in their residing locality. Today, with the rampant spread of the Internet, children are now being tormented in every place and at all times. This has led to an epidemic-like environment which has to be urgently curtailed. When people are not talking to someone directly, they are less prone to the face to face consequences or to feel the implications of their activity. On the internet, it is too easy to say something to someone. There is a thin line between the after effects of cyber bullying and physical bullying. However, if ignored, the repercussions can be fatal. One of the most serious aftermaths is suicide followed by self-esteem issues in a close second spot, followed by depression, self-injury, feelings of loneliness which can seriously damage academic performance in school and general well-being.

#### Social media- a danger to cyber security

One should be always be careful and have responsiveness regarding the likely threats of sharing information on networking sites.

#### Threats and over disclosure of information

Attackers may attack social media services and spread infected content or malwares, gain access to personal information like identity, residence, relationship details, etc. Sometimes, the users themselves may disclose too much information than necessary to unauthorised or scrupulous individuals.

1. **Viruses**- social networking sites are the most convenient back ground for spreading of viruses, given their nature of public acceptance and popularity. When a virus is created and implanted in a website, the attacker exposes many unsuspecting users to risk, who in turn share the malicious links with their contacts.
2. **Devices**- pranksters make use of tools to gain control of a user's account and then gathers all the personal information of the users and the contacts he share. Sometimes, there may also be an attacker pretending as an imposter.
3. **Social engineering attacks**- the attackers may post a comment or content that looks to have been originated from a genuine networking service or a person in the contact list. If proceeded based on the directions, the user may land up divulging too much of information or pave way for computer attack.
4. **Identity theft**- when personal details end up into the hands of the attackers, they can assume the identity of the user and post contents in his/her name
5. **Third party applications**- sometimes social networking sites permit third party applications to be installed. Though it may

look inoffensive or harmless, it is capable of peeking into intimate details without the knowledge of the user and post materials, send spams, check friends list, etc.

### **Professional and personal effects**

Professional or personal relationships may be compromised due to unscrupulous access

1. **Business details-** disclosing official incidents on social sites are unethical as well as harmful. It shows the employee or organization in bad light. Sometimes, it causes irreparable damage to professional life. Divulging customer data, internal issues of the company, intellectual property details or other company related matters on social media may bring about a bad reputation both for the employee and the company.
2. **Professional status-** unsuitable images or posts on social networking sites may terminate all future professional prospects. Job recruiters or institutions may check the accounts of their prospective candidates during the application screening process. Contents posted by the candidate that hint his/her political, religious or social inclination may hamper the chances of selection and affect the integrity and or reliability of the candidates. There have been occasions where people were sacked from their jobs for the manner in which they have posted contents or expressed their views.
3. **Personal relationship-** it is impossible to restrict the audience for certain posts. The comments, photos or contents posted thoughtlessly may do much destruction to personal relationships. Being frank and transparent about the personal life on social media does much loss than expected as it is difficult to retract from one's views or comments immediately. As per data, almost 33 percent of the users have expressed their regret for divulging too much information impulsively.
4. **Personal safety-** there have been many incidents of cyber bullying. The information posted may cause pain not only for the user but also many others who are tagged in the posts or photos or are associated with the user. The information posted unconsciously may call for annoying harassment or nuisance. Posting details such as the location, residential address, children's school details are too dangerous and may even cause harm to the child's security. Cyberbullying incidents have impacted many individuals psychologically. So, social media pose as a physical, psychological or even social hazard to the user if is incapable of managing his account meticulously or intelligently.

### **Social Media and Cyber Security in the work place**

Social media is a bizarre tool used by businesses in every sector. It provides the seamless opportunity for advertising, social networking, and increased customer backing and communication. Online platforms are excellent spaces for soliciting customers and handling a brand image. It is next to impossible to keep away from social media propaganda in today's digital culture. But the innumerable positives does not refute the risks involved for businesses. Social media in the work space has been found to be the biggest security issue faced by businesses in the current scenario. Many organisations have become gullible to phishing attacks (fraudulent emails claiming to be from authentic companies). Social media sites help hackers with the podium from which they can launch these attacks. They also open the gates to malware outbreaks, leading to malicious software being installed itself within a device or network. As a matter of fact, Facebook is one of the leading threats with respect to malware infiltration. Use of social media escalates the risk of fraud, spam and intellectual property ambush. In addition to the technical risks involved in social media use, there are also risks triggered by employees who are active social media users during work.

There is only a thin line between what is deemed suitable to an organisation and what can be damaging. People are at liberty to post whatever they want and whenever they want, but this can be of grave risk to privacy and to organisation's goodwill. People should always remember that anything posted on the internet is a public possession and that which cannot be retrieved as and when desired. It can be used fatally against an individual, business or organisation that an individual is linked to. There are chances that an employee can post inappropriate content or share information that ought not to be shared. An employee could gravely cause damage to professional reputation. The guidelines vary depending on sector. Sometimes, employees cannot be held responsible for what is being posted on their very own social media accounts. Hacking social media accounts has become increasingly prevalent, with hackers inventing and evolving fancy tactics all the time.

The following calculations, can be made with a greater amount of belief. They are not trivial and unfortunately, are once again intimately associated to social media.

1. There is a serious word of caution about immature use of social networks and social media. There have been umpteen warnings indicating the dangers of cybercrime, and social media identity may be more amusing to fraudsters than any other online content. Everyone has now become accustomed to Social Security Numbers and credit card data being stolen and sold online to other scrupulous people for carrying out fraudulent movements, but now, the online mafia will sharply focus to shift its attention to our social media IDs.
2. The second warning is closely related to the first. The most important merged cyber-attack will arise from our very own "friends" on social media and networks. We, at present, have crusades against phishing e-mails and an increasing number of advanced threats which are also on their way, based on social systems. The fun element on social media has definitively been crushed.
3. We are most active on social media right on our very own smart gadgets. Year after year, we will dive into an upwelling of more than a thousand cyber-attacks on smartphones and tablets. This has been prevailing for years and we were finally

assaulted by the first real mobile malware in 2011. Criminals and hackers have switched their focus, interest and attention to mobile devices.

4. In the technical territory, mobile platforms and the use of Social media sites indicate that the “safe” tunnels for corporate IT can cause a blind spot. This occurs when security tools are ill-fortified of decrypting in the tunnels. Thus flawed products are clueless of what is going in and out of the business network.
5. As an addition to the previous point, this word of caution conveys a rather simple message- Restraint Is the best deterrent method. It means that there must be continuous observation of whether or not data are seeping or are penetrating through network connections. This can be done by installing a restraint area that is constantly supervised. If unusual circulation is observed, the road in or out can be closed and the data can be analysed. Organizations with the right software will be able to handle the problem and suitable action can be spontaneously taken within seconds.
6. There are also ample external factors that are sources of concern .The happenings can always be used to formulate and implement large-scale cyber-attacks. This occurs not only via search engines, but also increasingly via social media and networks. We have all underestimated this menace. Even now, we are ignorant and do not associate social media with cybercrime, but that is changing.

### **Dumbing-down anxiety**

Our memory is something that has always existed with us and is very dear to us. But with the advent of internet anxiety continues to irk us. We are unsure of what exactly is changing. Our brains are changing and our memory is also changing. Due to structural change, the use of the human memory processing is also changing. Once internet is in front of us, we start browsing. Irony is we have a habit of relying on that Google Effect. Our behaviour is also changing. The Google Effect has created a better understanding of matters. But those who learn tend to become less concerned about facts. People have become interdependent on their computer tools, developing in to interconnected systems that remember less but knows where the information can be found. We must forever be on Google to know information, in other words, believe everything that Google knows. We were always aware that someday digital technology would outshine our own intelligence. We are, forever, amazed at the events happening around us.

Digital technology and functionality are closely intertwined in our lives. The drastic progress of mobile social media is in severe disparity with the pretty gradual growth in large sectors of the economy. Here too the demand for a crucial and daring way of handling social media is directive. We should embrace social media and navigate them in the right direction. This marks the growth process, in which new designs emerge which over a period of time turn out to be the basis of new growth and wealth in the rest of the economy. However, there has to be a sincere and conscious effort to steer social media in the direction of to create a social society and social business and take treatment for dark sides of social media. But we are still unsure of what to do against the assault of social and mobile technology and their content, which creates an imbalance in our tempo on a 24/7 basis, divert and develop us at simultaneously. Mostly, it is hardly an option to train our overworked brain such that we are seldom diverted. Rather the new digital tools should ignore the imminence of real time and give messages in the correct context. This continuous state of distraction can be overpowered by unlearning the culture of multitasking and constant updates.

Technology must be made passive so that we realize that attention replace distraction. There has to be a suitable context or should be created that draws our attention. We are bombarded with more content than at any time in our lives yet the amount of time to assimilate it remains constant. Instant notifications should be reserved only for those few precious individuals and apps that absolutely warrant immediate attention, rather than those trivial ones. Content should never seem like a burden. To turn it into a pleasure, we need to start focusing on ways to regulate the flow. The classification and categorization of information are always subjective. We have to be concerned about consuming content consciously and making information and our information providers beneficial to thus rather than we being subjugated under them. Our gadgets and surprisingly, our human systems are extensions of digital universe. Our gadgets place right amongst emails, tweets, updates and notifications.

### **Responsible for our own behaviour**

With an overdose of enticing technology, taking charge for our own behaviour is tough indeed. We simply starting love our life with our smartphones, tablets and modern apps. Especially, the direct link of social media to our senses and emotions, everything is interactive and is in real time where the digital stimuli is more electrifying than life itself. From time immemorial, man has loved a reckless and adventurous life with scant regard for hard work and lethargies. But now, real life is substituted by digital commotion. It is becoming crystal clear that we can make significant economic and social developments given the abundance of information. But this becomes a reality only when the complexity of the network withers off. The device are undergoing a sea change with respect to technology and functionality. They make use of the underlying technology in a human way. We no longer have struggle to connect all kinds of plugs, sockets, cables and wires; we no longer encounter a frozen software; we are showered with technology that fits impeccably with our inner senses. It is the inception of the humanization of digital technology.

Now we have to evolve consciously from geek into human being. We are pioneers and controllers of technology. This is possible only when we make use of intelligent technology to assists us, to supplement or improves us. Otherwise, we may

perish in the ever-increasing deluge of information. And this is where we have to apply our own behaviour and our personal responsibility. Technology and human behaviour are intricately linked, the more powerful and smart our digital achievements, the steadier and safer we should be able to deal with it. In general, we will have to toughen up our stance on such digital temptations and have resistance particularly in handling social media, games and the screen gadgets on which they operate. Though this sounds moralistic, this is harsh reality.

The fact is our memory or our analytical skill is pathetically reduced due to our over dependence on other digital devices of knowledge such as smartphones and apps. Young People suffer from a digital form of Alzheimer's disease. The need to remember things have become a thing of the past as our digital resources do this for us, completely, correctly, automatically and in real time. So, a good idea, for health reasons, would be to distance ourselves a little from this technology as this will do us no harm and in fact, benefit our memory training.

For this, following four golden rules-of-thumb are recommended:

1. Train the memory to avoid it from becoming tangibly poor.
2. Accordingly, try to remember as many telephone numbers, names, poems, quotes and adages as possible, just like memory game winner
3. Try to leave behind as many digital devices as possible and grow with less dependence on them
4. Read books, articles and watch films, documentaries, etc, to successively discuss them with others and generate ideas.

A very important part of our Digital Literacy should be directed towards avoiding drowning into Digital Lethargy or worse-Digital Dementia. It is a question of self-discipline. Behaviour and technology should walk together, oriented to the place where we assign our digital privileges in our life. We would train ourselves to cope with such resources. The issue of how many victims rise up in the meantime, how people could have been properly guided are of scant regard in this fast paced digital era. We are currently living in an obsessive disruptive and distractive environment that is generating serious socio-cultural disorder.

Ironically, entertainment and mental inclinations towards digital devices are causing stress rather than relaxation. . Following are some tips for a happy and fulfilling life as provided by Manfred Spitzer at the end of his *Digitale Demenz* work

- To start with, eat well and healthily.
- Keep aside at least 30 minutes' for exercise a day.
- Do not live in a conceptual world, but live in the present.
- Pursue tangible and pragmatic goals.
- Help other people in need, without self-interest, expectations and financial profit.
- It is good to spend money on experiences than on things.
- Indulge in music now and again, sing whole-heartedly.
- A good mood triggers the brain areas for positive thoughts
- Be active, alert and push away hurdles from path.
- Make life easier for self wherever and whenever possible.
- Go out for an outing with family friends instead of always hanging around on social media
- Spend enough time in natural habitats, especially if there are children
- Avoid digital media wherever possible and mainly children should be restricted from using digital gadgets.

***Computing should be applicable only for computers, it is not the route to living***

But it is next to impossible to stay away from digital resources. However, there some responsible digital behaviour.

Accept that digital devices are an elementary component of our society only and nothing beyond it. Understand the sensitivity of Information before digitalising it. Avoid the usage of rude or immoral language while using e-mail, chats, blogs and social networking media. Be empathetic towards the person, who is the reader, on the other side. Refrain from using copy-righted material by way of copying, downloading or sharing with others. Do not use digital devices to cause injury or harm to others. Do not interfere in others' digital uses. Use others' digital gadgets or resources only if authorised to use them. Be digitally responsible when posting, writing or designing online content. Do not steal data from others' digital devices. Do not spy on other people's online behaviour.

**Spamming in social networks**

Spam can be considered as one of the most typical attacks of all time and it will be wise enough to adapt to latest technologies multiple times ranging from email spam, messaging spam and in-game spam. Obviously, social networks too have become a victim of spam and is gullible to security issues. With the social network usage mounting at an exponential rate, adding millions of users to their existing user base, it leaves itself exposed to astute spammers who take the maximum advantage of the popularity of these networks, to outline spamming procedures, time to time. Almost all of services sanction



the users to send messages to each other for free, it offers an easy gateway for spammers. Some networks are meticulously designed such that messages will be sent only if both users are connected online. To evade those type of constraints, bogus versions are created by the fraudsters and multiple friend requests are repeatedly sent so that at least some may accept them. When accepted, the spammer begins sending spam messages. A mere 'friend request' enables short messages to be sent within it, in spite of nil connection between the users.

Obviously, using compromised accounts is a popular spamming technique. Making use of formerly phished account credentials augments the authenticity of the message, as the receiver knows the person who held the compromised account and would be keen to expose the message. It is simple for an automated character to adopt a message that had been posted earlier, from the compromised user account, complement it with spam content and re-send it to all the connected contacts. Other variants like remarking on other people's posts or images and sending notifications to fake events are other ways of messaging to a wide audience. Regrettably, in every space meant for people to write standard information, the spammers will attempt to use them to place advertisements. Spam messages can be regularly seen in direct messages, status updates, comments on videos, contact requests, etc. Some methods can even self-generate multiple messages on different channels. For example, if a user sends event solicitations on Facebook, the user will not only obtain a statement message within Facebook, but also an email notification, unless the user has promptly deactivated notification emails.

Many communities have employed CAPTCHA checks that must be deciphered before sending multiple messages. This is done with the intention of stopping or to at least slow down the programmed spam messaging. Unfortunately, most CAPTCHA regulations can be cracked and there are systems available that use mechanical work to resolve them effectively. Furthermore, pranksters often use multiple accounts simultaneously until each one of them is unnavigable due to day-to-day message limit. Almost all social networks take proactive methods like offering a feature to report spam messages and enable blocking in future. But this feature is helpful or in other words functional only if the attacker does not switch accounts periodically. In addition to the spam embedded in the social networks, the brand statuses of social networks are often tainted to enhance the reliability of bulk mails sent outside of the social network. Since people are always getting friend requests, they are used to it and they often do not fully check the authenticity of the message and may end up clicking the link in the notification email. These links take the user to malicious websites, while others still use the old approach of attaching a spurious attachment with a virus.

### **Social engineering threats**

#### **Luring through baits in social networks**

There are multiple procedures of search engine optimization (SEO) attacks. The modus operandi works like this- employ keywords and links such that the sites makes its way into highest ranking ones and pop-up in the first search results. Likewise, related threats can also happen in social networks. Almost all social networks enable users to visualise what is up-to-the-minute and sizzling at that instant. For instance, Twitter grades all the popular titles on its home page. This is easily available to attackers, who can easily seize keywords and incorporate them in their spam texts to get a better ranking. Some attackers began working on benevolent Twitter messages and then forward them. The pranksters then look out for new messages encompassing popular keywords. This could be a message related to a controversial decision taken during a latest sporting event, with a condensed URL connecting to an equivalent news article. The attacker takes this message and substitutes the original, edited URL with his or her own link that directs to a scrupulous site and re-tweets the message. For an ordinary user, it is difficult to distinguish between a genuine and an infected message. Thus the probability that an unsuspecting user stumbles upon an infected link are very high. Not denying the conventional kinds of soliciting messages that promises to link to porn visuals of celebrities or software tools being spammed to trap someone into clicking them.

#### **Follower scams**

As the popularity of social networks has shot up, there is a stress on people to have as many friends or followers as possible in their account. The gravity of the issue is such that, in a few social circles, social acceptance is determined on the basis of the number of friends in social networks. Young children are more engrossed on such tactics, the more online friends, the more popular the kid is. This requisite has been observed by scammers and 'friends and follower scams' are rampant on the Internet. The craze has gone to such an extent that some websites offer free services where the account name and password should be given and on return they ensure that the user gains many new followers per day. However, it is ridiculous to part the password with strangers, since there is no regulation over what activities they might indulge in and they do with the available account. In most cases, it violates the rules and conditions of the social network. But, these services will take control of the account and start manipulating it in order to send unrelated junk messages to all the contacts. This was totally uncalled for and this was not what the user wanted. Another system is to auto-follow many users or to send friend requests to random people, in the belief that someone may consent them and follow the user back. Some of these services are even chargeable.

#### **Impersonation of celebrities**

All of us would have come across bogus profiles of celebrities existing on various social networks. Unfortunately, there are few systems that can prevent anyone from creating a new account in the name of a celebrity and placing an easily available

photo as a profile picture. An ordinary user cannot distinguish or determine if it is a genuine or fake account as long as the posted messages look genuine or until the message rip-off the real identity, people will perceive it as the authorised account. Such fake accounts can be used to blowout bad information about colleagues or fellow celebrities or to entice new followers, who can later be spammed. These fake accounts are vigorously endorsed by subscribing to many arbitrary accounts. These accounts usually contain a few messages which links to promotional offers or events. Some bogus celebrity accounts were used to contact real celebrities, posing as their friends. Some services are offering verified accounts tag. Twitter sanctions the identity of some of their accounts and displays a “checked account” message on those profile sites. But, this method cannot be followed for every noticeable account and they cannot validate that specific celebrity has been sending the messages. Unfortunately past results have shown that the passwords of official accounts are easily guessable. When a successful account is hacked, it results in the messages being posted in the user’s account name. This happens frequently especially when celebrity accounts get hacked, weird messages appear on their accounts.

### **Impersonation of friends**

Impersonation is a cause of concern for everyone irrespective of the social network in which they hold their account. There are numerous ways in which a password can be solicited. Phishing spells and Trojans can effectively do this. Once the prankster acquires the password of an account, he can resort to any activity like sending messages or even updating the profile status. These messages or statuses often direct links to different bogus sites to acquire more account passwords. The message looks like it has been originated from a friend’s account. Therefore, people may tend to trust it. The pranksters, often capitalise on this trust and curiosity which lead to a greater click rate on those malicious links, resulting in the attack being successful. Users must always be vigilant, as messages propping up from confirmed friends on the list, might have been auto-generated by spyware. So, be judicious while clicking on the links in messages and always be on high alert when asked to download content.

### **Koobface**

The Koobface worm is the pioneer in huge malware attacks which is aimed at social networking sites and is still going strong with its successful mission. It is highly successful as it launches evil social engineering outbreaks and lives on the link-opening behaviour of social media operators. The current options not only communicate from infected users to all their friends in their networks, but also resort to activities like apprising status messages or writing content to profile pages. The link that is posted will be delivered via Facebook’s official page which in turn auto-generates a caution message before redirecting the user to the second URL. The attackers are aware that the people are accustomed to latest versions of Koobface which spreads not only on Facebook, but also on other social networks, including MySpace, Hi5, Bebo, Tagged, Netlog, Fubar, LiveJournal, Twitter and Friendster. The bait chart used, usually works on a very simple pattern. A user usually gets a personal message or a text posted on his social media account. The message can be a joke or an interesting video that encompasses a link which directs to a bogus YouTube site. When clicked on the fake YouTube site, the user is directed to download and then install a setup executable to play or view the video. The bogus video sites are operated from infected systems and compromised servers. The attackers are also on the lookout for newer technologies to attack computers. To enable the spoofed video site look more authentic, the link enclosed in the message can permit a unique id which can be used to load the fake friends’ name and photo from the social network site. This looks very genuine when encompassed in the video site.

Trojan, after its installation, will download many more elements and start looking for access credentials to other social network sites. Apart from proliferating via social networks, the server also advises the Trojan to download further modules to the client, like including a small Web server to horde the fake video site or an installer for an ambiguous application. CAPTCHA-breaker element too can be downloaded to infected computers, directing the targeted victim to solve a CAPTCHA for the attacker who is camouflaged as a Windows validation check. This enables the Trojan to dodge anti-bot security measure, if any, but still automatically spam out infected messages. There are many modules available that contain a classic data-tracking mechanisms that can decipher passwords and re-direct them back to a drop-server. Manipulating the infected user’s accounts enable Koobface fraudsters to accomplish their mission by creating fake accounts whereby they can also get access to online friends with an innate level of conviction at zero cost. This makes the soliciting messages look really genuine and allows the infection to spread like uncontrollably like wildfire via social network. It is not viable for the social network provider to install filters for such purposes.

### **Phishing**

Social networking sites can be accessed by user name and passwords for logging in. So inevitably, they are also vulnerable to phishing attacks. Similar to the phishing attacks on banks, social networking phishing has different variations. Tricky emails claiming to arise from the social network service, offering some update or contest, appear frequently. To view the update status, the user is required to trail a link and log in, thereby disclosing his details to the attacker. The connected page is a bogus copy of the real login page, which is aimed at pilfering user account identifications. There are many other social engineering gimmicks where the user is connected to a link, which kindles the interest of the user and which lures him into a phishing page that steal the passwords. But financial sector is more affected or targeted by phishing activities compared to community sites. The returns from such bank accounts through phishing are much higher. But usage of dummy sites for

community networks are huge mainly due to the ease of creation. Some of the scams even impersonate the originals by offering value added services just as the original one does. One such example is that of a service claiming to be given by Twitter. It made the users believe that once the user name and password was given to the fraudsters, they would enable the users to find out who follows their posts. They would display the names of some random fellow users as followers. Meanwhile, they misuse it by sending endorsements and promotional schemes. For this, security software suites can be made use of to reduce the risk as there would be difficulty in spotting the fake one.

#### **Advanced fee scams**

Social communities are gullible area for advanced fee scams. This is mainly due to the fact that users reveal too many details regarding their personal self. They also tend to easily fall for fake scams and scammers are shrewd enough to identify such possible victims and alter the motives to lure such victims. These types of scams typically offer huge benefits for nothing in return. After that the fraudster will inform the user about a fake issue which requires a small amount of money to be sorted out. Once the fraudster receives the money, he absconds. Social networking sites are the paradise for fraudsters. They are meticulous planners and cleverly execute their agenda. The social networking site helps identify lot of possible targets along with their personal details. The scammers impersonates another and lures the victims to make an advance fee payment promising a future service. Once they receive the money, the scammers get away. They do it with such impunity and repeat the same scam many times with newer victims.

#### **Misusing information from the social network**

The following sections illustrate how information from social networks can be manipulated to undertake attacks.

##### *Resetting passwords*

Almost all Web services enable users to reset their password. For this, the user name need to be filled and perfect answers to some security questions need to be given during the time of registering. This is used for verification purposes. There are usual, standard questions, the answers to which can be obtained easily from the profile page of the user itself. This way, the attacker can answer the questions and re-design the account. Once the account is penetrated into, it can be used to carry out future spamming attacks. So to avoid falling prey to such vile ways, users should abstain from using the usual, standard, easy-to-guess security questions. Always create a unique question and use secured passwords.

##### *Make friend with someone to get information*

Some intrusion testers use social networks to creep into larger enterprises. Their motive is to search the apt social networks of employees of the target organisation. This is simple, as business networks permit only restricted searches and facilitate the attacker to relate the email addresses and user names to definite companies. Using the information obtained, a believable but fake account can be designed. The attacker can then contact a promising account holder. The scammer, through his regular conversations and soft talks digs into sensitive content that the new contact reveals. Once a high level of trust is built, the scammer probes and finds out sensitive information like sever names, project details or even lure the new friend into opening a backdoor access to his system by way of opening an infected document or website. This shared data is used as a clue to select people from his target group. Though social engineering may not be always successful, it opens up a list of vulnerable people who can be tried on. In most cases, the fake account gets connected to many people from different sectors leading to access even sensitive data, job offers and promotional activities and incentives.

##### *Revealing reconnaissance data*

Another common blunder that employees make is by disclosing some seemingly unimportant technical information to the public unintentionally. This could be a comment on his social network account on the kind of job that he is working on currently or how he is stuck with some mundane software or firewall used in his project. This gives enough fodder for the prankster to plan his future course of action. An attacker makes full use of this available product details to decode the safety software that is used by the user or the target company. Therefore, a good idea would be to abstain from revealing too much of job-related data or security-related data on social sites.

#### **Applications and widgets in social networks**

A few social networks facilitate frequently used information to be implanted as applications or widgets. These applications can then connect with the user and his set of friends. For instance, it can be a daily humour application that posts a new funny content or a funny joke to the user's profile page daily, for the user and his friends to experience enjoyment. More intricate applications like multi-player games or photo rotation albums are also possible to be embedded.

Each social network uses its unique technique of implanting applications and implanting active content. Some of them permit remote code to be encompassed which is very risky, as it is difficult to monitor and control the content that will be uploaded. Bigger networks have generated their own, unique APIs that enable developers to gather definite information from the user's accounts. Sadly, it permits them to stealthily access some data or can resort to attack users or other applications. The following sections are instances of attacks that has been observed.

#### **Never Text Again Scam**

In July 2010, around 300,000 people became victims of a sham application on Facebook. Unexpectedly, more and more

personal profiles began displaying a text with the following content: I am shocked! I am NEVER texting AGAIN as I found out this. Video here: [http://bit.ly/worldwide scandal!](http://bit.ly/worldwide%20scandal!)

#### **Application directing to unrelated malware**

There can be loopholes even with legitimate applications. Most of the popular and widely used applications on Facebook are games. Apart from the typical card games and arcade classics, simulation games or in other words, social games, are considered very cool and loved by a number of users. This means that the user can own his virtual fish tank, a virtual island or a realistic farm to take care of. FarmVille is a hugely popular game with current, active user base of over 60 million users per month. The user can multiply his simulated crops and seeds and harvest them to reap experience points and coins. These, in turn can be used to purchase cattle or tools and to reap bigger harvests and so on. Feats can be circulated on the user's profile to display how good a farmer the user is. Just as in real life, the plants in this virtual life takes quite some time to grow and reach the harvesting stage. This is to ensure that the user comes again frequently to view the development. For those impatient users who hates to wait, there is an option to buy in-game coins with real money using a credit card. For those misers who hate to spend real money either, there are many websites that offer tricky equipment for the game. These "assistant tools" are often typical Trojans that does not help with the game at all, but they clandestinely access passwords and other important information from the user. Hence it is understood that such games can push people to websites that promise helper applications, which in reality are scrupulous programs. It is advisable to keep such offers far away.

#### **Vulnerabilities in applications**

Apart from all the activities an application is permitted to undertake including harvesting personal details, it might also bring together a host of new pitfalls to a user's profile. There have been instances of threats in some of the Facebook applications which enabled attacks on user's private data. Most of these were XSS or CSRF attacks that pose grave data violations. But, there have been reports of liabilities that give permissions to legitimate application so as to be transferred on to a malicious application. As a result, any application that has been installed can pose a security risk by being mischievous on its own or due to its weak admittance point.

#### **What applications can ensure**

Almost all social networks permit applications to access the user-data via multiple interfaces. Some offer documented APIs that grant definite access to bits of data. This could also include granular access provided on the basis of permission granted, to enable the user to decide on what to surf on the application. Based on its type, the application can be affixed deep into the social network and blended with the user interface. On the other hand, it may just interact on a superficial level, revealing only a limited information on a different website. For instance, Facebook has two rudimentary applications.

Firstly, it has social plug-ins, which permit the assimilation of simple Facebook features on to any website. Canvas applications that communicate with the profile, can send latest messages or open a new page. The "Like" button for a page is to apprise others about the presence of a page and to gain publicity, which is an apt example of a social plug-in. The other applications, to a large degree, get code from remote websites and implement it. In 2010, Facebook altered its basic API and authentication process, enabling it more transparent for the user to decide on what data the application is permitted to practise. The application requires to acquire the extended permissions before trying to access any private information from an account. Once the application receives consent from the user, it can do anything with this available information. The user can annul the liberties and deactivate all the applications any time from the application settings menu. But any information that had been accessed until then could be transferred elsewhere. Since 2010, Facebook necessitates any new developer to authenticate their uniqueness either by an active mobile phone number or a credit card number. This is done to prevent any anonymous developer from registering mock accounts for malicious applications. Unfortunately, this is not an effective prevention measure as any anonymous accounts can be registered with an anonymous phone number, which still prevail in some countries.

An application gets permission for certain activities which are as follows

**Access the general data** —this comprises the user's name, display picture, list of contacts and all other public elements of the profile.

**Access the profile contents** —This contains additional information like birthday, favourites, etc.

**Send e mail** —This is sending straight emails to the listed email address.

**Access contents in the news feed** —This permits the application to access the posted texts.

**Access family and relationships data**

**Access photos and videos**

**Access friends' details**— These include their personal data, birthdays, etc.

**Access the data at any time** —The application can read the details even if the user is signed off from the application at that time.

**Post to the wall** —Post new message on the behalf of the user

These illustrations prove that an application can gain access to almost all the details that a user has included in his profile, given on the condition that the user permits access to those contents. As the applications are permitted to load remote scripts, it is impossible to predict what happens to the user data and how it gets handled. An application very easily accumulates all the available accessible content on an offsite record and store it for a later use. However, there are strict conditions established by Facebook as to what an application can officially access, the rules to which a developer is required to abide by. Still, all users are required to have a glance at the permission-request windows cautiously and verify if the application actually is looking to access those pieces of information. At the end of it, the idea is to protect their intimate information. In addition to this, an application can appeal for offline-access rights from the user. Once granted, the application can get to read the user information at anytime, anywhere irrespective of whether the user is using the application or even signed into Facebook. This access gets cancelled only if the application is plainly removed by the account holder under his application settings. It should be noted that some of the non-public information, might also be accessed through applications. To prevent this action, the user must always alter the access settings of the applications used in his account.

### **Content threats**

#### **Affected profile sites**

The founders of popular social networking sites have resorted to and identified steps to monitor the data that users send or upload. But often, some user may find a worm in the execution, or some issue that may have been overlooked. Despite this, it still enables uploading of infected content. One of the most extreme cases happen when it including arbitrary remote content becomes possible. This permits an attacker to embed attacking toolsets within profile sites, leading to an enormous attack on anyone surfing the affected profile. Social media websites may be used as display area or a platform for malware. Some of these do not directly pose a hazard to the user visiting the profile site due to their dormant nature. But, they can easily be distorted by a remote Trojan to update itself. In general, most often we see that infected profiles or status pages contain malicious scripts or links.

#### **Malevolent links**

Since users can regulate the content of their own profile, they can add infected content to the pages intentionally. One apparent attack is by readdressing the user to an outward malicious site, which is totally under the control of the attacker. The posts can be crafted intentionally on specific, registered fake accounts or by script attacks. The user redirection can be accomplished by social engineering tricks that redirect the user spontaneously. The social engineering spell is meticulously crafted and is difficult to be blocked by the social media provider as it is hard to differentiate it from harmless, regular posts. Some providers have begun using publicly available URL to block certain URL posts. A few network providers use a transitional re-directing site that cautions the users that they are quitting their page and that the target site is beyond their control. The redirected website may contain anything like advertisements for bogus products, misleading applications, phishing sites or even enable download attacks.

#### **URL limiting services**

URL limiting services were existent since a long time. Today, it is usually a short domain name in combination with a function key redirection system. This helps the user to design a short URL from any given link. Since there is no line break, it is easier to share and it gels perfectly into short messages. There are hundreds of limiting services which are freely available. Most services are cheap or sometimes incurs no cost and are available to all. A few of them were designed in combination with applications or browser plug-ins. But, one of the apparent issues with such services is that they confuse the terminal point of the link. This makes it difficult for a user to identify which is genuine and which is malicious, as they do not see its destination. Fortunately, many of the popular services enable viewing of the destination or statistic page with the number of hits made till date.

#### **Script risks**

Every social network provides an API that can be used to access the functionality straight from a script. This is extensively used by third-party applications. This technique of access helps an attacker to create automated scripts that can gather any open information or to spread bugs that can reproduce across the network.

#### *Manual script attacks*

A simple attack genre that is observed on social media is the manual script attack. The term manual is used because the target is directed to copy and run the script physically. Therefore, a few interaction steps are needed. By following the instructions step-by-step, hidden JavaScript will be copied, which will focus on the users URL bar and will paste the JavaScript, and finally execute it. By following these directions, the script can use the current logged-in session to send messages to all the friends of the user, requesting them to repeat the cycle. The user may be directed to click on a few surveys to reach the application.

Many of the existing services use public blacklists to hinder malicious links from being shortened. Unfortunately, this is not very effective and still allows past, unknown malicious links to be utilised for attacks. The one thing that is common to every attack is that the user voluntarily spreads the information to his friends. Some attackers have also begun adding advertising banners to each of the step, generating further cash flow for them. Users should always be very cautious whenever they are

asked to process manual commands, especially if the purpose of the command is unclear. Also exercise caution when disclosing real address or mobile phone number anywhere.

#### *Cross-site scripting (XSS)*

Cross site scripting (XSS) attacks are a very common kind of injection attack. There are a range of ways in which an attacker can implant or embed customised scripts in a genuine website. A user who surfs the site or trails a specially-crafted link will reach the specific site. From here, the injected script from the attacker will be sent back as a part of the legitimate site. This enables the script from the attacker to be implanted in the visitor's browser from the susceptible site. This script can exploit the trust the user has in a genuine website and potentially steal session cookies or begin cross-site forgery attacks (CSRF). As people are usually logged into the service when they are surfing other profiles, the script can manipulate the session and infect their own profile with the same infected script. Thus, spreading of malware from one profile to another occurs. Further, the bug will begin posting contents in the victim's name. These messages embed short links that leads to malicious websites. Apart from spreading worms, XSS attacks are often used to take a user's session cookie. Alternatively, the fraudster will use it to include random content. It can help in the designing of phishing sites under the real domain, directing documents back to the attacker. Conventional anti-phishing toolbars cannot discover these phishing sites.

#### *Cross-site request forgery (CSRF)*

The CSRF outbreaks capitalise on the trust that a website has in the browser. Whenever a request arises from a user's browser with a valid session, the Web server will accept the request and execute it. The Web server is clueless about the request. It is unaware if it was deliberately made by the user or if a hidden script on a website sent the command clandestinely in the background, without any notice of the user. Since most people are constantly logged into their preferred social sites and seldom log out, this becomes a potential target for CSRF attacks. Such an authenticated session can be distorted by scripts on maliciously-crafted websites or scripts planted by XSS attacks. Those sites can give instructions which will be executed because the current user is logged in. To the social network, it may seem like the user clicked something. This includes potential for disseminating worms. In 2005, My Space became a victim of worm attack. A user guessed the methods to dodge the content filter that was needed for publishing content on profile pages. He also learned that he could use JavaScript in CSS tags without being filtered. By clouding his JavaScript, he was able to execute various actions including reading out the content of the current page and creating new 'http post' quests. This generated a kind of worm which spread rapidly and infected more than one million users within 20 hours. Social networks are still prone to such similar attacks and there is an increasing trend of mass infection. To curtail such risks, users should always log out of any service when they are done with it. Smart security resolutions can always lessen the threat.

#### *5.3.4 Clickjacking*

Clickjacking and click-fraud work on the principle where users can be deceived into clicking on things that they do not see or that they are aware of. Usually, an invisible frame is mounted along with some content and spread over an easy game that enable the user to click numerous times at specific places. While a user is under the impression that he has clicked the game, he has, in reality, clicked on the invisible layer and has started some other action. This could be a 'submit key' that gets triggered. This enables the attacker to perform any action that requires a few easy clicks. If the user is signed into a service at the same time, then something like a CSRF attack with manual interaction can ensue. This means, the user can be deceived into clicking on a hidden button to alter his privacy settings or share all the contents in his account.

Sometimes, even CAPTCHAs could be implanted and passed on to the user for resolving.

The messages sometimes contain catchy phrases which lure the users into clicking on the links on the profile sites of infected friends. They will get re-directed to a website where the only visible content may be "click here to continue" written in big letters. Of course, clicking anywhere on the page will activate an invisible 'Like' button, which can update the user's status message with the same text as seen in the earlier accessed profile. This allowed the bug to spread to numerous profile sites with no extra effort. Though there is no direct damage, similar attacks could include malicious URLs or sometimes newer versions include advertisements that generated profits when a user viewed them.

It is not at all cumbersome for users to shield against such clickjacking attacks. In addition to using latest security software, users can also use browser plug-ins, such as NoScript, that will discover some of the hidden frames. As for the owners of websites, there are a few methods which can be practised in order to safeguard their website from being presented in an invisible frame. For instance, Facebook executes some of these approaches to prevent the "Share" button from being used within a hidden frame-tag. This thwarts clickjacking attacks. Despite all these proactive measures some clickjacking attacks still continue. Unfortunately, the like-jacking attack still works. The attacks that took place had tried to use the mobile versions of the social network page, as they are easier to deconstruct and have minimal level of security mechanisms.

### **Design issues**

#### **Privacy**

Privacy is a prime cause of concern for all social network users. The user may choose to disclose the amount of private data willing to be shared with the external world. The information that are posted can be restricted to a select set of audience depending on the content or how relevant it is to the group of contacts. Most social networks have a different set of privacy

setting for confirmed friends compared to the public audience, which again can be chosen by the account holder. In some cases, a user can decide on what details to share with all his connected friends, but still keep it invisible for someone browsing his public profile. For example, Facebook has three groups of visitors- direct “friends”, the “friends of friends”, “everyone”. Depending on the kind of information, the user can decide on the audience who are permitted to view the contents or who to share the information with. The default sharing setting is “everyone” kind of audience, which is really abundant and share a lot of information. Many users may probably want to alter their privacy settings depending on the kind of content shared or posted.

Likewise, Twitter permits its users to shield their tweets and messages. This means, once they are enabled, all future messages can be viewed solely by those users who have been established as friends. The privacy settings also enable a user to deactivate this option when others can find them by searching for their email address. It is complex to link a Twitter account to a known email address. It is also important to bear in mind that some social networks, indicate in their EULA, that they are entitled to use and even sell the contents that are uploaded. It is understandable that they may need some rights because the content is shared in their network. However, others might be sharing contents with third-parties. The permissions granted, would theoretically include using the texts or images for a commercial ad without asking for consent or without making a payment. Often users are totally in the dark regarding the quantity of information that they are sharing publicly. Irrespective of which social network one uses, it is mandatory to understand the privacy settings and if necessary, alter them to suit to one’s needs. There is only a thin line between participation through sharing information and preserving one’s privacy, especially in matters of social networking.

### **Erasing data and accounts**

Once a message is posted, it is almost impossible to delete it completely from a social network because it would have already been forwarded to others and might have been reposted again. Twitter provides a key to delete messages individually. Undoubtedly, once something is posted on the Internet, it is impossible to delete. Therefore be judicious and cautious before posting something online. As far as Facebook users are concerned, they can go to their profile page and delete any post by means of a Remove button. For those interested in deleting their full account, it is a long and complicated process involving a few steps, compared to deleting individual messages. On Facebook, the user can deactivate a profile from the settings page, which may keep all the data intact, but enable the profile invisible to others. This ensures that it can be re-activated at any time later. Those who genuinely want to delete a Facebook account can log into the account and visit the delete page. The account will then be deactivated for two weeks, during which no further interaction should be made for it to be removed. Unfortunately, this include automated log-ins from affiliate sites that the user might still have in his browser cache. So it is advisable to erase the browser history and cache, to make sure that he or she does not inadvertently log in, which will cancel the deletion process completely.

### **Information revelation**

The prime purpose of a social community is to disseminate information. Therefore, all the information will be unchecked and will be disclosed to others. However, the users are sometimes ignorant of the velocity and impact of the information shared or the implications they carry. The following sections will reveal the effects.

#### *Disclosing location data*

People, generally, like to socialize and share their mind. This includes information that might be misused. One of the characteristics, that often goes unheeded, is the location data that is passed along. Many people publicize their exact location, which is not a serious concern per se, but this information can obviously be misused for stalking or for robbery. Some services like FourSquare, emphasise on the geographical location of the people, at a given moment. In FourSquare, users can check-in at different locations. The more frequent they check in, higher the ranking for that place. In this manner, people can see where the fellow users are present, at the same restaurant or attending a concert and so on. Even though FourSquare enables a user to restrict what information to publicly display, it is vulnerable to design flaws.

Sometimes, even if the user disables the option of being shown on location sites, identity of checked in user can be ascertained. Another user group, who should exercise caution on revealing their geographical locations, are the defence personnel. Sending status update messages back home, revealing the troop power and their current camping location, is probably a foolish idea. But, something as simple as uploading some pictures from a specific location, can reveal information, as many cameras are powerful and can automatically embed metadata into pictures. Therefore, unsurprisingly, many military forces have banned the use of social media completely, or have taken precautionary measures by training their users not to reveal too much information. There were already instances of location information being leaked. Apart from showing where the users are located at a given time, it obviously reveals where they are not, for example, at home or in school. So tentatively speaking, a tech- savvy robber could analyse from their profile, when people are not at home, find their residence address and then rob their homes. Sometimes, people could risk their jobs when their superiors track their location when they are found to be absent from work. There have been cases of self-exposure by the employees.

### **Disclosing identity**

In some groups, social networks can be directly connected to fellow internet users, on various platforms. As they provide a

real name, it is easy to identify the users behind an anonymous action. In some social networks, a registered user can see the other users who visited his or her profile page, even if that person did not add him or her as a friend or send any message. Mere reading of the profile page, is sufficient for leaving behind the trace of identity. Regrettably, this can be abused with CSRF risks. Any user with evil intention, can add a hidden frame or link to any unrelated website he has control and link it to his own profile site. Whenever someone visits that web page while logged into the social network, they will leave behind their trace in the logs. The site owner can potentially track the true identity of the visitor. Some researchers have advanced a step ahead by tracking another person's social network connections. To illustrate, with the CSS characteristic of links called "visited" and a small bit of JavaScript programme, an attacker can decipher if a user has recently logged on a predefined URL. This process can be used to surf through many sites and to identify all the social networks that are being accessed by the user. Based on the nature of social network, it can also showcase the main profile site of the user or give an evident trace of the user. To guess the identity of the user, determine the intersection of groups to which he is affiliated. To launch such a cross-checking, there should be some background study on the groups available on the network. Also. There should also be some back-tracking work that has to be undertaken to establish the identity of the connection. A social media user can easily be identified if he visits any website by virtue of his identity in the media site. Some social platforms offer this as a feature. Facebook enable a feature called instant personalisation to all its users. This permits third parties to ascertain the identity of the user who visit their website without the user being logged in.

### **Unprotected frameworks**

As social networking platforms are becoming more complicated, undoubtedly, some susceptibilities in their structure can be discovered. The rigorousness varies between snooping personal information of other users and fiddling with other user's accounts.

Sometimes, when there is privacy malfunction, the bug can be tracked in the privacy settings feature itself. It shows a user to check how his reformed privacy setting impacts the way his profile looks to another person by giving a preview. This also gives a read-only rights to someone else's account. Unfortunately, this also includes viewing the private chat interactions or pending friend requests that the other person had. Pranksters can design a crawler that can export the data of millions of users within a few days by means of design bugs, to determine the group affiliation of protected user accounts. This problem may be followed by many data leakages.

Attackers can access information from reserved accounts by using the power-search function even if a user locks his details on his profile site. A mixture of automated queries for every possible combination and permutation enabled reading out all the intended data from protected profiles. Sometimes, after publishing a code update, many private messages can be directed to the wrong person's inbox. Users will not know if the message was acknowledged by the intended person or not.

In SQL intrusions, an attacker can post his specific SQL queries to the linked-database. These assaults can be very catastrophic, as they might disclose user's accounts with passwords, emails address and all other sensitive information. There will also be exterior attacks than can hamper a social network's amenities. Big names like Facebook and Twitter too were smashed by a massive, distributed denial of service (DDoS) threat that rendered the entire web service offline for a few hours. However, one respite is that DDoS damages will not compromise the privacy or security of the account. Just that there will be a restriction on the availability of the network. The issues gets serious when services that are dependent on social media has serious glitches. So any shrewd attacker can pose serious problems to social networks.

### **Mismanagement as a control structure**

The well-designed framework of social networks and their Internet connections make them a potential candidate for botnet control, especially, due to the fact that such commands could merge into the usual social network traffic seen at any major site. The following sections discuss some methods that were misused.

#### *Botnet regulation over status messages*

There had been efforts to mistreat social networks as a 'command and control structure' for botnets. However, this is not surprising, especially after several ISPs have blacked out, in order to get rid of botnets. The botnet designers are on the lookout for tougher ways to control their assets. Since social webs are widely distributed, usually having speedy Internet connections, they are a susceptible victim for a command structure. Trojan Whitewell is an example of such a bot that frequently checks the mobile form of existing Facebook account. The attacker can submit a new post to the profile, in order to enable the bot to be downloaded and to run a file from an URL or contact a web server to get new commands. Related concepts have been tried on Twitter, where the bot downloads the up-to-date communications from an existing Twitter account. We have also witnessed a simple Twitter bot-creator tool that can create another bot, which will verify instructions in clear text from designated accounts. This setup need not necessarily deliver extra resistance against black outs, as the social web service provider can merely deactivate the accounts or filter for specific posts. However, the fraudster can always design new accounts. But the already distributed bots will not be able to get notified of these updates.

Some attackers have keenly observed this single-point botch up. KreiosC2 is a good case of a proof-of-concept bot that make use of social networks for governing channels in a more refined way. The bot is likely to command in natural language presented by any user account or it discovers commands implanted as comments in uploaded JPEG files. As a result, there is



much complication in blocking and filtering out all the commands for the service provider. It has been observed that almost all of the present efforts aimed at using social networks as a command and control structure are of a very primitive structure. However, it is possible to use the infrastructure for undercover channels in a more refined way.

#### *Information allocation*

Apart from making use of social networking profiles as command structures, they can also be used for loading updates or releasing data. Consider the case of a Trojan that downloads a binary data from an established profile. To make matters worse, it is harder to trace, as the updates could be hidden in a media file, such as an image. The new Trojan could then transfer its accumulated data as encrypted text data, such as local passwords to another profile. If the content is complicated enough, it will mix into the normal estimated traffic and can be opened from anywhere.

#### **Best practice tips**

On social networking sites, always tread with caution. The user must have awareness regarding the dark side of social media and that it is filled with risks and security threats. With adequate proactive measures, this situation can be confronted and can be transformed into an enjoyable process. Adopting and implementing proper security measures will protect the user as well as the computer from scrupulous and malicious attacks. By protecting oneself, those connected around can also be secured. Social media put forth unique risks. However, the user need not be on panic mode when using social media. The risks can be minimized and social media can be made entertaining and informative by adopting certain precautionary and proactive measures. The following are some of the guidelines that need to be remembered while using social media sites.

#### **Be sceptical**

Social networks are a useful resource of business information, as well as, a great channel that gives news-worthy updates from friends. But, they may contain a lot of unimportant and irrelevant information. Generally, anything that is viewed online should be dealt with a great extent of scepticism. Do not ever blindly trust everything that is shared- be it financial assistance, hot topics, trending news or tips on free gifts, especially if it involves clicking on a link or installing an application. Anyone that demands money in advance should be ignored as it is sure to be a scam.

#### **Check privacy policies and settings**

Every major social networking service has a unique and specific privacy strategy and rule that are published on their websites, to ensure privacy protection for the users. Ensure that they are thoroughly understood, even though they may be time consuming, boring and tedious to be read. They give tips and explanation on the course of action that need to be taken if the information is shared with other people. Some services extend the ability to control privacy settings for specific clusters, such as permission to share pictures only with a select group of audience like 'friends only' and not 'everyone'. Always make wise use of these settings. By taking advantage of the privacy policies, the user is doing good not only to himself but also others who are associated. There should be no compromise on privacy and choose appropriate action for security. Always keep a tab on safety guidelines and periodically review the settings and options looking for alterations and apply the safest feature. Always undertake a periodic review of services privacy policies and adopt and incorporate all the available security measures.

#### **Good passwords**

Use good, strong, complex passwords. Do not set easy and guessable passwords like date of birth, names of family members or pets. If possible, ensure that the password is a combination of letters, numbers, as well as special characters. If remembering complex password is difficult, either use an easy hint or use any of the existing password management functions that can securely safeguard them. Do not ever select a password that can be deduced from the existing information published on the account site. This includes friends' names, favourite movie stars or author names. Set strong, complicated and difficult to guess passwords for each service.

#### **Protect the password**

Never act foolish by sharing the password with others, come what may. These include services that assure to assist to get more friends or such similar gimmicks. Do not lose grip of password.

When entering the password, ensure that user is logged on the authentic website and not a phishing page that appear identical to the original site. On being doubtful to have become prey to a phishing attack and account being compromised, use a clean computer to log into the original site and modify the password.

#### **Be considerate**

Always double check before posting or updating something. Any content that is once posted, even if it is to a close group of friends, makes the user loses control over the matter because it will or will not be reposted and the audience cannot be controlled. These issues may be back to haunt the user if he searches for a new position or relationship in the future. Double check before publishing the full information and do it only if it is absolutely necessary. This comprises disclosing too many private details, such as phone numbers, whereabouts, relationships or work-related stuffs. Likewise, abstain from promoting virus hoax or inflated warning messages that will create panic among fellow users, as it does more harm to other users than actually help them. Be diplomatic and respectful to others. Never ever post derogatory messages about others. Be empathetic

as one would never want to read derogatory posts about self.

#### **Be cautious**

People online are not always who they pretend to be. They may display multiple personalities. The public figure who the user may be following, might turn out to be just be another fan or the co-worker posing as an employee from another office might just be someone conniving against the enterprise. Not everyone who claims to be a friend on social media site can be trusted as a friend.

#### **Stay updated**

Make sure that the software installed is up-to-date. It should not only cover the operating system and web browser, but also third-party plug-ins, such as PDF viewers. Install all the cutting-edge versions. Always keep the anti-virus softwares updated. Time bound installation and updating of applications and softwares are pivotal to system safety.

#### **Stay protected**

Some of the newer versions of viruses and threats are very complicated and sophisticated. They are sometimes difficult to catch the attention for an unqualified or even experienced user. Use inclusive safety software to shield from these threats.

#### **Share information only with trustworthy contacts**

Social media gives the option of choosing an audience for posts. While posting or sharing content, choose the right viewers who should see the posts. Sometimes users try to increase their contact lists, but consider sharing contents only with the appropriate audience. Always segregate the contacts and allocate access features differently for each group. Attackers are manipulative enough to convince users to include them in their close circle. They may even assume fake identities to persuade the user to be added as a contact. Double check the legitimacy of the new contact and confirm the identity who they claim they are before authorising them to access the personal details. However, a proactive measure would be to always add people known to the user than add unknown fraudsters just for the sake of growing the contacts base. Better be cautious than feel remorse later.

#### **Discourage suspicious third party applications**

Choose third party application wisely. Do not install scrupulous looking softwares or those conceived by unscrupulous or unreliable vendors. Keep a vigil on the extent of details that third party applications can access. Always check out for applications developed by trust worthy vendors.

#### **All contents online are public**

Be aware that anything posted on social media cannot evade public eye. So the intelligent way to protect oneself is by regulating the amount of personal data posted on social media. This relates not only to the profile of the user, but also is pertinent to the contents, comments or photos posted. Always be wary of the responses from fellow users. Be cautious on the kinds of contents posted about self, others and in particular, children. Abstain from divulging details about children as it may attract unwanted attention towards the children which may cause irreparable harm to them.

#### **Conclusion**

Social networking communities are an intrinsic element of today's web world. People use these sites as they want to be in touch with friends, exchange pictures or just kill time when bored. Companies too, have started engaging social media as a marketing tool for targeting their customers with relevant information and give more focus to them. With the availability of user groups capable of covering millions of users, there are always evil ones with malicious motives. Attacks through worms and bugs spread through these social networks. In almost every case, fraudsters have engaged social engineering tricks to send soliciting messages under the pretext of an infected user. Inquisitive people who trail the link will also get corrupted with malware and unintentionally spread the texts further. Unfortunately, many people will click any link in their feeds and add any contact to their personal network, without knowing the real wolf hidden behind the screens. This innate trust, especially from the messages sent by friends, who have an infected account makes the attack-chain to be successful, irrespective of whether it is a phishing attack, a spam or a malicious worm spreading through automated scripts. Past experiences have proved that the safety and privacy of the user can be violated, either by flaws in the underlying structure or by installed applications that have seeped out data. But, many users are still ignorant or rather indifferent towards the security settings provided by the network and expose themselves to the risks that arise out of disclosing too much personal information. Social networks definitely can be definitely be informative and entertaining, but users should exercise caution and behave with the required level of uncertainty.

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# Review on Reformulation of the Mean-Variance Model with Real-life Trading Restrictions

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## Abstract

In this paper, we consider a class of portfolio selection problems with cardinality and minimum buy-in threshold constraints in real-life which can be formulated as mixed-integer quadratic programming (MIQP). Two reformulation methods that generate the same tight continuous relaxation of original problem are compared in the context under the branch-and-bound algorithm, one is the Perspective Reformulation and another is the Lift-and-Convexification Reformulation (LCR). Computational results show that the (PC) is more competitive than the (LCR) method in terms of computing time and nodes in MIQP solver CPLEX 12.7, what's more, this outperformance becomes more obvious as the size of instances grows.

**Keywords:** Portfolio selection, MIQP, Perspective reformulation, LCR, Branch-and-Bound algorithm

## 1. Introduction

Since Markowitz first proposed the mean-variance model in (Markowitz, 1952), the portfolio selection problem has become a popular research topic in the field of modern financial research. Considering there are  $n$  risky assets in the market. The expected return vector and the covariance matrix for the assets are  $\mu$  and  $Q$  respectively. Supposing investor has amount of money to invest in a certain period of time and he has to decide which risky assets to buy and how to allocate his capitals so that raising the revenue and reducing the risk as much as possible. The resulting investment MV model revealing the problem that of trading returns versus risk which can be formulated as:

$$\begin{aligned} \text{(MV)} \quad & \min x^T Q x \\ & \text{s.t. } e^T x = I, \\ & \mu^T x \geq \rho \end{aligned} \tag{1}$$
$$\tag{2}$$

where  $x=(x_1, x_2, \dots, x_n)$  represents the proportion of the investment in risky asset  $i, i=1, \dots, n$ , the objective function  $x^T Q x$  on behalf of the associated risk, constraint (1) depicts a feasible allocation of the available resources over assets, constraint (2) meant that the expected return exceeds prescribed expected return level set by investor.

Motivated by Markowitz's work, many researchers have conducted a series of extension work based on mean-variance model. Ogryczak and Ruszczyński (1997); Ouederni and Sullivan (1991); Green and Hollifield (1992); Mao (1970) measured the risk by semivariance and established a mean-semivariance model of portfolio selection. Markowitz (1959) also proved that the mean-semivariance model has better performance than MV model. Konno and Yamazaki (1991) proposed a mean absolute deviation (MAD) model which can remove the most disadvantages of classical MV model and be solved by linear program with largely reduced computational effort. With the rapid development of computer technology, many scholars turned to investigate the skew model for the reason that skewness plays an important role if the distribution of the rate of assets return is asymmetric around the mean. Konno, Shirakawa and Yamazaki (1993) introduced skewness into the mean-absolute deviation model. Then, Konno and Suzuki (1995) introduced the skewness to the mean-variance model, established the mean-variance-skew model and solved the model by integer programming method quickly and efficiently. Value-at-Risk (VaR) was proposed as a risk measure tool to evaluate the maximum loss of assets at a certain probability level for a specific period of time. When using the VaR, however, the original optimization problem will be transformed into a nonconvex problem which is difficult to solve. To overcome this difficulty,

Rockafellar and Uryasev proposed an improved risk measurement method in (Rockafellar & Uryasev, 2000; Uryasev, 2000) based on VaR—Conditional Value at Risk (CVaR). Since then, many scholars have demonstrated that the CVaR method is superior to the VaR method in the risk measurement of various financial optimization problems through empirical analysis, such as Andersson, Mausser, Rosen and Uryasev (2001); Rockafellar and Uryasev (2002); Mansini, Ogryczak and Grazia Speranza (2003); Topaloglou, Vladimirov and Zenios (2002).

Compared with above models, the standard MV problem is a convex quadratic programming and easy to solve. However, in many real cases, rational investor would not completely follow the classical MV model due to many practical factors, for example, a lot of very small holdings will yield extra transaction and management costs, so the minimum and maximum buy-in thresholds can not be negligible in practice with the expression form of  $x_i \in \{0\} \cup [\alpha_i, \beta_i], i = 1, \dots, n$ . This type of variable is mathematically called semi-continuous variable. We have another expression of this structure with the binary variable:

$$\alpha_i y_i \leq x_i \leq \beta_i y_i, y_i \in \{0, 1\}, i = 1, \dots, n$$

What's more, the MV model often appears in many practical applications along with the cardinality constraint to limit the number of asset to invest. The mathematical expression of cardinality constraints can be formulated as following:

$$\text{card}(x) \leq K$$

Where  $\text{card}(x)$  explains the number of nonzero variables  $x_i$ ,  $K$  is an integer with  $1 \leq K \leq n$ . Moreover, the cardinality constraints are usually expressed as  $e^T y \leq K$  with binary variable  $y_i \in \{0, 1\}, i = 1, \dots, n$  when modeling the real-world optimization problems, where  $e$  is a vector of all ones. So we focus on the mean-variance portfolio optimization problems with cardinality and minimum buy-in threshold constraints in this paper which can be formulated as following:

$$(QP) \quad \min f(x) = x^T Q x + c^T x \tag{3}$$

$$\text{s.t. } e^T x = 1, \tag{4}$$

$$\mu^T x \geq \rho \tag{5}$$

$$\alpha_i y_i \leq x_i \leq \beta_i y_i, y_i \in \{0, 1\}, i = 1, \dots, n \tag{6}$$

$$e^T y \leq K \tag{7}$$

where  $Q$  is an  $n \times n$  positive semi definite symmetric matrix,  $c \in \mathbb{R}^n, \mu \in \mathbb{R}^n, \rho \in \mathbb{R}$ , constraint (6) is referred as minimum buy-in threshold constraint to prevent the investors from holding some assets with a very small amount and constraint (7) is the cardinality constraint to limit the total number of different assets in the optimal portfolio. With the joint of cardinality and minimum threshold constraints, the original quadratic programming problem turned into a mixed-integer quadratic programming (MIQP) problem with semi-continuous variables. Various solution methods for this class of portfolio optimization problems with cardinality and minimum threshold constraints have been investigated in the literature by many researchers, such as Bertsimas and Shioda (2009); Bienstock (1996); Bonami and Lejeune (2009); Cesarone, Scozzari and Tardella (2009); Cui, Zheng, Zhu and Sun (2013); Gao and Li (2013); Li, Sun and Wang (2006). Many heuristic algorithms also have been used to solve such MV problems such as genetic algorithms, tabu search, and simulated annealing (see, e.g., (Chang, Meade, Beasley, & Sharaiha, 2000; Blog, Hoek, & Timmer, 1983; Jacob, 1974; Maringer & Kellerer, 2003; Mitra, Ellison, & Scowcroft, 2007)). Despite the various virtues of heuristic algorithm, it cannot guarantee to find the optimal solution or a satisfactory solution of (QP).

In general, problem (QP) is NP-hard problem. The difficulty of finding an efficient solution for this class of MIQP problems arises from the discrete structure induced by the semi-continuous variables in the model so that it has become an active area of research. Typical solutions for this class of MIQP are based on branch-and-bound algorithm. Thus estimating a tighter lower bound which can substantially improve the efficiency of the branch-and-bound algorithm is of much importance. In real applications, however, the lower bound generated by the standard continuous relaxation is too loose to improve the computation efficiency. Therefore many equivalent reformulations have been proposed for the tighter lower bound.

Perspective reformulation is a well-performed reformulation method since it depends on replacing the original convex function in the formulation with its so-called perspective function which is related to the convex envelope of the objective function in original problem. Frangioni and Gentile added the perspective cuts to the reformulation which objective function is either separable in (Frangioni & Gentile, 2006) or nonseparable in (Frangioni, & Gentile, 2007). Four types reformulations of tractable perspective relaxation have been proposed to solve the high nonlinearity of objective function due to the fractional term in perspective function. Frangioni

and Gentile (2009) compared two of them, one is the second-order cone program (SOCP) reformulation, another is perspective cuts (PC) reformulation, and then a new method called projected perspective relaxation (P<sup>2</sup>R) had been put up in (Frangioni, Gentile, Grande, & Pacifici, 2011) under three further restrict assumptions so that the perspective relaxation of MIQP can be reformulated as a piecewise linear-quadratic problem and then the consequent model can be simplified as roughly the same size of the original standard continuous relaxation. However, this method has many limitations in application. To solve it, Frangioni, Furini, & Gentile (2016) invented another P<sup>2</sup>R based approach—Approximated Projected Perspective Reformulation (AP<sup>2</sup>R) which is approximated to the P<sup>2</sup>R approach. Other contribution work about perspective reformulation can be seen in (Günlük & Linderoth, 2012; Zheng, Sun, & Li, 2014).

Besides the perspective reformulation, another type of reformulation method called lift-and-convexification reformulation (LCR) has been put forward in (Wu, Sun, Li, & Zheng, 2015). The substance of this approach is to add a quadratic equivalent term multiplied by a parameter to the objective function and to convexify the objective function so that the resulting formulation equivalent to the original problem. Moreover, the continuous relaxation of reformulation obtains a lower bound the same as that obtained from the perspective reformulation in (Zheng et al., 2014) with dramatically reduced computational time of (SDP). This approach originates from the idea of quadratic convex reformulation (QCR) method which was first introduced for binary quadratic programming in (Hammer & Rubin, 1970) to show that by adding a quadratic equivalent term to the objective function, the original problem is equivalent to one convex quadratic programming that has positive semidefinite matrix. Billionnet, Elloumi and Plateau (2008, 2009) improved this method further by adding an equality constraint in the reformulation and found the best convex reformulation by semidefinite programming. After that Billionnet, Elloumi and Lambert (2012, 2015) extended the QCR method to general mixed-integer programs.

The paper is organized as follows: In section 2, we review the current state-of-the-art perspective reformulation for the MIQP with semicontinuous variables and section 3 gives a review of the recent work LCR for the MIQP with semi-continuous variables. In section 4, we conduct numerical experiment to compare the effectiveness of perspective reformulation and LCR. Conclusions are made in section 6.

*Notation:* Throughout the paper, we denote by  $v(\cdot)$  the optimal value of problem  $(\cdot)$ , and  $\square^n$  the nonnegative orthant of  $\square^n$ . For any  $a \in \square^n$ , we denote by  $\text{diag}(a) = \text{diag}(a_1, \dots, a_n)$  the diagonal matrix with  $a_i$  being the  $i$ th diagonal element. For any matrix  $A$ , we denote  $A \geq 0$  as  $A$  is a semidefinite matrix in our paper.

**2. Perspective Reformulation Review**

In this section, we make a review of perspective reformulation of mixed-integer quadratic programming with semi-continuous variables and cardinality constraint. Firstly, the perspective reformulation requires the objective function is separable while the objective function  $f(x)$  in (QP) is usually nonseparable. Frangioni and Gentile (2007) proposed a diagonal decomposition method to decompose the quadratic form  $x^T Q x$  as  $x^T(Q - \text{diag}(d))x + x^T \text{diag}(d)x$  so that extracting the separable terms, where  $d \in \square_+^n$  with  $Q - D \geq 0$  and  $\text{diag}(d)$  is a diagonal  $n \times n$  matrix with the elements of  $d$  on the diagonal. Replacing the separable term  $x^T \text{diag}(d)x$  with its convex envelope over the semi-continuous variables, which is the sum of the perspective functions of  $d_i x_i^2$  over  $x_i \in \{0\} \cup [\alpha_i, \beta_i]$ ,  $i = 1, \dots, n$ , then the perspective reformulation of (QP) can be expressed as the following:

$$\begin{aligned}
 \text{(PR}(d)) \quad & \min \quad x^T(Q - \text{diag}(d)) + c^T x + \sum_{i=1}^n d_i(x_i^2 / y_i) \\
 & \text{s.t. (4), (5), (6), (7)}
 \end{aligned}$$

Since the high nonlinearity of objective function due to the fractional term in perspective function of (PR( $d$ )), efficient solution methods can not be directly applied to solve (PR( $d$ )). Then two tractable reformulation methods were proposed to deal with it. One is the second-order cone programming (SOCP) reformulation proposed in (Aktürk, Atamtürk, & Gürel, 2009; Günlük, & Linderoth, 2010) which introducing an additional variable  $\phi_i = x_i^2 / y_i$  for each  $i = 1, \dots, n$  and then rewriting the  $\phi_i \geq x_i^2 / y_i$  as an SOCP constraint. The resulting SOCP reformulation of (PR( $d$ )) can be rewrite as the following form:

$$\begin{aligned}
 \text{(SOCP}(d)) \quad & \min \quad x^T(Q - \text{diag}(d)) + c^T x + \phi^T d \\
 & \text{s.t.} \quad \left\| \begin{matrix} x_i \\ \phi - y_i \end{matrix} \right\| \leq \frac{\phi + y_i}{2}, i = 1, \dots, n,
 \end{aligned}$$

$$(4), (5), (6), (7)$$

Another is the perspective cut (P/C) reformulation proposed in (Frangioni and Gentile, 2007). Representing the epigraph of  $x_i^2 / y_i$  by a set of perspective cut inequalities which can be expressed as the following form:

$$\begin{aligned} \text{(PC}(d)) \quad & \min \quad x^T(Q - \text{diag}(d)) + c^T x + \sum_{i=1}^n d_i v_i \\ & \text{s.t.} \quad v_i \geq 2\bar{x}_i x_i - \bar{x}_i^2 y_i, \forall \bar{x}_i \in [\alpha_i, \beta_i], i = 1, \dots, n, \end{aligned}$$

$$(4), (5), (6), (7)$$

A key point is how to choose the best parameter vector  $d$  when implementing the SOCP reformulation (SOCP( $d$ )) and (P/C) reformulation (PC( $d$ )) so that the lower bound is as tight as possible. One simple way is to select the smallest eigenvalue of  $Q$  as the elements of vector  $d$ . Then Frangioni and Gentile (2007) proposed a heuristic method to find a “better”  $d$  compared with the smallest eigenvalue method by solving the following “small” semidefinite programming (SDP):

$$\text{(SDP}_s) \quad \max \{e^T d \mid Q - D \geq 0, d \geq 0\},$$

Zheng et al. (2014) proposed a large SDP approach to find the “best” parameter vector  $d$  in the perspective reformulation. Since the continuous relaxations (PR( $d$ )), (SOCP( $d$ )), (PC( $d$ )) have the same continuous bounds, the best parameter vector  $d$  that maximize the  $v(\text{PR}(d))$  can be found by solving the following problem:

$$\text{(MAX}_d) \quad \max \{v(\overline{\text{PR}}(d)) \mid Q - D \geq 0, d \geq 0\},$$

According to the conclusion in (Zheng et al., 2014), problem (MAX $_d$ ) is equivalent to the following SDP problem:

$$\begin{aligned} \text{(SDP}_l) \quad & \max \quad -Ks - e^T \pi - \tau \\ & \text{s.t.} \quad \begin{pmatrix} d_i + \mu_i & \frac{1}{2}(c_i - \lambda_i - (\alpha_i + \beta_i)\mu_i) \\ \frac{1}{2}(c_i - \lambda_i - (\alpha_i + \beta_i)\mu_i)^T & \pi_i + s + \alpha_i \beta_i \mu_i \end{pmatrix} \geq 0, \\ & \quad i = 1, \dots, n, \\ & \quad \begin{pmatrix} Q - \text{diag}(\phi) & \frac{1}{2}(\lambda + A^T \eta) \\ \frac{1}{2}(\lambda + A^T \eta)^T & -\eta^T b + \tau \end{pmatrix} \geq 0, \\ & \quad (s, \eta, \mu, \pi, d) \in \mathbb{R}_+ \times \mathbb{R}_+^m \times \mathbb{R}_+^n \times \mathbb{R}_+^n \times \mathbb{R}_+^n, \\ & \quad (\tau, \lambda) \in \mathbb{R} \times \mathbb{R}^n \end{aligned}$$

Although the computation time of solving the SDP problem (SDP $_l$ ) is longer than solving (SDP $_s$ ) due to the large dimension, the dramatically time reduction in computing SOCP or P/C reformulations pays off the long time consumption in (SDP $_l$ ). Moreover, computational results in (Zheng et al., 2014) were shown that using the parameter vector  $d$  computed by the large SDP formulation can considerably improve the performance of the perspective reformulations, largely due to the improvement of the continuous bounds.

### 3. Lift-and-Convexification Reformulation (LCR) Review

Another efficient solution method for mixed-integer quadratic programming with semi-continuous variables and cardinality constraint is the lift-and-convexification reformulation (LCR) proposed by Wu et al. (2015), where the original problem is:

$$\text{(P)} \quad \min \quad f(x, y) = x^T Q x + c^T x + h^T y \tag{8}$$

$$\text{s.t.} \quad Ax + By \leq d, \tag{9}$$

$$\alpha_i y_i \leq x_i \leq \beta_i y_i, y_i \in \{0, 1\}, i = 1, \dots, n \tag{10}$$

The LCR is to add a quadratic equivalent term  $\sum_{i=1}^n (u_i x_i + v_i y_i)(y_i - 1)$ , where  $u \in \mathbb{R}^n, v \in \mathbb{R}^n$  to the objective function and to convexify the objective function at the same time so that the resulting formulation equivalent to

the original problem. The reformulated problem  $(P(u, v))$  can be expressed as following:

$$\begin{aligned} (P(u,v)) \quad & \min f_{u,v}(x,y) = f(x,y) + \sum_{i=1}^n (u_i x_i + v_i y_i)(y_i - 1) \\ & \text{s.t. (9), (10)} \end{aligned}$$

The reformulated problem  $(P(u, v))$  can be solved by the classical branch-and-bound algorithm based on its lower bound, which is the optimal value of its continuous relaxation. Let  $u = (u_1, \dots, u_n)^T$  and  $v = (v_1, \dots, v_n)^T$ ,  $(\bar{P}(u, v))$  denote the continuous relaxation of  $(P(u, v))$  by relaxing  $y \in \{0,1\}^n$  to  $y \in [0,1]^n$ . Moreover, we define the value of  $(P(u, v))$  as  $v(\bar{P}(u, v))$ . The best parameters  $(u, v)$  can be found by solving the following problem:

$$(MAX_{uv}) \quad \max \{v(\bar{P}(u, v)) \mid u, v \in \square^n, f_{u,v}(x, y) \text{ is convex}\}$$

**Theorem 1** Problem  $(MAX_{uv})$  is equivalent to the following semidefinite programming SDP problem:

$$(SDP_l) \quad \max -Ks - e^T \pi - \tau$$

$$\begin{aligned} \text{s.t.} \quad & \begin{pmatrix} Q & \frac{1}{2} \text{diag}(u) & \frac{1}{2} \alpha(u, \eta, \mu, \sigma) \\ \frac{1}{2} \text{diag}(u) & \text{diag}(v) & \frac{1}{2} \beta(v, \eta, \mu, \sigma, \lambda, \pi) \\ \frac{1}{2} \alpha(u, \eta, \mu, \sigma)^T & \frac{1}{2} \beta(v, \eta, \mu, \sigma, \lambda, \pi)^T & -\eta d - e^T \pi - \tau \end{pmatrix} \geq 0, \\ & (\eta, \mu, \sigma, \lambda, \pi) \in \square_+^m \times \square_+^n \times \square_+^n \times \square_+^n \times \square_+^n, \\ & (u, v, \tau) \in \square^n \times \square^n \times \square \end{aligned}$$

Where

$$\alpha(u, \eta, \mu, \sigma) = c - u + A^T \eta - \mu + \sigma$$

$$\beta(v, \eta, \mu, \sigma, \lambda, \pi) = h - v + B^T \eta + \text{diag}(\alpha) \mu - \text{diag}(\beta) \sigma - \lambda + \pi$$

#### 4. Computational results

In this section, we conduct a series of computational experiments for the mean-variance portfolio selection problem (QP) with cardinality and minimum threshold constraints in real-life described in section 1. The aim of our numerical tests is to compare the performance of the perspective reformulation and the LCR proposed in section 2 and section 3 respectively under the branch-and-bound algorithm. Since Frangioni and Gentile (2009) has drew the conclusion that the  $(PC(d))$  is more competitive than the  $(SOCP(d))$  if probably processed, then we focus on the following two reformulation method:

- (PC): the perspective cut reformulation  $(PC(d))$  with  $d = d^*$ , where  $d^*$  is obtained by solving  $(SDP_l)$ .
- (LCR): the lift-and-convexification reformulation  $(P(u, v))$  with  $(u, v) = (u^*, v^*)$ , where  $(u^*, v^*)$  is obtained by solving  $(SDP_q)$ .

To conduct the test of our approach for above MV problem, we randomly generated 5 instances for each test problem with the same size ( $n = 200, 300, 400$ ). For each instance, test was conducted under  $K = 4, 6, 8, 12$  and without cardinality constraint. The diagonal elements and non diagonal elements of the real symmetric matrix  $Q$  are randomly generated in the interval  $[4, 1000]$  and  $[1, 10]$ , respectively. The elements of matrices  $\mu$  and the interval of expected return level  $\rho$  are all randomly set in  $[0.002, 0.01]$ . The intervals of minimum and maximum buy-in thresholds  $\alpha_i$  and  $\beta_i$  have been randomly set in  $[0.075, 0.125]$  and  $[0.375, 0.425]$ , respectively. The two SDP are all implemented in Matlab R2016b and run on a PC (2.5GHz, 8GB RAM). The computational results are interface as the lower bounds used in CPLEX 12.7 where the MIQP are solved by the MIQP solver. The CPU time limit is set at 10000 seconds and the CPLEX 12.7 is operated with the default setting.

Table 1 reports the computational results of two reformulation methods (PC and LCR) for the MV problem where the column “time<sub>l</sub>” is the computational time for solving  $(SDP_l)$  and “time<sub>q</sub>” is the computational time for solving  $(SDP_q)$ . Each line reports the average results for the 5 instances in a subset. The column “gap” refers to the relative gap between the objective value of the exiting solution and the best lower bound which is expressed in percentage. The column “time” is the computing time (in seconds) and the column “nodes” is the number of nodes when solved in CPLEX. The “nonK” is expressed as the instances without cardinality constraint.

Table 1. Comparison Results of Reformulations for (MV)

(MV)	K	time <sub>l</sub>	time <sub>q</sub>	(PC)			(LCR)		
				gap	time	nodes	gap	time	nodes
200	4	15.56	46.63	0	5.86	117	0	2.75	105
	6	12.33	41.86	0	1.98	50	0	1.19	38
	8	11.2	41.22	0	2.19	60	0	1.25	62
	12	10.84	51.75	0	1.69	49	0	1.13	44
	nonK	12.83	42.47	0	1.20	56	0	1.11	84
300	4	24.45	144.69	0	53.72	492	0	60.57	541
	6	29.02	159.55	0	7.27	187	0	5.5	223
	8	26.36	167.44	0	6.88	73	0	5.32	83
	12	23.83	165.81	0	11.41	200	0	20.16	270
	nonk	24.45	179.31	0	5.87	112	0	15.26	190
400	4	53.31	457.13	0	1234.85	3038	0	1411.56	11353
	6	52.03	427.92	0	191.7	1126	0	233.07	1990
	8	61.19	514.03	0	229.06	3521	0	848.92	9831
	12	60.73	460.59	0	158.28	926	0	695.63	4629
	nonk	58.83	383.45	0	40.54	435	0	59.74	604

From the Table 1 we can see that the average computing time of (SDP<sub>l</sub>) is far less than the computing time of (SDP<sub>q</sub>), what’s more, the computing time gap between (SDP<sub>l</sub>) and (SDP<sub>q</sub>) increases dramatically as the dimension increases. On the other hand, when comparing the time of MIQP solver CPLEX, the computing time for (PC) is longer than (LCR) as  $n = 200$ . However, the computing time for (PC) is less than (LCR) when  $n = 300, 400$ . From the data in column “gap”, we can see that the lower bound obtained from (SDP<sub>l</sub>) and (SDP<sub>q</sub>) is nearly the same as the objective value obtained by CPLEX 12.7. Moreover, for the total computing time (the sum of time for solving SDP and corresponding PC/LCR), (PC) performs better than (LCR) for all the instances. For the number of nodes explored in (PC) and (LCR), (PC) performs better than (LCR) for 12 out of the total 15 instances. The computational result is well as we expected because the relaxations in (LCR) are in general looser than the ones in (PC) at children nodes.

**5. Conclusions**

We have reviewed two kinds of reformulation methods for the mean-variance portfolio selection problem with cardinality and minimum buy-in threshold constraints which can be classified as the mixed-integer quadratic programming problems (MIQP). One is Perspective Reformulation and another is Lift-and-Convexification (LCR). We mainly focus on the theory review and its application in portfolio selection problems. According to the computational results, both the (PC) and the (LCR) are useful tools for obtaining the tighter lower bounds on MIQP with semi-continuous variables and cardinality constraint. Further more, it seems that the (PC) is more competitive than the (LCR) method in both computing time and nodes in MIQP solver CPLEX 12.7 and this outperformance becomes more obvious as the size of instances grows.

**References**

Aktürk, M. S., Atamtürk, A., & Gürel, S. (2009). A strong conic quadratic reformulation for machine-job assignment with controllable processing times. *Operations Research Letters*, 37(3), 187-191. <https://doi.org/10.1016/j.orl.2008.12.009>

Andersson, F., Mausser, H., Rosen, D., & Uryasev, S. (2001). Credit risk optimization with conditional value-at-risk criterion. *Mathematical Programming*, 89(2), 273-291. <https://doi.org/10.1007/PL00011399>

Bertsimas, D., & Shioda, R. (2009). Algorithm for cardinality-constrained quadratic optimization. *Computational Optimization and Applications*, 43(1), 1-22. <https://doi.org/10.1007/s10589-007-9126-9>

Bienstock, D. (1996). Computational study of a family of mixed-integer quadratic programming problems. *Mathematical Programming*, 74(2), 121-140. <https://doi.org/10.1007/BF02592208>



- Billionnet, A., Elloumi, S., & Lambert, A. (2012). Extending the QCR method to general mixed-integer programs. *Mathematical programming*, 131(1-2), 381-401. <https://doi.org/10.1007/s10107-010-0381-7>
- Billionnet, A., Elloumi, S., & Lambert, A. (2015). A branch and bound algorithm for general mixed-integer quadratic programs based on quadratic convex relaxation. *Journal of Combinatorial Optimization*, 28(2), 376-399. <https://doi.org/10.1007/s10878-012-9560-1>
- Billionnet, A., Elloumi, S., & Plateau, M.-C. (2008). Quadratic 0-1 programming: tightening linear or quadratic convex reformulation by use of relaxations. *RAIRO-Operations Research*, 42(2), 103-121. <https://doi.org/10.1051/ro:2008011>
- Billionnet, A., Elloumi, S., & Plateau, M.-C. (2009). Improving the performance of standard solvers for quadratic 0-1 programs by a tight convex reformulation: The QCR method. *Discrete Applied Mathematics*, 157(6), 1185-1197. <https://doi.org/10.1016/j.dam.2007.12.007>
- Blog, B., Hoek, G. V. D., & Timmer, G. T. (1983). The optimal selection of small portfolios. *Management Science*, 29(7), 792-798. <https://doi.org/10.1287/mnsc.29.7.792>
- Bonami, P., & Lejeune, M. A. (2009). An exact solution approach for portfolio optimization problems under stochastic and integer constraints. *Operations research*, 57(3), 650-670. <https://doi.org/10.1287/opre.1080.0599>
- Cesarone, F., Scozzari, A., & Tardella, F. (2009). Efficient algorithms for mean-variance portfolio optimization with hard real-world constraints. *Giornale dell'Istituto Italiano degli Attuari*, 72, 37-56.
- Chang, T. J., Meade, N., Beasley, J. E., & Sharaiha, Y. M. (2000). Heuristics for cardinality constrained portfolio optimisation. *Computers and Operations Research*, 27(13), 1271-1302. [https://doi.org/10.1016/S0305-0548\(99\)00074-X](https://doi.org/10.1016/S0305-0548(99)00074-X)
- Cui, X. T., Zheng, X. J., Zhu, S. S., & Sun, X. L. (2013). Convex relaxations and MIQCQP reformulations for a class of cardinality-constrained portfolio selection problems. *Journal of Global Optimization*, 56(4), 1409-1423. <https://doi.org/10.1007/s10898-012-9842-2>
- Frangioni, A., Furini, F., & Gentile, C. (2016). Approximated perspective relaxations: a project and lift approach. *Computational Optimization and Applications*, 63(3), 705-735. <https://doi.org/10.1007/s10589-015-9787-8>
- Frangioni, A., & Gentile, C. (2006). Perspective cuts for a class of convex 0C1 mixed integer programs. *Mathematical Programming*, 106(2), 225-236. <https://doi.org/10.1007/s10107-005-0594-3>
- Frangioni, A., & Gentile, C. (2007). SDP diagonalizations and perspective cuts for a class of nonseparable MIQP. *Operations Research Letters*, 35(2), 181-185. <https://doi.org/10.1016/j.orl.2006.03.008>
- Frangioni, A., & Gentile, C. (2009). A computational comparison of reformulations of the perspective relaxation: SOCP vs. cutting planes. *Operations Research Letters*, 37(3), 206-210. <https://doi.org/10.1016/j.orl.2009.02.003>
- Frangioni, A., Gentile, C., Grande, E., & Pacifici, A. (2011). Projected perspective reformulations with applications in design problems. *Operations Research*, 59(5), 1225-1232. <https://doi.org/10.1287/opre.1110.0930>
- Gao, J., & Li, D. (2013). Optimal cardinality constrained portfolio selection. *Operations Research*, 61(3), 745-761. <https://doi.org/10.1287/opre.2013.1170>
- Günlük, O., & Linderoth, J. (2010). Perspective reformulations of mixed integer nonlinear programs with indicator variables. *Mathematical programming*, 124(1-2), 183-205. <https://doi.org/10.1007/s10107-010-0360-z>
- Günlük, O., & Linderoth, J. (2012). Perspective reformulation and applications. <https://doi.org/10.1007/s10107-010-0360-z>
- Green, R. C., & Hollifield, B. (1992). When will mean-variance efficient portfolios be well diversified? *The Journal of Finance*, 47(5), 1785-1809. <https://doi.org/10.1111/j.1540-6261.1992.tb04683.x>
- Hammer, P. L., & Rubin, A. A. (1970). Some remarks on quadratic programming with 0-1 variables. *Revue française d'informatique et de recherche opérationnelle. Série verte*, 4(V3), 67-79. Retrieved from [http://www.numdam.org/article/RO\\_1970\\_\\_4\\_3\\_67\\_0.pdf](http://www.numdam.org/article/RO_1970__4_3_67_0.pdf)
- Jacob, N. L. (1974). A limited-diversification portfolio selection model for the small investor. *Journal of Finance*, 29(3), 847-856. <https://doi.org/10.1111/j.1540-6261.1974.tb01487.x>

- Konno, H., Shirakawa, H., & Yamazaki, H. (1993). A mean-absolute deviation-skewness portfolio optimization model. *Annals of Operations Research*, 45(1), 205-220. <https://doi.org/10.1007/BF02282050>
- Konno, H., & Suzuki, K.-i. (1995). A mean-variance-skewness portfolio optimization model. *Journal of the Operations Research Society of Japan*, 38(2), 173-187. <http://doi.org/10.15807/jorsj.38.173>
- Konno, H., & Yamazaki, H. (1991). Mean-absolute deviation portfolio optimization model and its applications to Tokyo stock market. *Management science*, 37(5), 519-531. <https://doi.org/10.1287/mnsc.37.5.519>
- Li, D., Sun, X., & Wang, J. (2006). Optimal lot solution to cardinality constrained mean-variance formulation for portfolio selection. *Mathematical Finance*, 16(1), 83-101. <https://doi.org/10.1111/j.1467-9965.2006.00262.x>
- Mansini, R., Ogryczak, W., & Grazia Speranza, M. (2003). Lp solvable models for portfolio optimization: A classification and computational comparison. *IMA Journal of Management Mathematics*, 14(3), 187-220. <https://doi.org/10.1093/imaman/14.3.187>
- Mao, J. C. (1970). Models of capital budgeting, Ev vs Es. *Journal of financial and quantitative analysis*, 4(5), 657-675. <https://doi.org/10.2307/2330119>
- Maringer, D., & Kellerer, H. (2003). Optimization of cardinality constrained portfolios with a hybrid local search algorithm. *OR Spectrum*, 25(4), 481-495. <https://doi.org/10.1007/s00291-003-0139-1>
- Markowitz, H. (1952). Portfolio selection. *The journal of finance*, 7(1), 77-91. <https://doi.org/10.1111/j.1540-6261.1952.tb01525.x>
- Markowitz, H. (1959). Portfolio selection: efficient diversification of investments.
- Mitra, G., Ellison, F., & Scowcroft, A. (2007). Quadratic programming for portfolio planning: Insights into algorithmic and computational issues part ii? processing of portfolio planning models with discrete constraints. *Journal of Asset Management*, 8(4), 249-258. <https://doi.org/10.1057/palgrave.jam.2250079>
- Ogryczak, W., & Ruszczyński, A. (1997). On stochastic dominance and mean-semideviation models. *Working Papers*, 3(3), 169-190. Retrieved from <http://pure.iiasa.ac.at/5251/1/IR-97-043.pdf>
- Ouederni, B. N., & Sullivan, W. G. (1991). A semi-variance model for incorporating risk into capital investment analysis. *The Engineering Economist*, 36(2), 83-106. <http://doi.org/10.1080/00137919108903035>
- Rockafellar, R. T., & Uryasev, S. (2000). Optimization of conditional value-at-risk. *Journal of risk*, 2, 21-42. <https://doi.org/10.21314/JOR.2000.038>
- Rockafellar, R. T., & Uryasev, S. (2002). Conditional value-at-risk for general loss distributions. *Journal of banking and finance*, 26(7), 1443-1471. [https://doi.org/10.1016/S0378-4266\(02\)00271-6](https://doi.org/10.1016/S0378-4266(02)00271-6)
- Topaloglou, N., Vladimirov, H., & Zenios, S. A. (2002). CVaR models with selective hedging for international asset allocation. *Journal of Banking and Finance*, 26(7), 1535-1561. [https://doi.org/10.1016/S0378-4266\(02\)00289-3](https://doi.org/10.1016/S0378-4266(02)00289-3)
- Uryasev, S. (2000). Conditional value-at-risk: Optimization algorithms and applications. *Computational intelligence for financial engineering*, 49-57. <https://doi.org/10.1109/CIFER.2000.844598>
- Wu, B., Sun, X., Li, D., & Zheng, X. (2015). Quadratic Convex Reformulations for Semicontinuous Quadratic Programming. *Siam Journal on Optimization*, 27(3), 1531-1553. <https://doi.org/10.1137/15M1012232>
- Zheng, X., Sun, X., & Li, D. (2014). Improving the performance of MIQP solvers for quadratic programs with cardinality and minimum threshold constraints: A semidefinite program approach. *Inform Journal on Computing*, 26(4), 690-703. <https://doi.org/10.1287/ijoc.2014.0592>

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# Treatment of the Race-Consciousness in Ralph Ellison's *Invisible Man*

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## Abstract

Ralph Ellison's *Invisible Man* portrays the plight of 'blacks' in America and is a testimony to the fact that the negroes feel disillusioned in a world which is dominated by the white oppressors. Moreover, it is my assertion in the paper that the journey of the un-named hero is a journey from innocence to awareness. The protagonist at the end comes to realize the duplicity of the whites and through his experiences has been successful to convey his individuality.

**Keywords:** Race-consciousness, violence, discontent, identity, individuality, universal man, journey, awareness, freedom

## 1. Introduction

The burden of race-consciousness has been an unavoidable lot of the Blacks ever since they were brought as slaves of the USA. Even after emancipation, they continue to suffer the ignominies of their white masters. This has not only contributed to violence and discontent in the country, but has been also distorted both the whites and the blacks. For the latter, it has meant both a most formidable challenge and any excuse for addiction to "self-pity, anxiety and psychological dependence."<sup>1</sup>

In any case, the result is that every Negro in America continues to carry all through his life the burden of race-consciousness like a corpse on his back. The impact of slavery has been most debilitating. Many a Black feels inferior because he repeatedly told that he is inferior; most turn self-defensive and aggressive in their assertions of their superiority. The distorted system yields the Blacks "no true self-consciousness." They always look at themselves with the eyes of the whites look at themselves as if they were their own other: "One ever feels his two-ness-an American, a Negro; two souls, two thoughts, two unreconciled strivings; two warring ideals in one dark body, whose dogged strength alone keeps it from being torn asunder."<sup>2</sup> This "consciousness of ambiguity"<sup>3</sup> finds its expression in Ellison's unnamed narrator – hero in *Invisible Man* whose journey from the south to the north becomes "a journey into the self"<sup>4</sup> or "quest for identity ... an epic journey through a labyrinth of freedom, conformity, denial and possibility."<sup>5</sup>

Ellison's reaction to the type of criticism that treats the protagonist of the novel as representative of a universal man is noteworthy. In a letter addressed to James Alan McPherson Ellison says: "So many concerned blacks had read the plight of the Afro-American into this figure with no face and no name. So many people saw the author riding a champion the cause of the black man. Those same people heard him say that the symbol was representative of universal man. I found the most disheartening,"<sup>6</sup> therefore, in view of the aforesaid evidence, it is difficult to believe in the statements which attempt at highlighting the universal overtones of the novel. Indeed. That seems to be a way to undermine the main thrust of the book, which is surely intended by Ellison to serve as an eye-opener to not only the white oppressors the Uncle Toms as well.

In fact, the critics' attempts to attribute universal dimension to the novel by equating the protagonist the "No man and Everyman" seem to be intriguing as these epithets do not lead the reader to the heart of the matter which lies in Ellison's attempt at self-definition as the American-Negro has been "misnamed by others"<sup>7</sup> Viewed from the perspective of black experience, the novel testifies to the fact of discrimination of the blacks by the whites on the basis of color. It articulates the predicament, the dilemma of Negro who find themselves disillusioned in the sham world of white oppressors. Far from seeking to universalize, the phenomenon of exploitation of the black by the white, Ellison's novels an attempt at self-definition. It can be viewed as Ellison's attempt to deifier and assert his racial identity. "At a time when many blacks, especially the young, are denying all influences of American culture, Ellison as always,

doggedly affirms his identity as Negro-American, a product of the blending of both cultures. But more than this, he attempts to explore most of complex implications of this burden in his fiction, in his essays, speeches, and his private life ... he is thinking Blackman who has integrated his homework into the fabrics of his private life."<sup>8</sup> Thus in considering himself as "a product of the blending of both cultures" – the black as well as the American – Ellison does not recognize any "American culture which is not the partial creation of black people"<sup>9</sup>. The novel is, thus, an attempt to "assert his own individuality in his own terms"<sup>10</sup> by challenging the defence mechanisms of the black community. In the process, his journey becomes a journey from innocence to awareness, a journey which enables him to see through the duplicity of the white oppressors.

Thus, the racial journey not only enables him to make himself visible to the Nortons and the Bledsoes, but also serves as an eye-opener to the teeming millions of his race who will be compelled to undertake a similar journey in terms of racial consciousness. He is determined to break the myth of the monopoly of the whites on individuality and intelligence by exposing the whites as well as the Uncle Toms, who want to perpetuate the myth.

## 2. Discussion

The novel opens in a South American town in the first half of the twentieth century. Written in a retrospective first-person narrative like *Moby Dick* and *The Great Gatsby*, the novel recounts the happenings from the time of the narrator's graduation from high school to the point at which he began to live underground – "a critical period of development that encompasses his right of passage from adolescence to the threshold of maturity."<sup>11</sup>

The speech the narrator delivers at his high school valedictory function is so impressive that he is invited to deliver it again before the most prominent white citizens of this Southern town. Although he is invited to deliver a speech at a leading hotel in the town, yet it is given a very low priority. Instead he and group of his schoolmates are huddled on the stage and asked to wear boxing gloves. As they prepare themselves to fight the Battle Royal, a stark-naked blonde dances on the stage. They are forced to look at her and threatened if they do not. They are blindfolded and commanded to box with each other. Fake coins are thrown on the electrified carpet as payment. When they try to pick up the coins, they receive shocks.

The narrator is exposed to a fake world presented to him in the Battle Royal scene. Fake coins on the electrified rug seem to be suggestive of the extent to which the blacks have been driven by their white oppressors. The coins are emblematic of the identity, the only one that the whites can afford to confer on the narrator. Needless to add, this identity presupposes psychological dependence on the white masters. Even though the coins are fake, the narrator's attempts culminate in electric shocks that he receives in the process. However, at this stage, the narrator is too naïve to realize the implications as the truth is known to the whites only. The suggestion is that the type of identity that the whites want the narrator to have, is fake like the coins as the narrator will not be allowed to transcend the barriers which block the way on his racial journey. He is supposed to follow in the footsteps of his grandfather, to "overcome" them with yeses."<sup>12</sup> But at this stage, he is unable to understand the true significance of the death-bed advice of his grandfather. It is only towards the end that the narrator will be able to see possible hidden meanings in this exhortation.

Finally, the narrator is asked to give his speech to the jeering audience. He temporarily upsets his listeners by saying 'equality' while he had intended to say 'responsibility.' An instant explosive reaction from the whites forces him to recant the words. Gloating over his surrender, he is given a scholarship to the local college for black, along with a calf-skin brief case which contains a document with the following recommendation: "keep This Nigger-Boy, Running" (p.32).

The scene proves to be a "crucial initiatory experience"<sup>13</sup> of the hero's boyhood. His briefcase carries the reward, a scholarship which is supposed to open a new world of experience to him, and a world which will enable him to penetrate beneath the surface of the white reality. However, as the future course of events unfolds, the briefcase turns out to be a repository only of the symbols of his disillusionment and remind one of S.T Coleridge's 'albatross' which the unnamed narrator carries around his neck while charting the course of his perilous journey.

The Battle Royal scene is a glaring example of oppression and self-victimization. George E. Kent aptly puts it: "On the level of Blackness, there is the manipulation of Blacks to fight each other blindly, education as brainwash, the general white manipulation of reality, and the shaping of misleaders of the people."<sup>14</sup> Here, it would be pertinent to recall that the protagonist is blind to his own plight and the miseries happened on him by the Whites. He thinks that education will free him from the shackles of white oppression and help him realize his cherished goal of individual identity in a democratic society which echoes Ellison's eventual concern and can be traced back to his "father's gesture of naming him Ralph Waldo in honor of Emerson."<sup>15</sup> As the novel progresses, one comes to realize the futility of the hero's successive attempts at seeking some sort of identity, but his individuality is ignored both by the blacks and whites. However, it is his invisibility which endows him with a better sight, a wider perspective. Ellin Horowitz is right when he finds a method in this invisibility. He observes, "The hero's invisibility is like Hamlet's madness: it is both a plight

and a device."<sup>16</sup> Perhaps, like Louis Armstrong, he is bent upon making poetry "out of being invisible" (p.11).

The anguish and frustration of the protagonist is manifest here. His innocence is abused by a fellow Black who does not mind being a puppet in the hands of his white masters as long as his own position is secure. The protagonist is admonished as he has failed to learn the tactics of telling lies to please the white, forfeiting, thus the very purpose of education he is getting at the college. It is a system of education which is designed to keep the Negroes in their place by encouraging racial discrimination. He is expelled from the college. In the seemingly kind gesture, the hero is given letters of introduction to influential men in New York may be helpful in getting him a job. Here, Ellison also suggests the moral deprivation of the whites who are in no way superior to the blacks. The unnamed narrator has tried to assess his individuality and sees no point in "yessing" the whites. Animal instincts are a part as much of the life of the white as that of the blacks. The Golden Day episode further establishes that "animality" is part of the human condition."<sup>17</sup> In the process, Dr. Bledsoe, instead of helping the protagonist, confuses him and clouds his vision which not only results in his expulsion from the college but opens him to a new world of experience in New York and marks a significant in his quest for racial awareness.

The hero comes to discover that Dr. Bledsoe has betrayed him. In fact, the letters are only the criticism of the 'invisible man' as these prove to be the variations of the letter his grandfather showed him in a dream. These are only betrayals as there is no prospect of his ever coming back to the college. Even the letter to Emerson, in essence, says: "Keep this Nigger-Boy Running," This is a cruel and practical joke on the blacks and relates to the times of slavery, when illiterate blacks required a note signed by the white master to enable them to travel from plantation to plantation. But here, the narrator is made to run in vain from one place to another by not only the white Master but a caucus of people who include those of his own race. As the narrator progresses on his racial journey, his destination eludes him like a horizon that recedes farther as he seems to approach it. It is only after realization of the real import of the letter that awareness will come to him. So far his journey has led him only from one disillusionment to another as the college has proved no better than his experience in the Battle Royal. In the hope of becoming a teacher or a member of the administrative staff he has been duped by the Nortons and the Bledsoes into believing that they are his benefactors. Deceived and disillusioned, he keeps running from one to another.

Earlier, in the Battle Royal scene he was deceived by only the whites, but now realizes that even the blacks, his own people, are in league with the whites for their self-interest. He realizes that the deceit and duplicity of his own men has been the root cause of his expulsion from Eden. He becomes aware of the powerful coalition of Bledsoe and Norton. He understands that his struggle from now onwards is both with the blacks as well as the whites.

In fact, Bledsoe's letter to Emerson serves as an eye-opener to the protagonist. His mind flows in circles at the revelation that he will never be allowed to return to the college. Determined to avenge his hurt and humiliation he asserts: "I decided that I would go back and kill Bledsoe. Yes. I thought, I owe it to race and to myself. I'll kill him" (p.159). Thus, the narrator is devoted to the cause of his race. To ameliorate the lot of his community, he will have to fight the Bledsoe and his own people.

Unable to find a suitable education, he takes up a job in a paint factory. There he works under Luscious Brockway who considers this educated Negro a threat as he does not know this place and might offend the white masters. This Uncle Tom has created the company slogan: "If it's Optic White. It's the Right white" (p.177) for which he got a three hundred dollar bonus from the factory owners. The protagonist's recollection of a childhood jingle, "if you're white, you're right" (p.178) betrays his keen perception of the white duplicity which cannot allow independent thinking by the blacks. This denial of individuality certainly comes in the way of racial upliftment. Moreover; this attitude of the whites to negate the contribution of the blacks to the American industrialisation also speaks of the racial discrimination which is sought to be perpetuated endlessly. However, the hero has begun to see through the machinations of the white masters, which marks a significant step in his racial awareness. The hero's unconscious inability to make white paint, only speaks of his implicit rebellion against Lucius Brockway whose security of job is in danger, but also poses a challenge to the white supremacy.

His first act of rebellion is followed by the furnace explosion which lands him in the factory hospital. There he sees strange visions of birth with suggestions of lobotomy and castration. Ellison Horowitz aptly sums up the ordeal of the hero: "...'delivery' is complete with the literal cutting of an umbilical cord. The personality is dead and the initiate has a new identity born out of the machine. Because he has lost his past he is considered cured but when questioned about Buckeye the Rabbit he remembers playing this part as child and is brought back through reversion to the folk tradition of which he is an unacknowledged part."<sup>18</sup>

Thus, the hero's traumatic experience in the furnace explosion may be interpreted as his spiritual death and his simultaneous rebirth. It is the death of his old self. He knows that freedom and identity are one. When he is free, he will have his individual identity. The narrator-protagonist's rumination poignantly suggests his keen self awakening:

I wanted freedom, not destruction. It was exhausting, for no matter what the scheme I conceived, there was one constant flaw-myself. There was no getting around it. I could no more escape than I could think of my identity. Perhaps, I thought, the two things are involved with each other. When I discover who I am, I'll be free (p.198).

Thus he rejects Lucius Brockway, a Negro himself, who wishes to ensure his own security even at the expense of other Negroes. He realizes that identity and freedom are synonymous and complementary to each other. For his proper development the 'Invisible Man' needs to reject these anti-life forces.

This is a crucial stage in the protagonist's journey of racial consciousness as this experience in the factory hospital has the semblance of the phase of passage through inferno. He becomes completely oblivious of his past. In the words of Ellin Horowitz: "...he is like a child, without a past, helpless, and lost in a 'vast whiteness.'"<sup>19</sup> He is ill, weakened, and friendless. It is at this stage during his racial journey that he comes in the care of Mary, a motherly woman. He thinks of her as "a force, a stable, familiar force like something out of my past" (p, 210) which is representative of the protagonist's southern roots. She reminds him of his past and demands a credit to the race. Later on, under the benign motherly influence of Mary, he accepts Negro food. He eats yams on the streets. This boldness on his part constitutes a landmark in his racial journey as this "act of participating in and enjoying an element of his heritage has given him his freedom."<sup>20</sup> His exhilaration is noteworthy: "I walked along, munching the yam, just as suddenly overcome by an intense feeling of freedom—simply because I was eating while walking along the street" (p.214). He can proudly say: "I yam what I am" (p.215).

This playing with the language links him with his past, his history, his very identity, and becomes his passport to the 'Brotherhood', "a fictional representation of the Communist party."<sup>21</sup> It is this spirited acceptance of his roots that inspires to deliver the eviction speech. Ultimately, it is this deep sense of his racial and familial past that wins him a position in the 'Brotherhood', where he studies ideology with Brother Hambro.

The protagonist's growing sense of self-awareness is obvious in his Harlem speech. With his improved vision, he is able to see through the thick haze of history and is determined to break the shackles of age-old oppression. His clarity of vision enables him to foresee a speedy end to the "uncommonly blind journey" of his people. It is this sense of awareness which leads him towards the wholeness of his being. Conscious of his individuality, he will, no more be duped by those who refuse to see him. However, at this stage, the narrator is least aware of the designs of the 'Brotherhood'.

It is only when the protagonist realizes that the 'Brotherhood' is "a matter of sacrificing the weak" (p. 407), he begins to accept his past. He decides to translate his grandfather's advice into action by overcoming "them with yeses" (p. 409). He has certainly come a long way in his arduous journey. He understands that a definite identity is still a distant dream and that what he can at best is to recognize his invisibility. He knows fully well that he is simply a material, a natural resource to be used.

Now, the protagonist has been graduated into looking beneath the surface. His power of perception and keen observation bring about a transformation in him. He can discriminate the real from the fake and knows the truth behind tile masks. The reality of his "benefactors" becomes available to him. He realizes that the 'Brotherhood', "as much as any other group of whites. Is in a conspiracy to keep the blacks out of history."<sup>22</sup>

In the coal cellar the hero is able to get rid of the contents of his brief case. He burns his high school diploma, the threatening letter written by Brother Jack, his 'Brotherhood' name and identity, the scholarship, the letter that kept him running, the dancing doll, Brother Tarp's chain-all token of his identity.

Several emblems which the hero carries on his racial journey serve as homelier reminders of his heritage, his past which needs to be integrated into personality to move towards racial awareness. By invoking thus the history of oppression, he wants his people to remember their past. The cast-iron figure of a Negro and the paper dancing doll, among other things, in the briefcase are the reminders of his shameful past, and the hero's guilt lies in the realization that he has yet to free himself from the dismal past. While his breaking of the cast-iron figure into garments speaks of his resolve to transcend the barriers raised by the history of oppression, his carrying of the fragments is emblematic of his guilt. In fact, he emphasizes the need for his people to link themselves with their past heritage which alone can give them an awareness which will ultimately lead them to achieve racial identity. In a world characterized by white duplicity, it is essential for the Negro to go to his roots, and this possible only by embracing his past.

One cannot think when one is too much in movement; for thinking, solitude is needed. Thus the 'Invisible Man' has come to a man-hole he is hibernating, something which symbolically means returning to the reflective centers. He is going to seek out and to reflect. He has realized that he is not going to be Uncle Tom, nor is he going to be a Bledsoe or a Rosenblatt. Having been disappointed in his experiences in both the groups, black and white, he starts grappling with his individuality.

Towards the end of the novel, the narrator-protagonist fully accepts the fact of his invisibility. Rosenblatt feels that the protagonist ends as an illusion. Charting the course of the hero's journey, he says:

The hero progresses from South to North to nothing; from capitalism to communism to nihilism. He makes a long and arduous pilgrimage which finishes in a basement; he starts Out heading for the future, and settles down in the nineteenth to those who cannot see him, and in addressing his narrative to white people explaining himself to those who made him, or to wish him to remain, inexplicable.<sup>23</sup>

Richard D. Lehan says that the "end of the novel is the beginning for both Ellison and his hero-it brings his hero an awareness of who he is not."<sup>24</sup> though the novel ends here, it is the real starting point in his life.

And now I realized as follows:

I could approach it only from the outside, and I had as invisible as I had been to the Brotherhood. No, I couldn't return to Mary's or to the campus, or to the Brotherhood, I could only move ahead or stay here, underground. So I would stay here until I was chased out. Here, at least I could try to think out in peace, or if not in peace, in quiet. I would take up residence underground. The end was in the beginning (p. 460).

The novel relies heavily on the symbolism of vision closely related to the complex problem of identity. The protagonist of Ellison's novel is invisible because people refuse to see him. They see everything, except him. These people are not people of his race; they are the whites with a defective inner vision, the people who refuse to see him, to recognize his existence *per se*. In the process, invisibility becomes a metaphor for identity.

The protagonist has been made to think that he is getting the right kind of education at college. He sincerely pursues his studies to be a model student. However, his expulsion from the college convinces him that this education is not going to help him find his identity. It is through his education that he loses his only identity. At this stage of his career, he is not able to see beneath the surface. He remains baffled by the action of his peers who are there to ensure the perpetration of the whites' atrocities on the blacks. It is not only the whites who cheat him; indeed, even the blacks seem to be in league with the white oppressors. Significantly, before he leaves the college, the hero is asked to listen to the sermon by blind Negro, whose speech symbolically hints at myopic vision that renders him incapable of seeing into the reality of black experience.

In New York the hero realizes the extent to which he has been cheated by the President of the College. Again in the factory hospital, the protagonist tries to recollect his name. But his memory fails him. Here his inner vision enables him to perceive that he can attain true freedom only when he is able to "know" himself. Walking through Harlem, he has a unique experience when he buys some yams from a vendor and relishes them. A unique feeling satisfaction and freedom overwhelms him. This association of the protagonist with his past will enable him to assert his individuality.

His identification with the "professed" cause of the 'Brotherhood' and the applause he receives from the audience in Harlem is in sharp contrast to his traumatic experience at the hands of the jeering audience of the Battle Royal scene in the beginning of the novel. Now, he asserts himself and is determined to see that opportunities for Negroes are not restricted by their racial identity. He addresses the audience: "With your eyes upon me I feel that I've found my true family! My true people! My true country! I am a new citizen of the country of your vision, a native of your fraternal land"

He further exhorts his listeners by addressing them as "True Patriots" (p. 280) and visualizes a future world where "WE'LL BE DISPOSSESSED NO MORE!" (p. 280). Initially, he does not perceive the whole truth about 'Brotherhood', but gradually he is left with his illusion about the group's ideology. When riots take place in Harlem, the protagonist severs his connection with the 'Brotherhood'. He has been through the cunning plans of the organization and will be duped no more.

However, as Ellison explains in *Shadow and Act*, the hero's downward movement in the novel, literally as well as metaphorically, is paradoxically "a process of rising to an understanding of his human condition."<sup>25</sup> Charles I Glicksberg sees Negro's struggle to find himself, to rise to his full height as a man and achieve the glory of selfhood."<sup>26</sup>

### 3. Conclusion

During his odyssey, the unnamed protagonist's efforts of the 'Invisible Man' to create the uncreated conscience of his race, bring credibility to the fact that he is not merely "a wounded Adam."<sup>27</sup> His terrifying ordeal in the wood of experience has brought him close to the truth of his being. He seems, to be determined to continue his journey which will surely enable him to assert his individuality and his freedom some day and see the racial identity does not bar his way to equality with his oppressors. In the process, the novel becomes a consciousness raising exercise, a sermon for the Negro, an initiation to others undertake a similar journey in terms of racial awareness.

## Notes

- <sup>1</sup> Jayantanuja Bandyopadhyaya, *North over south—A Non-Western perspective of international Relation* (New Delhi: South Asian Publishers, 1982), p. 46.
- <sup>2</sup> W. E. B. DuBois, *The Souls of black Folk* (New York: Washington Square Press, 1970), p. 3.
- <sup>3</sup> John M. Reilly, Introduction, *Twentieth Century Interpretations of Invisible Man: A Collection of Critical Essays* (Englewood Cliffs, N.J.: Prentice-Hall, 1970), p.5.
- <sup>4</sup> Richard D. Lehan, "The Strange Silence of Ralph Ellison," *California English Journal*, I, No.2 (1965). Pp 63-68. rpt. in *Twentieth Century Interpretation of Invisible Man*, p. 107.
- <sup>5</sup> William I. Schafer, "Ralph Ellison and the Birth of the Anti-Hero," *Critique*, X (1968), pp. 81-93 rpt. In John Hersey, ed. *Ralph Ellison: A Collection of Critical Essays, Twentieth Century Views* (Englewood Cliffs, N.J.: Prentice-Hall, 1962), p. 116.
- <sup>6</sup> James Alan McPherson, "Creating the Uncreated Features of His Face" (1970), rpt. In Reilly, pp 54-55.
- <sup>7</sup> Robert Bone, "Ralph Ellison and the Uses of Imagination". (1966), rpt. In Reilly, p. 30.
- <sup>8</sup> James McPherson, P. 44.
- <sup>9</sup> Ibid
- <sup>10</sup> Ibid, p. 46.
- <sup>11</sup> Kerry McSweeney, *Invisible Man: Race and Identity*,\_ (Boston: Twayne Publishers, 1988): p. 28.
- <sup>12</sup> Ralph Ellison, *Invisible Man* (1952; rpt. Harmondsworth: Penguin, 1981), p. J 7. All subsequent references are to this edition and have been incorporated in parentheses.
- <sup>13</sup> Ellin Horowitz, "The Rebirth of the Artist" (1964), rpt. In Reilly, ed., p. 81.
- <sup>14</sup> George E. Kent, "Ralph Ellison and Afro-American Folk and Cultural Tradition" (1970) rpt. In Hersey, ed; p,- 165.
- <sup>15</sup> John M. Reilly, "Introduction," in John M.Reilly, p.1.
- <sup>16</sup> Ian Ousby, *Introduction to Fifty American Novels* (London: Pan Books, 1980); p. 333.
- <sup>17</sup> M.k. Singleton, "Leadership Mirages as Antagonists in *Invisible Man*" (1966) rpt. In John M. Reilly, ed., p. 17.
- <sup>18</sup> Ellin Horowitz, p. 83.
- <sup>19</sup> Ibid., P. 84.
- <sup>20</sup> O. Keith E. Byerman, *Fingering the Jagged Grain: Tradition and Form in Recent Black Fiction*. Athens: University of Georgia Press, 1985, p. 29.
- <sup>21</sup> Amritjit Singh, "Racial Politics in Black American Fiction: Schuyler and Ellison." *The American Political Novel: Critical Essays*, ed. Harish Trivedi (New Delhi: Allied Publishers, 1984), p. 135.
- <sup>22</sup> M.L. Raina, "Black Violence: Black Despair, Richard Wiight and Ralph Ellison," *in the American Political Novel*, p. 149.
- <sup>23</sup> Roger Rosenblatt, *Black Fiction* (Cambridge: Harvard Univ, Press, 1974), p. 185.
- <sup>24</sup> Richard.D.'Lehan, p. 110.
- <sup>25</sup> Lucio P. Ruotolo, *Six Existential Heroes: The Politics of Faith* (Cambridge: Harvard Univ. Press, 1973), p. 82.
- <sup>26</sup> Charles I. Glicksberg, "The Symbolism of Vision" (1954) rpt in John M. Reilly, Ed., p. 55.
- <sup>27</sup> Nathan A. Scott, Jr., "Black, Literature," in *Harvard Guide to Contemporary American Writing*, ed. Daniel Hoffman (Delhi: Oxford Univ. Press. 1981), p. 297.

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# Inter-enterprise Collaborative Management for Patent Resources Based on Multi-agent

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## Abstract

Based on relevant literature and theoretical consideration on management for patent resources, a theory of inter-enterprise collaborative management for patent resources (ICMPR) based on multi-agent was proposed. We put forward 4 main function modules, including collaborative recommendation, collaborative analysis, collaborative application and system server management, to support ICMPR. The ICMPR can be good to solve those tough and important problems, such as patent cross licensing among enterprises, early warning analysis of patents, collaborative technology innovation and other issues. The ICMPR can provide enterprises with practical methodology, and improve the overall competitiveness of world manufacturing industry.

**Keywords:** Collaborative management, Patent resources, ICMPR, Recommendation technology

## 1. Introduction

In knowledge-based economy age, the management of intellectual properties has become more and more important for an enterprise. For most enterprises, patent is the core part of intellectual properties, and it is very important intangible assets. In the enterprise management, it can often bring more value than tangible assets. Patents imply some methods of solving problems, which can quickly and systematically reflect the development of technologies or related disciplines. The World Intellectual Property Organization revealed that 90-95% of world's inventions were found in patented documents. If the related patent information can be effectively used, modern enterprises will raise the starting point of scientific research and save funds and time in the development course. Besides, they also will get their own intellectual property rights, reliable technical support and high value-added products to improve the ability of market competitiveness of enterprises (Soo et al., 2006).

Modern products are often the integration of many technologies, which could never be finished by one enterprise independently. Therefore, inter-enterprise collaborative management for patent resources (ICMPR) is becoming the urgent demand for enterprises. Inter-enterprise resources collaborative management, as a brand-new kind of management mode, has become one of the hotspots for research (Xin-Jian, 2010). In order to promote comprehensive cooperation and innovation in the collaborative environment, our research objective is to propose an integrated system that contains collaborative recommendation, collaborative Analysis, collaborative application and system server management. This paper study in the patent domain, and the research question is inter-enterprise collaborative management for patent resources (ICMPR).

## 2. Related work

The European Patent Office disclosed "more than 80% of man's technical knowledge is described in patent literature". Unfortunately, most studies in the patent document analysis are on document search and classification (Fall et al., 2004), very few discussed how to use the patent documents to further support advanced management including the recommendation, analysis and application(Soo et al., 2006). Therefore, how to

establish a collaborative platform to automatically recommend the useful patent knowledge from patent documents in order to further support the collaborative management among enterprises becomes an essential topic.

Activities in the collaborative management process are usually distributed across managers, experts, teams, departments from different enterprises. Multi-agent systems (MAS) (Wang et al., 2000) offer a new dimension for cooperation and coordination in an enterprise. A MAS consists of a collection of autonomous agents who can define their own goals and actions and can interact and collaborate among each other through communication. In a MAS environment, multi-agent work collectively to solve specific problems. It provides an effective platform for coordination and cooperation among multiple functional units in a company. Multi-agent systems have already been proposed for supporting distributed decision-making in as many fields as engineering (Tan & Harker, 1999), manufacturing (Lee & Lee, 1999), business (Jung & Jo, 2000). In this paper, how to use a collaborative multi-agent platform to make the management process effectively is one of the major goals of the research (Timothy et al., 2002; Ali & Coskun, 2007; Agnieszka et al., 2010).

### 3. Methodology

To meet user's requirements from four different levels, the research on the ICMPR can be divided into four stages of implementation, which are respectively personal, business unit, enterprise group, cooperation among enterprises. We focus on the cooperation among enterprises, as shown in figure 1.

Several steps are taken for this study. The brief description of the steps in the methodology is as follows:

The first step is to have a collection of patent resources, including the knowledge mining and analysis of patents and patent evaluation, in order to realize collaborative recommendation function for patents;

The second step is to complete the early warning of patents, collaborative evaluation for patent resources.

The third step is to complete the construction of patent standard, collaborative protection of patents, collaborative technology innovation, collaborative portfolio management of patents, patent cross licensing among enterprises.

Ended up with the Haier group to study, looking forward to application prospect of theories proposed by the paper.

### 4. An overview of the proposed collaborative multi-agent platform

#### 4.1 Function model of ICMPR based on multi-agent

Collaborative management for patent resources using agent technology will provide all kinds of intelligent retrieval, mining, analysis and service function. The environment of ICMPR has distribution, openness, heterogeneity, mobility and collaborative etc. Due to the complex, multi-levels and the interactive relationships existed in human society, the calculation based on agent, especially MAS (Multi-Agent System) and mobile agent, has many outstanding advantages in the analyzing and establishing people-oriented inter-enterprise patent resources management system. In order to reduce the difficulty in implementation of ICMPR, the cooperative mode should be loose coupling model rather than tightly coupled, and the centralized collaborative mode will be changed into the distributed collaborative mode. Publication and application of ICMPR is in the form of web-sites, on which safety problems also should be paid attention to.

Based on the above analysis, main functions of inter-enterprise collaborative management system for patent resources (ICMSPR) based on Multi-agent are shown in fig.2 (Xin-Jian, 2010; Guo-Hai, 2007). We can see from fig.2, collaborative recommendation for patent resources is the basis of the whole system, which also offers important premise for collaborative analysis, the application of patent resources. Therefore, towards the ICMPR based on multi-agent proposed by this paper, the study of patent resources collaborative recommendation technology is very important, and will be described detailed in section 4.2. In addition, the study of patent resources collaborative analysis will be described detailed in section 4.3, the study of patent resources collaborative application will be described detailed in section 4.4, the study of system server management will be described detailed in section 4.5.

#### 4.2 Collaborative recommendation

Along with the explosion of information, it is more and more difficult to acquire knowledge from the Internet. For example, we can retrieve "TV" patents from the website of China's intellectual property rights (<http://www.cnipr.com/>) for almost 1050 pages (10493 correlative patents in total), among which there are 2728 invention patents, 4178 utility patents, 3888 appearance design patents. Then, how to retrieve useful relevant patents for users from vast intellectual property database and recommend users automatically so as to realize

personalized service? However, there isn't any recommendation intelligent technique that has been applied to patent information research. Studying of intelligence recommendation technology based on patents, has an important foundational role for the ICMPR proposed by this paper, also can be applied to patent retrieval system and web, for it could greatly improve the retrieval efficiency of patents. Our research will have a positive influence on the intellectual property in the world (Lee et al., 2007; Liebowitz et al., 2007).

#### *4.3 Collaborative analysis*

To make a further analysis on substantive, finer-grained patent information and supply a more valuable analysis report, these could never be finished by one enterprise independently. As showed in fig.2, collaborative analysis contains early warning analysis of patents, patent combination management, patent cross licensing among enterprises, data mining for patent resources. The knowledge mining and analysis of patents include: the statistical methods of patent information, technology analytical method based on patents, the patent rights analysis, etc.

Patent information statistics methods mainly use commercial software for data mining, while, technical analysis and right analysis for patents use the patent knowledge mining technology and agent technology to support decisions for enterprises (Wu, 2009).

Early warning analysis of patents include: introducing to the latest patent information and statistics, establishing qualitative evaluation guidelines for early warning of patents, drawing up the patent map, etc. Patent portfolio management is a strategic collection of some patents under a common control which are distinct but related. Patent portfolio management, including: establishing evaluation guidelines for patent portfolio, establishing the relations between patents and products, calculating the effectiveness of patents and Relative technical share, analyzing of patent portfolio, etc. Patent cross licensing among enterprises including: management for patent pools, evaluation on patents, management for patent cross licensing among enterprises.

#### *4.4 Collaborative application*

There are a lot of applications of patent resources, which need even more to be cooperatively executing among enterprises, as showed in fig.2, including patent collaborative protection, patent training, collaborative technology innovation, collaborative construction of standard, etc. Collaborative protection for patent include information management of products' patent protection, data management of patent infringement, acquisition and analysis on patent information of export countries, information management of patent system and regulations of export countries, aiming to support enterprises in the policy analysis and strategy analysis; Patent training aims to ascend patent awareness and sensitivity, cultivating patent talents, stimulate the ability to innovate and improve patent retrieval and analysis capability (Lin & Tseng, 2006).

Collaborative technology innovation based on patent contain acquisition and analysis of patent information of related products and technology, acquisition and analysis of patent information in the target market, collaborative technical innovation management based on patents, establishing information interaction platform to support collaborative technological innovation.

#### *4.5 System Service Management*

System service management is necessary to co-ordinate all of the services, and it is a system to ensure the efficient operation of the system, including:

- (1) User management: Management for users' data in the system.
- (2) Authority management: It gives different permissions to different users, and provides different services according to the different permissions.
- (3) Log management: Management the use of this system for users.
- (4) Repository management: Regular management of all kinds of patent resources in the system.

### **5. Conclusion**

This paper studies the technologies of inter-enterprise collaborative management for patent resources (ICMPR), and proposes its function model, then gives a detailed introduction of its four functions, especially collaborative recommendation. Aiming at realizing the function of collaborative recommendation, the paper gives a hybrid collaborative filtering algorithm, to make up for the blank of the patent recommendation. Last, we choose the Haier group to forecast the future application of ICMPR, which can raise the management level of patents to support enterprises to develop collaborative analysis for patents and improve the capacity for independent innovation of enterprises.

Inter-enterprise collaborative management for patent resources (ICMPR) proposed by this paper can provide enterprises with practical methodology, and improve the overall competitiveness of world manufacturing industry.

**References**

Agnieszka, S. L., Supakij, C., Arkhom, S., & Kongkiti, P. (2010). Applying social network analysis on customer complaint handling. *Industrial Management & Data Systems*, 110(9), 1402-1419. <https://doi.org/10.1108/02635571011087455>

Fall, C. J., Torcsvari, A., Benzineb, K., & Karetka, G. (2004). Automated categorization of German-language patent documents. *Expert Systems with Applications*, 26, 269-277. [https://doi.org/10.1016/S0957-4174\(03\)00141-6](https://doi.org/10.1016/S0957-4174(03)00141-6)

Guo-Hai, C. (2007). Research on Some Key Technologies of Enterprise Patent Management & Analysis System. Master Thesis, Zhejiang university, pp. 15-16.

Lee, S., Lee, Z. & Lee, J. (2007). Knowledge transfer in work practice: adoption and use of integrated information Systems. *Industrial Management & Data Systems*, 107(4), 501-518. <https://doi.org/10.1108/02635570710740661>

Liebowitz, J., Ayyavoo, N., Nguyen, H., Carran, D. and Simien, J. (2007). Cross-generational knowledge flows in edge organizations. *Industrial Management & Data Systems*, 107(8), 1123-1153. <https://doi.org/10.1108/02635570710822787>

Lin, C. & Tseng, H. (2006). Identifying the pivotal role of participation strategies and information technology application for supply chain excellence. *Industrial Management & Data Systems*, 106(5), 739-56. <https://doi.org/10.1108/02635570610666476>

Soo, V.-W., Lin, S.-Y., Yang, S.-Y., Lin, S.-N., & Cheng, S.-L.(2006). A cooperative multi-agent platform for invention based on patent document analysis and ontology. *Expert Systems with Applications*, 31(4), 766-775. <https://doi.org/10.1016/j.eswa.2006.01.014>

Tan, J. C., & Harker, P. T. (1999). Designing workflow coordination: centralized versus market-based mechanisms. *Information Systems Research*, 10(4), 328–342. <https://doi.org/10.1287/isre.10.4.328>

Timothy, K. S., Chuanfeng, C., Huihuang, H. & Fuhua L. (2002). An integrated framework for recommendation systems in e-commerce. *Industrial Management & Data Systems*, 102(8), 417-431. <https://doi.org/10.1108/02635570210445853>

Wang, A., Conradi, R., & Liu, C. (2000). A multi-agent architecture for cooperative software engineering. In: Twelfth international conference of software engineering and knowledge engineering (SEKE'2000).

Wu, L. (2009). Supplier selection under uncertainty: a switching options perspective. *Industrial Management & Data Systems*, 109(2), 191-205. <https://doi.org/10.1108/02635570910930091>

Xin-Jian, G. The National High Technology Development 863 Program of China: Research on Inter-enterprise Collaborative management for patent resources Model and its Software technology [EB/OL]. [2010-12-1]. <http://www.ie.zju.edu.cn/m/ie/download/2008zanban-zhuanli.pdf>

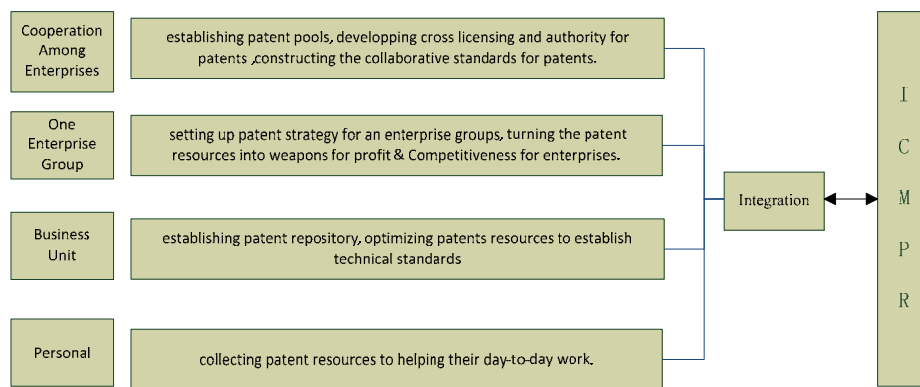


Figure 1. ICMPR for Different Levels

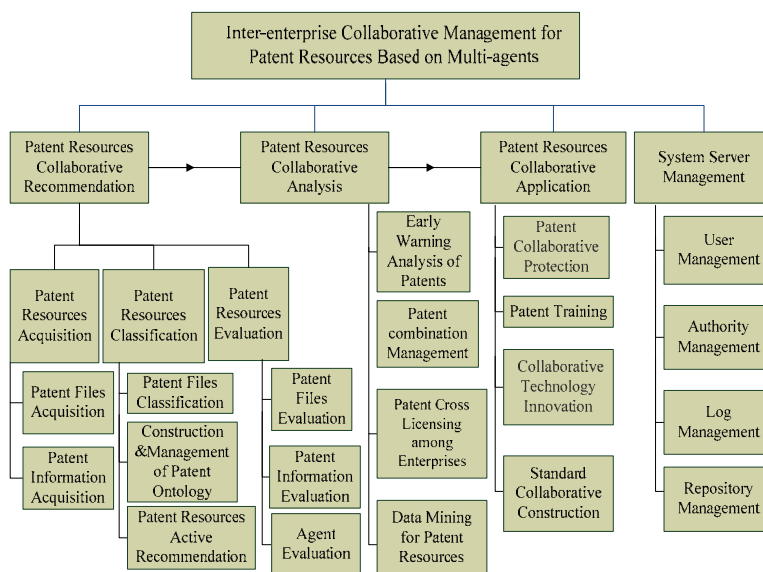


Figure 2. Function model of inter-enterprise collaborative management system for patent resources

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# The Mission of Basic Education That Is Overlooked in the Border Country (Case Study of Education Special Services for Indonesian Labor Child in Sebatik Island Indonesia-Malaysia Border)

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## Abstract

The border region is currently still very identical to the "limitations" so almost all border regions in Indonesia have nearly the same issue namely welfare gaps to the Community border as a result of the limitations of the various issues of basic infrastructure, education, health issues to social economic problems communities are still largely dependent on neighboring countries. In the field of education is known for all education jargon that became the Foundation of the movement the fulfillment of *education for all*. In order to achieve the goals of national education the flattens, quality, relevant and efficient as mandated by legislation of the national education system the number 20 in 2003, where special education and special services (PK-LK) need very basic education gets special attention. A labor of Indonesia (TKI) at the boundary of the country generally citizens of the entrants in the Emergency Department and is busy with his household economic activities. The condition implies less serious handling education for their child. This problem is compounded by the limited educational facilities at the border. To address this movement of strange education boundary is required.

**Keywords:** Social Movements, Education Special Service, and Border

## 1. Introduction

The impression of a lack attention from the Government towards the border area has always been associated with the development of the approach used in the past, that a greater emphasis on security (*security*) compared with increased prosperity (*prosperity*). If we notice on social condition, politic and security in the past, it creates a high impression into development border area which is emphasizing on aspect and security approach. While in this situation where security aspect is more conducive and a globalization process indicated by a lot of cooperation both of local economies or sub regional, in order a security approach need to be allowed through prosperity approach equally. In the other side, a lot of neighbor country bordering directly with Indonesia has developed their border area as an area of economical growth progressively through facility and physical infrastructure completely together with human resource who having quality.

The handling question of the border is not only become the responsibility of the Central Government, provincial government, and the Government district/city alone but also will need to be supported by all components of the nation both from the corporate world, community organizations and agencies/other technical institutions. Starting from the large number of issues in the border area, then needed an innovation and creativity from the organizers of Government at the level of districts and Villages as the Border becomes the home front of Indonesian Republic. The attitude of society to care about the borders should look for solutions and solving the problem.

Central Sebatik district as one of border district at Sebatik Island that is implement a lot of innovative activities aiming to decrease various problems faced by community border. Those innovations implemented classified into two fields such as Health and Education program. In the health field, have carried out Free Sub program Defecation carelessly. These activities were carried out as a form of concerned from the districts and villages of the border most of those houses have no Toilet/closet for Defecation in any place.

In the education field, have held Illiteracy eradication activities for the Community borders and border education activities for Indonesian Labor children working in Sebatik Malaysia as a labour company Palm. Activities in the education field is cooperation with education service District serving Nunukan, PKK Subdistrict Sebatik and Ar-Rasyid Foundation as one of the foundations in the Central Sebatik District concentrated and commit against the

education frontier. Necessary social movements that can mobilize public attention Indonesia to address the Education problem of Indonesian Labor Child at the border.

The concept of this research are as follows: 1) to observe educational concept of This research aims to develop education concept in the border area in early childhood education (OLD), the movement of the eradication of illiteracy and education movement for Indonesia Labor Child /TKI, 2) how does the implementetation of education movement in the border area, 3) how does the stakeholders role in the implementation of educational movement. This research aims to develop educational concept in the border area. The stakeholder role into educational movement starts from an activist namely Mrs. Hj. Zuraidah as a midwife in the border area for community deliviring then supported by Non-Governmental Organization and Local Government.

## **2. Previous Research**

### *2.1 Border Education with emphasizing on Giroux 's Educative Implications*

By: Mohsen Farmahini Farahania, Najmeh Ahmadabadi Arani

Modern Socio-philosophical perspective has been arisen in the work of thinkers in recent decades which has been called postmodernism As this perspective introduces new issues in different areas, it poses new attitudes in the education area. Giroux who is a contemporary postmodernism Theory maker is going to introduce a kind of education in which culture, ethics and politics are very important. As he criticizes the present worldwide education which is based on modernized courses, he proposes border educative perspective. The present article explains his implications in education by an analytical-descriptive method. Findings showed that in his idea, education essentially has got political tendency and the goal of the border education is making a democratic society which is in favour of equality and detecting the borders, observing the differences and understanding them Education in which other voices are listened is a desired education. The reflection and philosophy of the border education cannot ignore the social and cultural issues of the people because it will fail without them. In the view of border education, we should trespass the mere transmission of understood knowledge in education and consider the teacher as the open-mindeds of the society and revolutionist.

### *2.2 Feasibility Analysis of Developing Cross-border Network Education in China*

By: Jun Lan

In the era of economic globalization, strengthen of international cooperation on network education is a general trend. Although China has not made commitments about the market access and national treatment of cross-border supply in Schedule of Specific Commitments on Services, the basic conditions of network education development in China have been met. The Chinese government should formulate strategies for the development of cross-border network education and take relevant measures to implement them. In the near future, the carrying out of cross-border network education in China will become an irreversible trend, and will possess broad prospect with the advance of globalization of Chinese education.

### *2.3 The Study of Concepts Understanding and Using Competence of Teachers in Educational Innovation and Technology for Teaching Management at Schools of the Unrest Areas of Three Southern Border Provinces of Thailand*

By: Kanita Nitjarunkul

This research study aimed to determine the understanding of concepts and use of competence of teachers in using educational innovation and technology (EIT) for teaching management. And also, to investigate the internal and external factors effecting teachers for applying EIT to their instructions at schools in the areas of unrest in three southern border provinces (3SBP) of Thailand. Questionnaire and group interview protocols were used. With 87 % return rate of completed surveys, it is shown that (1) the level of concepts understanding of teachers in EIT for teaching management was at high, (2) Teachers working in different affiliations have statistically significant in using computer software and computer-based learning for teaching management, and (3) Teachers teaching under the Basic Education Commission school have a higher level of using competence in computer software and computer-based learning than teachers who teach under Islamic private school. Key findings from focus group discussions revealed strengths, weaknesses, opportunities and threats that effected teachers in applying EIT to their teaching.

### *2.4 The Development of Cross-Border Cooperation in an EU Macroregion – a Case Study of the Baltic Sea Region*

By: Tomasz Studzieniecki

The Baltic Sea Region became an EU testing ground for international cooperation. This article presents the origin and the typologies of this cooperation. Macroregional, territorial and cross-border cooperation was discussed. The main aim of this article was to analyse the key determinants of the development of cross-border cooperation in the BSR, an EU macroregion. Based on literature studies, the BSR was delimited, proposing a definition of this area that is the

most beneficial from economic point of view. Having performed an analysis of documents and economic data, it was proven that macroregional cooperation supports territorial cooperation in the BSR in a significant way. For this purpose, the financing devices of territorial cooperation, i.e. crossborder, transnational and interregional cooperation programmes, were analysed. It was proven that the priorities of these programmes comply with the priorities of the EU Strategy for the Baltic Sea Region. Furthermore, an attempt was made to analyse the organisational resources of cross-border cooperation, with particular focus on Euroregions and European groupings of territorial cooperation. A diagnosis of the state was made based on secondary and primary data obtained from interviews. It was shown that the organisational structure is not fully efficient, which is a barrier to the development of cross-border cooperation.

### *2.5 The Important Factors of English Program Administration Responsive to the ASEAN Community for Schools in the Border Provinces of Southern Thailand*

By: Wuttichai Niemted

The purpose of this research was to determine the important factors utilizing the key principles of the Input-Process-Output (IPO) framework in the administration of English Programs for schools in the border provinces of southern Thailand in response to the protocols and agenda of the ASEAN community in its education platforms. The research explored various methods that involved analysis and interpretation of the quantitative and qualitative data obtained from the prepared 5-point rating scale questionnaire, interviews, and observation, target group discussion, and consultation with experts. The respondents selected as the sample group were English Program administrators, teachers, students, and parents from 5 selected English Program schools in the border provinces of southern Thailand for the academic 2013 year. Based on results gathered from both qualitative and quantitative methods, the important factors under the concept of the IPO framework consisted of 21 factors: Support-resource input consisted of 3 factors: integrating the curriculum with ASEAN community content, using technology as an effective teaching aid, and maximizing various learning resources. Personnel-resource input contained 2 factors: having a school director with a strong vision and understanding of bilingual education, and investing in qualified and professional teachers. School-management process highlighted 8 key factors: management structure, policy/vision, community involvement, school-networks, utilization of modern technology and classroom management for self-access learning, staff development, cultivation of the culture of research in the academy and student-centered activities that promote competence and quality assurance. Learning-management process consisted of 3 factors: learning patterns in the use of English and Thai as media of instruction, learning-management style, and measurement and evaluation. Output or educational quality entailed 5 determinants: learning achievement, attainment of the desirable characteristics of the learners, educational roles in society and culture, achievement of English skills among target groups in aspects of communication and research, and knowledge of the ASEAN community.

### *2.6 Integration Requirements for Integration's Sake? Identifying, Categorising and Comparing Civic Integration Policies*

By: Sara Wallace Goodman

Several countries in Europe have recently adopted obligatory language and country knowledge requirements for settlement, naturalisation and immigration. Integration tests, courses and contracts are only a few examples of the new 'civic integration policies' states are using to promote individual autonomy and common values for newcomers. Are these requirements in response to concrete problems of immigrant integration? Do they enable, or actually inhibit, integration? This paper examines the various pressures behind attaching mandatory integration requirements to status acquisition. To systematically examine these policies, I develop a civic integration index (CIVIX) to measure language, country-knowledge and value-commitment requirements across the EU-15. While there is a general shift toward civic requirements across Europe, evidence reveals important differences in the degree of policy change. Finally, I explore how new civic requirements complement or challenge existing citizenship practices, identifying where integration is facilitated and rewarded with citizenship. I also show where civic requirements fill strategic goals, mainly controlling the inflow and impact of immigration. The arguments made here support a critical rethinking of the conventional wisdom about national models of integration and a dynamic understanding of state citizenship strategies, where policies define not only the rules but also the content of national membership.

### *2.7 From Entitlement to Experience: Access to Education for Children of Migrant Workers from Burma*

By: Mary Austin

This article explores the impact of migrant worker registration on access to primary education for the children of Burmese migrants living in Thailand. The first section examines the basis in domestic and international law for migrant children's claim to educational entitlement and questions whether registration affects their claim. This leads to an analysis of NGO and other field-based reports of children and families' lived experience which explores how



registration interacts with other intersecting forms of discrimination and disadvantage. The final section proposes a framework for evaluating the impact of Thailand's current Nationality Verification scheme from a children's rights perspective.

### 3. Research Method

This paper comes from research result by applying qualitative approach with the main informant is Sebatik District Head and the staff of Educational Institution at Nunukan District, while the informant trilingual informant is this local community. This research is done by applying snowball method. The data is collected by using in-depth interview and Forum Group Discussion (FGD) from all of stakeholder participants. The key informant is started from the District Head of North Sebatik then pick Hj. Zuraidah (a midwife) as an actor preceding an educational movement in the border area. According to those informants previously then it develops into stakeholders of education movement which is consist of *Dompot Dhuafa* Foundation, *Pertamina* and *Ar-Rashid* Foundation. This research is also completed by family profile that send their children to the school around this border area. The illustration of this condition explain into figure and profile below:



Figure 1. Family Profile who Send Their Children To The School Around Border Area

Source: Interview Data

Mr. Nasir whose wear black shirt is one of Indonesia Labor working in Bagosong Besar area, Sebatik Island Malaysia. A mainland with Sebatik Island of Indonesia. He has three children in the age of elementary school, his children cared by his family in Sei Limau Countyside Central Sebatik Sub-District. Mr. Nasir come to his children once in a week, he was working as an Indonesia Labor to pay their school and family. His children names are Nurul Afizah in grade 4 of elementary school, Muh Khairul Admani in Grade 3 of Elementary School and Nurul Ain Asikin in Grade 2 of Elementary School.

### 4. Result and Discussion

This research will illustrate about a social movement generally which is started from various problems faced by community. In time this problem hasn't been solved clearly and the condition will present an actor namely Mrs. Zuraida (As a midwife) into social movement. She challenged to solve this social problem around the border area of Sebatik Island. This period was a critical condition of social movement appearance. In this case, this movement came from her concern of Mrs. Hj Zuraida when giving a partial service found a phenomenon of neglected education for children in the border Country, especially for Indonesia Labor. Referring to this condition she expressed an opinion to implement informal education service, and it was received friendly by all communities who need basic educational service.

The next step was strengthening educational social movement who face various obstructions in this implementation such as (location, facility, infrastructure, teacher and fundation). This condition were stimulating an empathy from various stakeholders such as: District-Head and various charities (*Dompot Dhuafa* Fondation, *Pertamina* and *Ar-Rasyid* Fondation).

The last step is the implementation of basic education, organizing and license of an alumnus. When this program were running in a long time finally it has faced hesitance concept among defending of informal status as an education social movement or it will be integrated with conventional program refers to government rule.

#### 4.1 Educational Complying for All Students

##### 4.1.1 The Meaning Social Activity

In general the meaning of social activity is an activity that consists of real action from various group, informal a large organized, and specifically focuses on a social or political issues with implementing, refused, or promote a social

change. The social movement is a collective behavior that characterized common interest and long-term goals, namely to change or maintain a community or institution that is in it. Another feature of the social movement is the use of different ways outside of existing institutions (Kamanto Sunarto, 2004:199). The social movement is an effort that is more or less loud and teroganisir are done by people who are realtif large numbers, either to cause change, either to oppose him (Rafael Raga Maran, 2001:67). When formulating or revising regulations for private supplementary tutoring, governments should of course relate their actions to the parallel regulations for schooling (Fielden & LaRocque 2008; Sergiovanni et al. 2009).

The examples of social movements education is education for all. This call keeps campaigned because access to education has not been the same for several groups of people. Marginal groups from the implementation of this education is not easy to get an education because of various things, so that the Government and people concerned felt it necessary to convene the Special Education known as (PK) and Educational Services known as (PLK) for the marginal groups. The marginal group hereinafter referred to Children in Need Special known as (ABK) which dealt with the special education is a group of intelligent and privileged diffable, are Special Education Services (PLK), developed to serve marginal groups, such as children non diffable from remote, poor communities, Islands, isolated, helpless, and so on.

#### 4.1.2 Education for Disability Children

In Indonesia, the Constitutional Laws of 1945 Article 31 and Constitutional Laws Number 20 in 2003 about National Educational System known as (UU SISDIKNAS) mandates that the Government of Indonesia is fully guaranteed to disability students or that have the potential for intelligence and special talents or to acquire quality education services. Education meant which is not differentiated by education services because of a limitation or specificity that is owned by the child. Explained that education is intended for Special Education known as (PK) and Educational Services known as (PLK).

Constitutional Laws of Sisdiknas Article 32 paragraph (1) makes it clear that the definition of special education is education for learners who have difficulty in following the learning process because the disorders are physical, emotional, mental, social, and or have the potential intelligence and special talents; While paragraph (2) makes it clear that the Special Services Education is education for learners in remote areas or underdeveloped, remote indigenous communities, and natural disasters, or having a social disaster, and could not afford in terms of economy.

According to the explanation above, then the Special Education known as (PK) is classified into various groups as follows:

1. Blind
2. Deaf, Dumb
3. Mentally Retarded: Minor: (IQ = 05-70), Middle (IQ = 25-50), (such as Down Syndrome)
4. Tuna Daksha both of Minor and Middle
5. Opium Addict ((Dysruptive), HIV AIDS & Drug)
6. Autistic, and Sindroma Asperger
7. Double Damage
8. Slow/learning difficulties learn (among others: Hyperactive, ADD/ADHD, Dyslexia, Dysgraphia/write/read/talk, Dysphasia, Dyscalculia/Count, Hyspraxia/Motor).
9. Gifted: potential special intelligence (IQ >130); Multi-talented: special talent potential (multiple intelligences: language, logico-mathematic, visuo-spatial, bodily-kinesthetic, musical, interpersonal, natural, sometimes intrapersonal, spiritual); & Indigo. Or more commonly known by the term CI & BI (Intelligent Exceptional and Special Talent)

While Special Education Services (PLK) for children under the age of 18 years including the following:

1. The area underdeveloped/remote/inland/Island, the Child of Indonesian labor (TKI), Indonesia Schools abroad (SILN).
2. isolated minority ethnic Communities (inland tribe)
3. Child workers, child prostitutes, child victims of trafficking, the lapas children, street children, children of scavengers.
4. Refugees (children of earthquake victims, and conflict).
5. Poor extreme/absolute poor.

So with the notion contained in the regulation of Minister of Women Wmpowerment and Child Protection Number 10 in 2011 article 1 mention of special education and Special Education Services or better known as the Disability Children (ABK) is a child who experiences limitations/exceptionally good physical, mental, social, intellectual or emotional effect significantly in the process of growth and development compared to other children with similar age.

General definition gives a sense of the Disability Children (ABK) is children with special characteristics which are different with children in General without always showed on mental disability, emotional or physical (Heward, 2000). It contains the categories of ABK (disability children), among others, children with visually impaired, deaf, mental retardation, tuna daksha, opium addict, behavior disorders, learning difficulties, gifted children, children with health disorders as well as the limitations of such geographical factors/borders, conflict-prone areas, disaster and other. Article 32 paragraph 2 of the Constitutional Laws of Sisdiknas for Disability Children Marginal consists of:

- a. Children victims of social economy, comprising workers of the child, the child scavengers, children goods seller, child prostitutes, child victims of trafficking, child victims, child drug lapas, child victims of HIV/AIDS, street children, child victims of divorce, orphans, children dropping out of school, poor children absolute
- b. Child disaster victims, consisting of the young victims of a natural disaster, the victims of the conflict, the victims of wars, refugee children
- c. Geographical berry consist of: children of Indonesia Labor (left behind, isolated, outermost) such as: children of the tribe/inland, the child of the island, childrens in the regions lagging behind

Thus education special services is a kind of education services for children in need of special non dissabilitas or disability children marginal. Special Education Services for children in need of Non-specific Disability/marginal in this research is meant as educational services special for the people that get education/schools with limited geographical factors such as the child of the Islands and in this case is the child of Indonesia labor at the border.

#### 4.1.3 Educational Movement in the Border Area

Existence awareness of education in boundary are: early childhood education (OLD), movement for the eradication of illiteracy and education for Indonesia Labor Child (TKI) at the border of Sebatik island ". One of the problems encountered in the border of Central Sebatik districts is a question in the field of education, especially the numbers dropping out of school and illiteracy figures high enough masyarakat. The issue is actually by Nunukan District Office of education has been accommodated in a variety programs and activities, but because of the extent of the geographical area of the County coupled with the availability of a limited budget so that the handling of issues in the field of education in the border region has not been fully resolved fine.

Sebatik central Subdistricts in collaboration with the educational institution concerned work together designing and implementing several cooperation programs in order to participate the education address. All stakeholders contribute in addressing the education issue in the education frontier. By utilizing a variety of potential i.e., civic organizations, ultimately in 2012 applied in early childhood Education activities (OLD), eradication of illiteracy and education child for Indonesia Labor in Sebatik. This activity was carried out over the Village and Sub-district government support as well as education service of Nunukan. Technically, the management and organization of the activities carried out by the Ar-Rashid Sebatik Island (one of the agencies concerned with Indonesia Labor child-education) in collaboration with the Organization of mother-homemaker/empowerment of family welfare (PKK) Central Sebatik District.

Thanks to the movement existence, some of the social institution or Government interested and engaged to provide support or assistance. One of the non-governmental a pretty intense help Middle and especially Sebatik community educational institutions run by the Ar-Rashid Foundation is a foundation of Dompét Dhuafa, one of amil zakat institution in Indonesia.

#### 4.2 Implementation of Educational Movement of the Boundary

There are at least 3 kinds of movement education in boundary, namely (i) early childhood education (OLD), (ii) the movement of the eradication of illiteracy and (iii) education movement for Indonesia Labor Child /TKI.

##### 4.2.1 Early Childhood Education

The large number of Indonesia Labor children who work in palm oil plantations in Sebatik island part of the State territory of Malaysia are "deposited" in the boundary also there needs early childhood education for local people need education service. Although with the minimum facilities, education at this level remains enforceable. Location of education are under houses and used interchangeably with other educational activities, namely the movement for the eradication of illiteracy. PUD managed working with National Education Service of Nunukan District. Until in 2015 already built space for two classes.

4.2.2 Movement for the Eradication of Illiteracy

The number of illiterate in Central sebatik subdistrict in 2012 is quite high. Formerly, before there was a movement for the eradication of illiteracy, of which there are four villages AT Sungai Limau village accounted for a fairly high figure. To address the question of illiteracy for the Community border of Central Sebatik district, then in 2012 implemented practice Functional activities known as (KF) and formed the group that managed the joint between Foundation Ar-Rasyd and PKK Sebatik Subdistrict.



Figure 1. Learning Activities for the eradication of Illiteracy with Functional Literacy

The number of Functional Literacy in the primary grades in 2012 totally is 11 groups from Ar-Rashid Foundation, consisting of 110 children and 5 group from teams the PKK conceptualizer of Central Sebatik Subdistrict consists of 50 children, bringing the total in 2012 as many as 160 children/learners. In 2013 from Ar-Rasyid Foundation bring 5 groups consists of 50 children/learners and PKK as much as 5 group consists of 50 children/learners, so that the total amount of 2013 as much as 100 children/learners.

Table 1. Learners Educational Movement at the beginning of the border

Year	Organization Executor	Group Amount	Students Amount
2012	Ar-Rasyid Foundation	11 groups	110 children
	PKK	5 groups	50 children
	Amount		160 children
2013	Ar-Rasyid Foundation	5 groups	50 children
	PKK	5 groups	50 children
	Amount		100 children

Since from 2012 to 2013 the overall educational level of graduates of this Foundation as many as 260 people, with details as follow:

- a) Sungai Limau Village: 20 groups (200 people)
- b) Aji Kuning Village: 2 groups (20 people)
- c) Bukit Harapan Village: 1 group (10 people)
- d) Maspul Village: 3 groups (30 people)

Bases on the implementation program of Functional Literacy (KF) in Central Sebatik sub-district since 2012 has resulted in a reduced number of illiterate. In addition, some communities that have completed the activities of KF continue with General Literacy activities known as (KUM).

One result of General Literacy Program is Village Commissioner in Sungai Limau village which up to now has also produced a product outside of the education field i.e. the assortment of products processed from raw bananas. This Illiteracy Eradication programs also involve teachers/tutors who work with voluntary and Staff come from the village, members of the PKK, the staff of districts, Educators from local people in Central Sebatik.

4.2.3 Education movement for Indonesia Labor Child (TKI)

Movement education for Indonesia Labor Child is a movement that arose from the concern will be high number of illiteracy and dropout numbers among the TKI, especially those working in the plantation companies (both run by States as well as by big corporations) are there in Sebatik Malaysia. Due to the absence of institutions founded a company to facilitate the education of children who are in that region, then the TKI "had to" send their children in

government schools that exist along the land border Sebatik Indonesia. To get to the nearest school, children must walk between 1.5 to 2 hours. For the TKI who have relatives, some are entrusting their children to be accommodated in the homes of relatives who lived in the region of Sebatik Indonesia.



Figure 2. The Education Condition of Indonesia Labor Child

The combination between the exhausting journey and the lure of the ringgit (malaysia's currency) so powerful, as well as awareness of the importance of education is still low is allegedly the cause of ever-increasing numbers dropouts among Indonesia Labor Child. Those who dropped out of school at the later generally helped their parents work in estates-palm oil plantations as well as the existing cocoa plantations in Sebatik Malaysia. Not least among those who have worked and lived in the companies that are in the neighbouring country during two to three generations. Their lives, however, is much to be said deserves due to the low level of education and their competitiveness.

According to the very conditions of concern, then Ar-Rashid Foundation with support from the Government and local Government Sub-district then initiated a shared activity involving Indonesia Labor on the border in order to arouse awareness and to give motivation to keep them more care about the education of their children. Gradually their awareness to education began to grow again and trust to the Government also gradually recovered. There are ideas for organizing a movement education and empowerment a more organized by Ar-Rashid Foundation became the leading sector.

#### 4.3 The Role of Non Governmental Organisations, Activists and Local Government Education Movement/Sub-District

##### 4.3.1 The Role Ar Rasyid Foundation

Ar-Rashid Foundation is one of the institutions that organise various social movements, education and healthcare in Nunukan Regency, Indonesia. The leader of Foundation Education also becomes Manager of al-Ikhlas education in Nunukan Sub-District Indonesia known by the local government and the local community. When any one of the citizens who are also successful entrepreneurs in Sebatik Central intends to invest its land for the development of education, head of Sebatik Central convey this plan to Al-Rashid Foundation Nunukan. Then this collaboration between Education Foundation, a community activist and local ruler gave birth to massive education movement. Local community leaders, namely the mother Hj. Bidan Suraidah, M.Ns, launch activities with da'wah religious movements, community empowerment, and health services that take in one part of the House residents.

At the request of local citizens, TKI working in Sebatik Malaysia, and support from the local government, then implemented early childhood Education activities known as (PAUD) held in one room loaned by the local citizens. In addition to local children, some of the PAUD learners in these institutions are children of TKI whose parents work at one of the leading palm oil plantation company in the region of Sebatik Malaysia, namely Teck Guan Company. They are dropping off and picking up their kids with crossing borders two countries each day.

It is not only PAUD, activities organized by Ar-Rashid Foundation also later evolved into the activities of health services with the majority patients also Indonesia Labor that working in Sebatik Malaysia, Illiteracy Eradication Program (Self-contained elementary and KF), formation of Village Students, educational Equality (package) and the last is a good Madrasah Education Diniyah or Ibtidaiya. Recently, PAUD Al-Ikhlas which is managed by this Foundation also became a *pilot* of PAUD Program Integration Project, Family & Toddler (BKB) and Health Care Centre for Mothers and Babies known as *Posyandu*.

In addition to support from the Government, in its activities, Ar-Rashid Foundation also received support and assistance from *Dompot Dhuafa* Foundation.

##### 4.3.2 The role of Activist Education

Profiles education activist is incredible. The name Suraida, because it ever went on Hajj, people called her Mother Hajah Suraida. School boundary pioneered since 2012 and successfully established in 2014 initiated a mother who works as a Midwife named Hj. Suraidah, S.SKM, M.NSc and supported by the head of Central Sebatik Mr. Harman, S.IP, MSi., as well as the citizens of Central Sebatik Mr. Sudarman self-described village chief, Ustad H. Firman take a

profession as teacher of Islamic religion, Mr. Steven as community leaders.

The mother Hj. Suraidah set her feet even until settled in Sebatik island of North Kalimantan was never imagined before. The mother Hj. Suraidah birth in Rappang, South Sulawesi, Indonesia, on December 2, 1954, felt very concerned against the fate of Indonesia Labor Child who work in the garden of oil palm in Sebatik, Malaysia. She began opening early childhood Education activities known as PAUD and that most of its students are the children of TKI.

The curious of Indonesia Labor destiny in Bergosong, Malaysia takes her brave on border area. The Mother of Suraidah wishes for notice directly of the community condition around this place, although the consequence is she should face police guard in the border. Her effort gives a result, she gets a lot of information relates to the real condition of Indonesia Labor that is working in the palm company owned by Malaysia.

Bases on information gotten from Indonesia Labor and her affection to children and United Nations so is education, creating The Mother of Suraidah intention so flare up to build school in Central Sebatik District. Her ideas are welcomed nice by all community of Central Sebatik District such as Mr. Sudarman, Mr. H. Firman, and Mr. Steven whose is struggling directly to build this border school in Central Sebatik.

Social movements Education of Boundary State of Indonesia Republic-Malaysia is initiated by the mother Hj. Suraidah with moral support, and material from the communities of Central Sebatik and also spiritual she got during the running of the Hajj. Mother Suraidah feel what she got during the running of the Hajj is a mandate that must be implemented and championed.

According to the village head (Sudarman), the personality of the mother Hj. Suraidah is soft, intimate and unpretentious also concern for the fate of the children nation make Mr. Sudarman was determined to help the struggle of the Hj. Suraidah to realize her ideas, let alone Hj. Suraidah has captivated the hearts of the parents either in Central Sebatik Indonesia or parents in Bergosong Malaysia. Because the ideas of the mother Hj. Suraidah makes the parents who want their children get education already impatient and often asked Councilor when ideas of the mother Hj. Suraidah it materialized.

Information from Father Ustad H. Firman, Mother Hj. Suraidah figure of woman-friendly, kind, and smart also has a fairly high faith in religious preaching movement prove that not only performed at the Mosque but also they move with go to the citizens. In addition the condition of Indonesia Labor in Bergosong not provided a place of worship is also an education makes the father of Ustad H. Firman of the determined support of the mother Hj. Suraidah to embody his ideals in setting up schools in Central Sebatik District later children would get an education and religious science.

Information from Steven (community leaders) that Hj. Suraidah is the figure of the woman who has everything, in terms of a gentle personality, attention to people who have not had time to feel the World Education attested by teach the illiterate communities to get to know the letters to be read, and that was done by the mother Hj. Suraidah selflessly without expecting rewards. The mother of Hj. Suraidah always sharing science to society and affection towards the children of the nation make the hearts of Mr. Steven wanted to help realize the her ideals. With struggle with Mr. Sudarman, father of Ust. H. Firman and the father of the Head and mother of Hj. Suraidah so that the school stood a poultice which consists of Early Childhood Education, package A (eradication of Illiteracy), and the Madrasa.

#### 4.3.3 The Role of The Local Government

The establishment of the School Boundary has been helping communities to meet the needs of children's education of villages at the border and including Indonesia Labor Child in adjacent to Central Sebatik called as Bergosong. At this time (2017) the number of students as much as 122 students, consisting of Early Childhood Education Levels, Madrasa Ibtida'iyah (MI) and Madrasah Diniyah (MD). School Boundary also get support from the Ministry Religion of Indonesia Republic in Nunukan Regency, The Government of East Kalimantan province, Dompot Duafa, The Government of Nunukan Regency which always helps in terms of administration and operations.

In order to make the movement of the eradication of illiteracy and education facilitation for Indonesia Labor Child, Central Sebatik Regency took a role with organise functions of planning, coaching, coordination and also get involved directly in the implementation through the PKK organization Subdistrict or assigning volunteer teachers to teach. This Regency also hosts these monitoring and evaluation activities of the events course.

##### 4.3.3.1 Planning

The involvement of local government (sub-district) in planning the form formulation strategy approach to society and Indonesia Labor. Planning activities will not be successful without the support and active participation from the community. Local governments help the Foundation to design the model approach is effective in increasing public confidence towards the institutions. Whereas the implementation of the strategy and planning, generally carried out by

the Foundation along with other strategic partners.

#### 4.3.3.2 Coordination

In addition to community education and empowerment, the movement for communities border and Indonesia Labor involves some local organizations, whether local governments with different levels of military organization, the border police, as well as some social institutions namely Ar-Rashid Foundation and *Dompét Dhuafa* Foundation. Local government/ Sub-District function performs coordination to help synergize the activities, including promoting these activities in order to encourage the stakeholder involvement.

#### 4.3.3.3 Implementation

The involvement of Sub-District are represented by women's organizations or *PKK* Sub-District or volunteer teachers who are also staff of the district, as well as the mutual society movement in the construction of the school building. *PKK* was directly involved in the Organization of several functional literacy groups, promotional product results processed from a group of students in the village. While the staff of the Sub-District volunteer teachers in educational equality. The involvement of the other sub-district is in the form of awarding honoraria for Teachers Program Equality organized by the Foundation in Sebatik Malaysia. Honor teachers in question are taken from the Community/charity funds collected in the Sub-District Office environment of Central Sebatik. The support Government Sub-District is also supplying equipment, mutual development and maturation of the school boundary currently being the center of Ar-Rashid Foundation activities.

#### 4.3.3.4 Monitoring

Monitoring activities is quite intense conducted by the Sub-District Government including accompanying guests who visit do visitasi in activities carried out by the Foundation.



Figure 3. The Visitation of Indonesia Labor Camp of Sebatik Malaysia

#### 4.3.3.5 Evaluation

Central Sebatik Sub-District is also active in implement evaluation activities. In addition to running the function of Sub-District, this evaluation was also done by the District Head in order as Trustees/Advisors at school Boundary.

#### 4.3.4 Dompét Duafa Foundation

*Dompét Duafa* (the name of a Social organisasil in Indonesia) provides assistance to School Boundary in 2014 in the form of revitalisai building which was originally the building was just a frame converted into a home and school. Next *dompét dhuafa* also provides assistance in the form of awarding honoraria for teachers, teachers and operations of healthy eating. Every year *dompét dhuafa* also strives to enhance competence of teachers in two ways namely massive and thorough way. How massive is raising a teacher competence inviting teachers in training undertaken in other areas such as teacher training in Bogor. While a thorough way is to increase the teachers competence and school management by bringing in teachers to suit the needs of the school known for its educational programs of Indonesia literature. Educational program of Indonesia Literature School Boundary given to Madrasah Ibtidaiyah. In addition to assisting in the development of the competency of the teachers were also given management training school by hoping this Madrasah Ibtidaiyah for future became an independent school.

#### 4.4 The Restricting Factor of The School Boundaries Movement

Movement education border still mostly encountered obstacles, among others: still the lack of support, whether the public at large, the Central Government, the local population as well as corporate. However there is such attention had already begun of *Dompét Dhuafa* and *Pertamina*. Expressed by the head of South Sebatik (Harman, SIP, MSi.):

“That needs attention is the learning space for students of Madrasah Ibtidaiyah and Madrasah Diniyah, Sir. It would be more elegant if boarding schools to be built, so that the Indonesia Labor Child do not need round trip across the country every day”.

The obstacles still faced in the development of education in border Sebatik island is among others, are:

a. Human resources educators are still skimpy, either quantity or quality. Currently the majority of educators are using Senior High School Degree or equivalent. The very lack of teachers make teaching and learning are not effective. Teachers current numbering 8 people, 3 people including Bachelor Degree backgrounds, while 5 others educated Senior High School Degree. The number of teachers is certainly not comparable to the number of pupils who are no proportionate as much as 130 students, with details of the 31 students of Early Childhood Education and 36 students of *Madrasah Ibtidaiyah*, and 63 students of *Madrasah Diniyah* students. Ar-Rashid Foundation also experienced difficulty in finding teachers, because most of the prospective teachers require salaries/honorarium which is not yet to be met by the Foundation. The source of the funds of Ar-Rashid Foundation is only the support from stakeholders and do not have donors anyway.

b. The schools locations, is join in the space under community house. Loan for 7 years (since 2012). Facilities and learning media is very minimal. The buildings used by the Ar-Rashid Foundation for teaching and learning activities is loaned by the homeowner for a period of 7 years. The buildings are made of wood measuring approximately 6 x 8 meters and has 2 floors. The 1st floor is used for the teaching and learning activities in the boundary into 3 parts so it looks very narrow once and any learning hours divided into 4 shift in the day which starts from 06.00 until 17.30. The 2nd floor of the building was used for a library and a place to stay of teachers and students. As for the number of teachers who stay as much as 4 people while the students who stay as many as 12 people. They stay because of the distance between the residence towards the school are very far. Limitations of operational costs. Operational costs and living costs of students (there are 11 of Indonesia Labor Child who settled in the location) is only relying on donors and partners (*Dompét Dhuafa*).

c. Low level education of student parents causing they assume that the school was not important. Their children were told to help out gardening, because the crops they pick is very large and profitable, so without attending school any children they can still eat and fulfilled their life necessities.

d. The distance among residence parents and school location are far. To get to schools, teachers and students have to walk as far as approximately 5 – 10 Km, passing through the hilly area, the cobbled streets and even across the river/sea due to the lack of public transportation. Even when the rainy season arrived most of the students do not attend school because of the path that is skipped is very muddy, slippery and muddy.

## 5. Conclusion

The social movement is a collective behavior that characterized common interest and long-term goals, namely to change or maintain a community or educational institution that is in it. Another feature of the social movement is the use of different ways outside of the usual way. Not just how but also the institutions that handle education services are also different, beyond naturalness. Education as the basic needs of the community in the border regions of Indonesia and Malaysia in particular of South Sebatik District, as well as other social movements have used different ways with the Organization of education not only for locals but by and for all Indonesia citizens even though it is not a local resident. Managed by the community work together with various civic and a pillar of the local government.

The handling question of the border is not only become the responsibility of the Central Government, provincial government, and the Government district/city alone but also will need to be supported by all components of the nation both from the corporate world, community organizations and agencies/other technical institutions. Starting from the large number of issues in the border area, then needed an innovation and creativity from the organizers of Government at the level of districts and Villages as the Border becomes the home front of Indonesian Republic. The attitude of society to care about the borders should look for solutions and solving the problem.

School Boundary, South Sebatik District held some type of education: Early Childhood Education known as (PAUD), *Madrasah Ibtidaiyah* (Elementary School/formal level), *Madrasah Diniyah* (Non Formal Elementary School), package A, B and C as well as Functional Literacy (KF)/General Literacy (KUM). Early Childhood Education students, *Madrasah Ibtidaiyah* and *Madrasah Diniyah* come from Indonesia Labor Child that is working in plantations Palm in Sebatik Island which became Malaysia country area. In Sebatik Malaysia currently there is also a class Package A. thus School boundary is the identity of education that hosts a variety of educational services program. As a social movement, this boundary education must always be raised spirit and--by continuing to address the problems at hand.

This research has its limitations, which is only focused on the efforts of the Organization of the education service by the Community border in Indonesia, not much special education services information worker conducted by society and the State on the border of Malaysia.

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relating to educational neglected in the border area around this world. This research supported by Diponegoro university Institution that has been supported a research process as well as resource classification around sebatik area Malaysia (border area among Indonesia and Malaysia).

## References

- Arikunto, S. (2007). *Dasar-dasar Evaluasi Pendidikan (Edisi Revisi) (The Basis of Educational Evaluation (Revision Edition))* Jakarta: Bumi Aksara.
- Arikunto, S. (2007). *Evaluasi Program Pendidikan (The Evaluation of Educational Program)*. Jakarta: Bumi Aksara
- Austin, M. (2012). From Entitlement to Experience: Access to Education for Children of Migrant Workers from Burma. *Asian and Pacific Migration Journal*, 21(3). <https://doi.org/10.1177/011719681202100307>
- Daryanto, H. M. (2006). *Administrasi Pendidikan (Educational Administration)*. Jakarta: Rineka Cipta.
- Farahania, M. F., & Arani, N. A. (2014). Border Education with Emphasizing on Giroux's Educative Implications. *Procedia - Social and Behavioral Sciences*, 116, 1423-1427. <https://doi.org/10.1016/j.sbspro.2014.01.409>
- Fielden, J., & LaRocque, N. (2008). *The Evolving Regulatory Context for Private Education in Emerging Economies: Discussion Paper*. Washington DC: The World Bank and International Finance Corporation.
- Goodman, S. W. (2010). Integration Requirements for Integration's Sake? Identifying, Categorising and Comparing Civic Integration Policies. *Journal of Ethnic and Migration Studies*, 36(5), 753-772. <https://doi.org/10.1080/13691831003764300>
- Jaluluddin, & Idi, A. (2007). *Filsafat Pendidikan (The Philosophy of Education)*. Yogyakarta: Ar-Ruzz Media.
- Kasetsart, W. N. (2016). The Important Factors of English Program Administration Responsive to the ASEAN Community for Schools in the Border Provinces of Southern Thailand. *Journal of Social Sciences*, 37, 158e163
- Lan, J. (2012). Feasibility Analysis of Developing Cross-Border Network Education in China. *Physics Procedia* 33, 1979-1985. <https://doi.org/10.1016/j.phpro.2012.05.311>
- Nitjarunkul, K. (2015). The Study of Concepts Understanding and Using Competence of Teachers in Educational Innovation and Technology for Teaching Management at Schools of the Unrest Areas of Three Southern Border Provinces of Thailand. *Procedia - Social and Behavioral Sciences*, 174, 2473-2480. <https://doi.org/10.1016/j.sbspro.2015.01.919>
- Rafael Raga Maran, *Pengantar Sosiologi Politik (Introduction to Political Sociology)*. Jakarta: Rineka Cipta, 2001.
- Studzieniecki, T. (2016). The Development of Cross-Border Cooperation in an EU Macroregion – a Case Study of the Baltic Sea Region. *Procedia Economics and Finance*, 39, 235-241. [https://doi.org/10.1016/S2212-5671\(16\)30318-5](https://doi.org/10.1016/S2212-5671(16)30318-5)
- Suharto, S. (2009). *Kemiskinan & Perlindungan Sosial di Indonesia (The Poverty and Social Protection in Indonesia)*. Bandung: Alfabeta.
- Sunarto, K. (2004). *Pengantar Sosiologi (Introduction to Sociology)*. Jakarta: Lembaga Penerbit Fakultas Ekonomi Universitas Indonesia.
- T.Keban, Yermias. (2008). *Enam Dimensi Strategis Administrasi Publik (Six Strategic Dimensions of Public Administration)*, Yogyakarta: Gava Mdia.
- Tilaar, H. A. R. (2002). *Manifesto Pendidikan Nasional Tinjauan dari Postmodernisme dan Studi Kultur (National education manifesto review of Postmodernism and Cultural Studies)*. Jakarta: Kompas.
- Tilaar, H. A. R. (2006). *Standarisasi Pendidikan Nasional suatu Tinjauan Kritis (National Education Standards a Critical Review)*. Jakarta: Rineka Cipta.
- Zuriah, N. (2007). *Pendidikan Moral dan Budi Pekerti dalam Perspektif Perubahan (Moral education and Manners in the perspective of change)*. Jakarta: bumi Aksara.

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# Effectiveness of the Microcredit Program in Enhancing Micro-Enterprise Entrepreneurs' Income in Selangor

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## Abstract

Poverty has been one of the pressing issues in developing countries like Malaysia. Amanah Ikhtiar Malaysia (AIM) was the first microcredit institution and one of the dominant players contributing to the poverty eradication in Malaysia through the provision of microcredit to the poor. Thus, the study aimed to investigate the effectiveness of the microcredit program on poverty eradication as experienced by AIM microcredit recipients in Selangor. Systematic random sampling was conducted to sample 326 *Sahabat* (from this point onwards the AIM microcredit recipients will be known as *Sahabat*) from February to April 2016. Descriptive analysis and multiple regression were used to analyse the data distribution and relationship between the dependent variable as measured by income-investment ratio and independent variables represented by socio-demographic as well as other related variables necessary to achieve the study objective. The findings of the study show that most of *Sahabat* were married (95.7 percent) and have secondary educated (72.7 percent). In terms of income distribution, most *Sahabat* earn less than RM1,500.00. Nevertheless, all *Sahabat* showed positive income changes after receiving different microcredit program schemes from AIM. Multiple regression analysis have identified two variables which are the family workers and hired workers where both significantly influenced the income-investment ratio after joining the microcredit program. This study affirmed the effectiveness of the AIM program in poverty eradication among the poor. AIM also plays an important role in meeting the financial needs of *Sahabat* which is necessary to enhance their microenterprises.

**Keywords:** microcredit, income, poor, income-investment ratio

## 1. Introduction

Poverty eradication continues to be one of the objectives of the country's developmental policy. Under the Tenth Malaysian Plan (2011-2015), the Government launched the National Transformation Policy (NTP) through the New Economic Model and sets the goal of moving the country into a high-income economy. This transformation is supported by the Economic Transformation Programmes and Government Transformation Programmes which focus on eradicating poverty and improving the living standard of Malaysians. Microcredit has become a prominent tool for poverty alleviation program in Malaysia and in most developing countries as well.

Thus in 1987 through the hands of Professor Muhammad Yunus, the most successful replication of the Grameen Bank of Bangladesh was established in Malaysia known as the Amanah Ikhtiar Malaysia (AIM) with the aim to reduce poverty. AIM was established under the Trustee Incorporation Act 258, 1987 to institutionalize an action research project carried out by the Centre for Policy Research of University Science Malaysia (USM), sponsored by the Asia and Pacific Development Centre (APDC), Islamic Economic Development Foundation of Malaysia (YAPEIM), and Selangor State Government where the outcome of the project was very encouraging and created a positive impact on the well-being of microcredit borrowers. Thus the main objectives of AIM are to reduce poverty among the poor and low-income households; to provide microcredit to fund activities that can improve income; and to provide funding, guidance, and training to the entrepreneurs from poor and low-income families (Gibbon et al., 1990).

As the years go by, AIM not only gives microcredit to help the poor generate income via creating small businesses and other economic activities but today, the microcredit schemes offered by AIM can be divided into two categories. The first is microcredit for economic activities, which are i-Mesra, i-Srikandi and i-Wibawa, and the second is for non-economic activities, which are i-Sejahtera, i-Bestari, i-Penyayang, and i-Emas (AIM, 2016).

Each microcredit scheme has their own prescriptions, guidelines, regulations and amount to be disbursed. With these loan schemes, it is hoped that the poor can set up not only small businesses to increase their income and improve their well-being but also increase their standard of living. Since its inception some 29 years ago as a private trust, AIM has disbursed about RM 15,097,046,687 as of April 2016, funded 382,178 active borrowers across 156 branches nationwide (AIM, 2016). Today, AIM is the leading microcredit institution and considered as the pioneer in Malaysia. Hence, AIM only selects *Sahabat* with household income below RM3,855 and per capita income below RM828 per month as prescribed by the poverty line index (PLI).

Microcredit has been recognised as a cost-effective way of combating poverty and developing the institutional capacity of the financial system to lend money to the poor (Jonathan Morduch, 2000). According to Christen et al., (2003), microfinance refers to the stipulation service for the poor and lower income citizens to assist them in obtaining microcredit service that includes the provision of regulated low income such as housing microfinance, pensions, savings and transfer services, micro-insurance and remittance management. The types of financial services that can be considered microfinance include loans, deposit facilities, and instruments for the transfer of funds to marginal clientele, especially to the poor (Gonzalez-Vega, 1998). Microcredit can be recognised as an essential socio-economic and financial mechanism for poverty alleviation, promoting entrepreneurial development, and increasing the profile of disadvantaged people in numerous countries around the world (Hossain et al., 2012). Microfinance also serves to alleviate rural livelihoods and urban poor through the creation of entrepreneurship opportunities that encourage the elimination of unemployment by developing potential businesses based on their interest and skills. Furthermore, Microcredit serves as small loans to poor people for self-employment projects that can generate income and allows them to take care of themselves and their families (Bank for the Poor: Garmeen Bank, 2014; International Year of Microcredit, 2015).

In Malaysia, Hamdino (2012) went further to indicate that married couples who are between the ages of 41-50 years of age seem to be the most successful microcredit recipients compared to single or younger recipients. This could be due to their experiences and good team spirit as they work together to improve their business. Similar study to Hamdino (2012), Terano et al. (2015) also reported that married couples were more effective in handling their microcredit. There were positive changes in their earning ability, the ability to pay back on schedule, improved well-being and livelihood. M. Zaini Omar et al. (2012) reported that AIM microcredit programme has a positive impact on household income and poverty alleviation in Kedah, especially among married participants who are between the ages of 40-49 years. Thus, it can be concluded that AIM has both economic and social impacts on its participants. Similar finding was also reported by Haryanti et al. (2012). According to Sayed Samer et al. (2015), the older members enjoy higher household income compared to the new ones and this is because they have spent over 3 years in the scheme and attended more business training. Thus the aim of this paper is to determine the factors that could enhanced the income of the AIM microcredit recipients by analysing the income-investment ratio among *Sahabat*.

## 2. Material and Method

### 2.1 Sample and Questionnaire

Systematic random sampling was used to select 326 *Sahabat* of AIM microcredit program recipients based on the information collected from AIM headquarters in Kuala Lumpur. There are 156 AIM branches all over Malaysia but this study will concentrate on 6 branches in the state of Selangor Darul Ehsan. The six branches were; Hulu Langat, Kuala Selangor, Barat Laut Selangor, Gombak, Selayang, Shah Alam and Klang to conduct face to face interview.

A list of targeted *Sahabat* which are agro-based and center meetings were obtained from AIM branches mentioned earlier. Systematic random sampling was performed in each meeting center to select and interview *Sahabat* that met the criteria for inclusion in the study. The center meetings selected were community halls, council housing, mosque, and flat house.

The questionnaire was designed to include open and close-ended questions specifically to achieve the objectives of the study. The questionnaire is divided into two parts: (a) demographic and loan profiles and (b) information in terms of the effectiveness of the microcredit. The survey was conducted from February to April 2016.

### 2.2 Research Hypothesis

The conceptual framework of the study was based on Figure 1. The basic aim of microcredit is to increase the income of the *Sahabat* so they can be better off than what they were. Involvement in the microcredit program serves as an important avenue for extending the size of a microenterprise or starting a new business. Thus a good business management is another factor for microcredit recipients in pursuing the *Sahabat* objective. The number

of employees, either from family or hired workers is another factor indicating the extend of their business. The demographic profiles describe the Sahabat characteristics which can also influence the success of the microcredit they've taken. The revealed influential determinant which is the income-investment ratio was used as a proxy in successful business by Sahabat of AIM. (Income-Investment Ratio= Total income / Total Investment). The total income and investment (microcredit from AIM) was obtained for a 2 year period i.e. 2014 and 2015. The hypothesis concerned on income-investment ratio is been formulated as follows:

*Hypothesis: There is no significant relationship between experience, time per day, entrepreneurial training, amount of loan, family workers, hired workers, marital status, education level and income-investment ratio.*

2.3 Pilot Study

The effectiveness of the research tool in measuring required outcome can be tested through a pilot study. In order to evaluate the viability of the questionnaire, a sample size of 68 was used for the pilot study. The Cronbach's alpha was employed to measure the reliability of the 15 variables selected. Cronbach's alpha was value greater than 0.50 means that there is acceptable Develis (2003) among the theory an factor analysis is fit to be used for the study. The Cronbach's alpha value for the entire statements is 0.853, indicating very high reliability.

2.4 Method of Analysis

Firstly, descriptive analysis was conducted to show the Sahabat demographic profiles variables. Secondly, multiple regression analysis was conducted to determine the effect of microcredit financing on the recipients' income. Income in this case was represented by income-investment ratio as the dependent variable while other variables such as borrowers' demographic profile, experience (years), time per day working on business (hours), amount of loan, family workers, and hired workers were the independent variables.

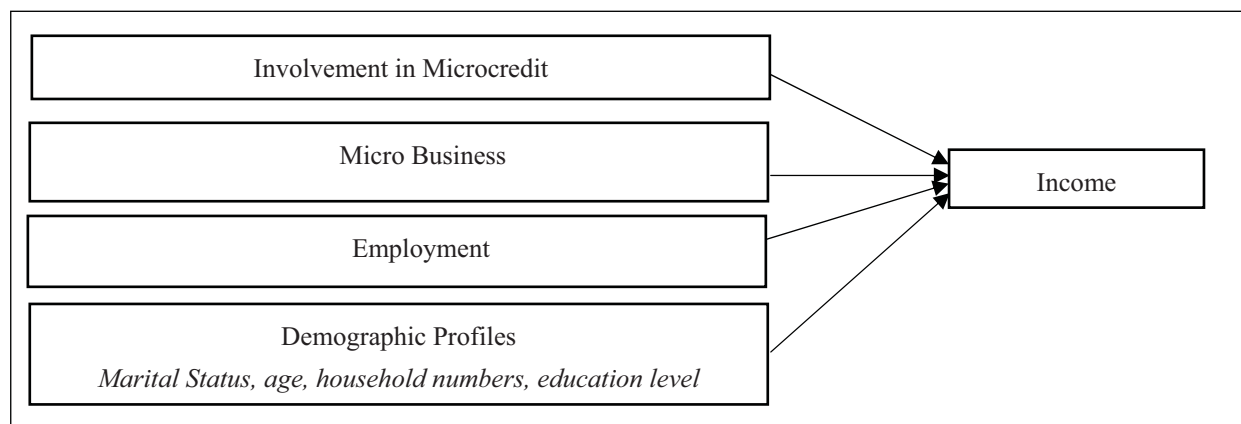


Figure 1. Conceptual Framework

The regression model used can be specified as follows:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e; \tag{1}$$

Where:

Y is income-investment ratio of the microcredit program average of 2 years (2014-2015)

X<sub>1</sub> is marital status; 0= single, and 1= married

X<sub>2</sub> is a dummy for education level; 0= primary and secondary, and 1= tertiary

X<sub>3</sub> is a dummy for experience; 0= less than 10, and 1= more than 11

X<sub>4</sub> is a dummy for time per day working on the business; 0= less than 8, and 1= more than 9

X<sub>5</sub> is entrepreneurial training; 0= not involved, and 1=involved

X<sub>6</sub> is a dummy for amount of loan; 0= below RM15,000, and 1= above RM15,001

X<sub>7</sub> is family worker; 0= do not have, and 1= have

X<sub>8</sub> is hired worker; 0= do not have, and 1= have

3. Results and Discussion

3.1 Descriptive Analysis

The distribution of the socio-demographic profile of AIM Sahabat is shown in Table 1. Most of the AIM Sahabat

were married (95.7%), majority have at least a secondary education (72.7%), followed by primary education (16.3%) and tertiary education (11.0%). Similarly to Hamdino (2012), Terano et al. (2015) also reported that married couples and secondary educated were more effective in handling the microcredit. The largest age group is between 41-50 years old (35.6%). About 52.1% of *Sahabat* have between 1-5 people in their household, followed by 6-10 people (45.7%) and 11-15 people (2.10%). About 68 *Sahabat* (20.9%) earn below RM1500 per month, 116 *Sahabat* (35.6%) earn between RM1,501-RM2,500 per month, 80 *Sahabat* (24.5%) earn between RM2,501-RM3,500 per month, 31 *Sahabat* (9.5%) earn between RM3,501-RM4,500 per month and 31 *Sahabat* (9.5%) earn above RM4,501 per month. Moreover, most of the *Sahabat* (53.7%) are engaged in food stall business and 41.7% of them have less than 5 years of experience.

Table 1. Demographic Profile of Sahabat, N=326 Female

Characteristics	Frequency	Percentage
<b>Marital Status</b>		
Single	14	4.30
Married	312	95.7
<b>Educational Level</b>		
Primary	53	16.3
Secondary	237	72.7
Tertiary	36	11.0
<b>Age</b>		
Below 30	25	7.70
31-40	69	21.2
41-50	116	35.6
51-60	95	29.1
Above 61	21	6.40
<b>Household Number</b>		
1-5	170	52.2
6-10	149	45.7
11-15	7	2.10
<b>Income Distribution</b> (average for 2014-2015 period)		
Below RM1,500	68	20.9
RM1,501-RM2,500	116	35.6
RM2,501-RM3,500	80	24.5
RM3,501-RM4,500	31	9.5
Above RM4,501	31	9.5
<b>Type of business</b>		
Retail	61	18.7
Processing and Manufacturing	25	7.70
Fish, Livestock and Crop cultivation	65	19.9
Food Stall business	175	53.7
<b>Experience in Business</b>		
Below 5 years	136	41.7
6-10 years	102	31.3
11-15 years	38	11.6
16-20 years	25	7.70
Above 21 years	25	7.70

Source : Own survey 2016

### 3.2 Income-Investment Ratio

This study aimed to determine the effect of microcredit financing on the recipients' income. To achieve this, we need to estimate the income-investment ratio. Thus, the income-investment ratio was derived by dividing the total income by the total investment (Mizanur et al., 2010 and Norma et al., 2010). The result shows that the income-investment ratio averaged 4.062. This indicates that the microenterprise activities carried out by the

*Sahabat* are successful in generating income. Table 2 shows the Income-investment ratio distribution and also the range of income investment ratio based on the range based on very low and very high ratio. As can be seen in Table 3, the frequency distribution of the income-investment ratio also reveals that some of the *Sahabat* are not doing very well which is noted by the low value of their income-investment ratio (minimum ratio of 1.07).

The general equation of the income investment ratio is as shown below:

Income-Investment Ratio = Total Income / Total Investment

Income = for two years (2014 to 2015)

Loan = for two years (2014 to 2015)

Table 2. Income-Investment Ratio

Income-Investment Ratio measure	Income-Investment Ratio value	
Mean	4.062	
Median	3.963	
Standard Deviation	1.515	
Minimum	1.07	
Maximum	7.30	
Range	Frequency Distribution ( <i>Sahabat</i> )	
Very Low Ratio	<1.99	17
Low Ratio	2.00-3.99	146
High Ratio	4.00-5.99	112
Very High Ratio	>6.00	51

Source : Own survey 2016

As shown in Table 2 above, about 17 *Sahabat* (5.2 percent) were categorised under “very low ratio” based on the results of their two years income-investment ratio from 2014 to 2015. Also, 146 *Sahabat* (44.8 percent) were categorised under low ratio, while 112 *Sahabat* (34.4 percent) and 51 *Sahabat* (15.6 percent) were categorised under high ratio and very high ratio respectively.

Furthermore, Table 2 shows that the minimum income-investment ratio is 1.07, indicating that some *Sahabat* did not perform well in their microenterprises. The incidence of very low and low ratio categories could be due to the low educational background of most of the *Sahabat* (primary and secondary education). It could also be due to the low return on investment associated with the first scheme (i-Mesra loan) as the new *Sahabat* might still be lacking the necessary experience. The first financing is RM3,000 and can increase to a maximum of RM10,000 as stipulated in the i-Mesra loan scheme. Other than that, *Sahabat* also engages in small enterprises like small food stall businesses such as junk food, nasi lemak, local fruits, drink stalls and others. The result also shows that the maximum income-investment ratio is 7.30 indicating that some *Sahabat* perform well in their microenterprises and generating high income. High income generated by these *Sahabat* is due to larger businesses such as chicken rearing, retail business, as well as processing and packaging of chips. Besides that, the *Sahabat* can access the second scheme (i-Srikandi) offered to those who already took the i-Mesra scheme.

### 3.3 Multiple Regression

Before the multiple regression analysis was conducted, some tests were carried out to determine the reliability of the data collected so that further analysis can be conducted. Table 3 is based on Tolerance greater than 0.2 and Variance Inflation Factor (VIF) less than 5. This indicates no multicollinearity problem since both values are within the acceptable range. Table 4 shows the result of the Collinearity Statistics.

The multiple regression was estimated to determine the relationship between the dependent and independent variables as discussed earlier in the methodology section. The multiple linear regression model was applied to determine the effect of AIM program on the income of the *Sahabat*. The coefficient of determination ( $R^2$ ) is 0.096, indicating that the factors (variables) in the model reflects 9.6% in the income-investment ratio of the *Sahabat*. The F-value is 4.206 ( $P < 0.00$ ) indicating significant overall relationship between dependent variable and all the independent variables. These findings correspond with the findings of Hamdino (2012), G. Maggiano (2006), Rosman et al., (2015) as they also generate low  $R^2$  in their respective studies. The finding shows that two variables (family workers and hired workers) out of the eight variables are positive and statistically significant (Table 4).

The number of family workers and hired workers have significant positive relationship with the

income-investment ratio. This indicates that the number of workers play an important role in the income generating activities and can be pivotal in moving the enterprises forward.

Table 3. Collinearity Statistics

	Collinearity Statistics	
	Tolerance	VIF
Marital status	0.961	1.041
Education Level	0.964	1.038
Experience	0.955	1.048
Time per day	0.994	1.006
Entrepreneurial Training	0.987	1.013
Amount of Loan	0.925	1.081
Family workers	0.965	1.036
Hired workers	0.934	1.071

Source: Own survey 2016

Note: Tolerance >0.2; Variance Inflation Factor <5

Table 4. Multiple linear regression coefficients of the factors contributing to the income of *Sahabat*

Dependent variable	Independent variable	Unstandardized Coefficient (Beta)	T-value	Sig.
Income- Investment Ratio	Constant	3.833	7.271	0.000
	Marital Status	-0.365	-0.899	0.369
	Education Level	-0.031	-0.119	0.906
	Experience	0.033	0.179	0.858
	Time per day	0.149	0.846	0.398
	Entrepreneurial Training	-0.173	-1.061	0.289
	Amount of Loan	-0.157	-0.933	0.352
	Family workers	0.693	3.741	0.000***
	Hired workers	0.827	4.163	0.000***

Source: Own survey 2016

Note: \*\*\*Statistically significant at the 0.01 level \*\*, \* at the 0.05 level and \* at the 0.1 level

#### 4. Limitations and Suggestions for Future Research

The present study is subjected to a number of limitations. Although this study achieved its aim, there were some unavoidable limitations. The study focused on the *Sahabat* in Selangor and could not afford to sample the whole Malaysia. However, gaining access to such a population size would prove difficult and beyond the time and budget constraints of the study. In addition, the study is related to the *Sahabat* demographic profile and the acquired data depends on the cooperation and honesty in giving accurate information especially accuracy of the reported income and investment level. Further study, microcredit loan should be measured based on the level of its effectiveness across different household income.

#### 5. Conclusion

AIM plays an important role in meeting the financial needs of the *Sahabat* such as the provision of credits for enhancing their microenterprises and also serves as an effective tool for poverty eradication. This study highlights the effectiveness of the AIM program towards increasing income among microenterprise entrepreneurs. The study explores the demographic profile and *Sahabat* characteristics with regards to the total income. The result showed that majority of the *Sahabat* are married, attained secondary education, aged between 41-50 years old and involved in the food stall business. All these characteristics significantly contribute towards the increased income.

AIM microcredit program provides an opportunity for the *Sahabat* to increase the total income derived from their microenterprises or business. It serves as a driving force for the poor and also important in reducing their poverty level. Family workers and hired workers have positive influences on income-investment ratio after joining the AIM microcredit program. Most of the *Sahabat* perceived that their lives have improved since they become a member of the AIM program. Hence, AIM should find a way to increase income by improving the sustainability and growth. This is important as it has higher probabilities of improving family well-being and graduating *Sahabat* above the poverty line income.

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## References

- Al-shahmi, S. S. A., Majid, I. B. A., Hamid, M. S. R. B., & Rashid, N. A. (2014). Conceptual Framework: the Role of Malaysian Microfinance on the Wellbeing of Users' Services from the Perspective of (AIM) and (TEKUN). In *University 4th International Islamic Banking and Finance Conference. Kuala Lumpur* (pp. 13-14).
- Amanah Ikhtiar Malaysia. (2016). *Schemes of Amanah Ikhtiar Malaysia*. Retrieved from <http://www.aim.gov.my/~cms/index.html>.
- Babu M, M. (2016). Some Determinants of Changes in the Real Income of Microfinance Programme Participating Households in Kerala. *International Journal of Rural Management*, 12(1), 51-71.
- Christen, RP, Lyman, TR, & Rosenberg, R. (2003). *Microfinance Consensus Guidelines; guiding principles on regulation and supervision of microfinance*. USA: Washington.
- DeVellis R.F. (2003). *Scale Development: Theory and Applications*. Sage, Thousand Oaks, CA, USA.
- Economic Planning Unit (11MP). (2016). *Eleven Malaysian Plan*. National Economic Policy. Retrieved from <http://rmk11.epu.gov.my/book/bm/Rancangan-Malaysia-Kesebelas/Buku%20RMKe-11.pdf>.
- Economic Planning Unit (11MP). (2016). *Eleven Malaysian Plan*. National Development Policy. Retrieved from <http://rmk11.epu.gov.my/book/bm/Rancangan-Malaysia-Kesebelas/Buku%20RMKe-11.pdf>.
- Economic Planning Unit (11MP). (2016). *Eleven Malaysian Plan*. National Vision Policy. Retrieved from <http://rmk11.epu.gov.my/book/bm/Rancangan-Malaysia-Kesebelas/Buku%20RMKe-11.pdf>.
- Economic Planning Unit (11MP). (2016). *Eleven Malaysian Plan*. National Transformation Policy. Retrieved from <http://rmk11.epu.gov.my/book/bm/Rancangan-Malaysia-Kesebelas/Buku%20RMKe-11.pdf>.
- Gibbons, D. S., & Sukor, K. (1991). *Annual report: Banking on the rural poor in Peninsular Malaysia*. Penang, Malaysia: Amanah Ikhtiar Malaysia.
- Gonzalez-Vega, C. (1998). Microfinance: broader achievements and new challenges. *Economics and Sociology Occasional Paper No. 2518*. The Ohio State University: Electric Bulletin.
- Grameen Bank. (2014). *Bank for the Poor*. Retrieved from <http://www.grameen.com/>
- Hamdan, H., Othman, P., & WSW, H. (2012). Is microfinance program in Malaysia really effective in helping the poor. *World Review of Business Research*, 2(1), 79-97.
- Hossain, M. (1988). *Credit for alleviation of rural poverty: The Grameen Bank in Bangladesh* (Vol. 65). Intl Food Policy Res Inst.
- International Year of Microcredit. (2015). Retrieved from [http://www.yearofmicrocredit.org/pages/whyayear/whyayear\\_aboutmicrofinance.asp](http://www.yearofmicrocredit.org/pages/whyayear/whyayear_aboutmicrofinance.asp)
- Jahan, I., & Mamun-ur-Rashid, M (2015). *Socio-economic Impact of IBBL Microfinance on Rural Women in a Selected District of Bangladesh*.
- Maggiano, G. (2006). The Impact of Rural Microfinance: Measuring Economic, Social and Spiritual Development in Kabale, Uganda (*Doctoral dissertation, Georgetown University*).
- Mahmood, R., Zahari, A. S. M., & Zin, S. M. (2015). The microcredit-business performance relationship: Program delivery services as mediator. *Mediterranean Journal of Social Sciences*, 6(6 S2), 691.
- Mizanur Rahman, M., & Ahmad, F. (2010). Impact of microfinance of IBBL on the rural poor's livelihood in Bangladesh: an empirical study. *International journal of Islamic and Middle Eastern finance and management*, 3(2), 168-190.
- Morduch, J. (2000). The microfinance schism. *World development*, 28(4), 617-629.
- Muthoni, M. P. (2016). Assessing Institutional Characteristics on Microcredit Default in Kenya: A Comparative Analysis of Microfinance Institutions and Financial Intermediaries. *J. of Edu. & Practice*, 7(18), 178-198.
- Nor, N. H. M., Rashid, S. N. M., Nawawi, R., & Mohd, F. (2012). Women Enterpreneurs in Micro Credit Performance: The Preliminary Study in Kelantan. In *Knowledge Management International Conference*



(KMICe) (pp. 724-729).

Norma Md. Saad. (2011). Selecting High-Income Generating Activities for Micro-Entrepreneurs: The Case Study of Amanah Ikhtiar Malaysia. *International Journal of Humanities and Social Sciences*, 1(5), 258-264.

Omar, M. Z., Noor, C. S. M., & Dahalan, N. (2012). The economic performance of the Amanah Ikhtiar Malaysia rural microcredit programme: A case study in Kedah. *World*, 2(5).

Saad, N. M., & Duasa, J. (2010). Determinants of Economic Performance of Micro-Credit Client and Prospect of Islamic Microfinance in Malaysia. *ISRA International Journal of Islamic Finance*, 2(1), 113-130.

Terano, R., Mohamed, Z., & Jusri, J. H. H. (2015). Effectiveness of microcredit program and determinants of income among small business entrepreneurs in Malaysia. *J. of Global Entrepreneurship Res.*, 5(1), 1-14.

**Appendix A**

Instruction: Please tick (√) in the appropriated box and fill in the blank

1. Marital Status
 

Single
Married
2. Education Level
 

Primary School
Secondary School
STPM
Diploma
Degree
3. Number of Households(include Sahabat) : \_\_\_\_\_
4. Age (Sahabat) : \_\_\_\_\_
5. Income Distribution : RM \_\_\_\_\_
6. What kind of business that you are involved with microcredit ?  
\_\_\_\_\_
7. How long you are experience in this business ?  
\_\_\_\_\_ years
8. How much time per day/ working you for their business ?  
\_\_\_\_\_ hour
9. How much you invest in microcredit loan ?  
RM \_\_\_\_\_
10. Have you take the family workers in their business ?
 

Yes
No
11. Have you take the hired workers in their business ?
 

Yes
No
12. Have you involved in entrepreneurial training in microcredit program ?
 

Yes
No

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# Changes and Impacts of Heritage Building to Small Hotel Building: A Case Study of Bangkok Story Hostel

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## Abstract

Over the last decade, trends of adaptive reuse of old buildings turned into hotels have been popular in Thailand, especially in Bangkok. Adaptive Reuse Heritage Building converted to the Hotel Building, AR-HB-hotel, effects changes and impacts in several aspects. There have been established criteria for substantial renovation, business investment and assessment of the value of heritage buildings but no concern has been paid to the surrounding community impact. The objective is to study four issues of AR-HB-hotel focused on (1) physical, (2) economic, (3) value changes, and (4) social impacts. The research method is qualitative approach with case study type. 'Bangkok Story Hostel' was selected as a representative case for AR-HB-hotel. This small 3-storey heritage hotel is located in a traditional trading district on Songward Street, Samphanthawong district, Bangkok. For the data collection, building history and project background, as well as physical and economic changes were collected from secondary data, surveys, and in-depth interview. Value change and social impact were collected from in-depth interview and questionnaire. The results showed that the level of physical, economic, and value changes of this building rose up, while the level of social impact stays the same or decreased a little less than the level before the renovation. This research may not be generalized wholly to another case with a significantly different context, but the four main approaches for examining physical, economic, value, and social issues and the procedure used in this study can be a guideline for future studies of AR-HB-hotel' changes and impacts.

**Keywords:** adaptive reuse, heritage building, changes, impacts, Bangkok Story Hostel

## 1. Introduction

An adaptively reuse project or conversion is a means to facilitate a major reuse of buildings (Remoy, 2014). Main issues associated with adaptive reuse of buildings are such as financial, environmental, and social issues as mentioned in ARP (Adaptive Reuse Potential) (Langston, 2008). As heritage buildings are worth preserving, their value is one significant issue that we have to consider. Heritage is valued in a variety of ways and the value is driven by different motivations: economic, political, cultural, spiritual, aesthetic, e.g. (Avrami et al., 2000). In particular for old heritage buildings, this is a significant conservation method that can preserve their architectural heritage at a time of rapid development. Adaptive Reuse (AR) method is the only architectural heritage preservation approach that addresses all three mains issues of sustainable development: the environment, economy, and society or cultural (Giddings, 2002; Naseer, 2003). It can be considered as conciliation between historical preservation and demolition.

AR of heritage buildings has several patterns according to functional usages: palaces or old houses adapted into office buildings, old houses converted into museums, restaurants, boutique hotels as well as shops, various other kinds of buildings changed to museums including commercial buildings whose original interior function turned into various other kinds of functions (Pongsermpol, 2011). For this study, we focused on one kind of adaptive reuse: building converted to Hotel Building (AR-hotels). Over the last decade, the trend of adaptive reuse of old buildings to hotels (AR-hotels) has been very strong in Thailand, especially in Bangkok.

In the case of Adaptive Reuse Heritage Building converted to the Hotel Building, AR-HB-hotel, there have been many standards for physical renovation, business investment, and heritage building evaluation (Pongsermpol & Upala, 2017). Started with (1) the substantial renovation, there were architectural and interior standards applicable to small hotel design, e.g., a small hotel had to have four main distinct types of areas: guest room, public area, administration office and 'back-of-house' facility (Pickard, 2002). (2) Regarding business investment, there are five main issues in small hotel business operation: service design, operation, sales and marketing, finance and accounting as well as management (Suksawasdi, 2015). To end with (3) heritage building evaluation, there have been some standards regarding heritage value and authenticity such as cultural and socio-economic value including regarding

authenticity—form and design, materials and substance, use and function, traditions, techniques and management systems, location and setting, language and other forms of intangible heritage, spirit and feeling, and other internal and external factors (WHC, 2012). In addition, (4) regarding social impacts to the surrounding community, there have not been many studies in the literature despite their significance. The social impacts focused on tourism could be perceived as positive, negative, or neutral. Each individual case can exhibit results that are much different from other cases (Pongsermpol & Upala, 2017). Therefore, AR–hotel projects have always resulted in changes of physical, economic, and value aspects as well as social impacts on the surrounding communities, so this study kept the focus on these 4 main issues: physical, economic, and value changes as well as social impacts as shown in Figure 1.



Figure 1. Four main issues of the study

In the target areas in Bangkok, there were many AR-hotels spread throughout, especially in the inner zone. The trend of this phenomenon is increasing continuously into the near future. Basically, there are five main reasons why adaptive reuses of heritage houses or buildings to hotel buildings (AR-HB-hotel) were very popular in Bangkok (Pongsermpol & Upala, 2017). They were (1) the increased awareness of heritage conservation, (2) the enactment of Hotel Act–2008, (3) the rapid communication through modern information technology, (4) the development of wide-coverage public transport network, and (5) the easy access of members from ASEAN Economics Community (AEC). At the time of this study, there were a large number of old buildings adapted to hotel buildings (AR-hotel) distributed all around in Bangkok.

In a preliminary investigation, thirty-two AR-HB-hotels were investigated in total (Pongsermpol, 2017). After some consideration, eight cases were selected for study according to the criteria of outstanding and unique character to the surrounding community. These cases were Here Hostel, The Bhuthorn Bed & Breakfast, Arun Residence, New Phiman Riverview Guesthouse, Bangkok Story Hostel, Praya Palazzo, Siamotif Boutique, and Si Yaek Huatakhe Cafe & Guesthouse. With a deeper consideration for mixed qualitative and quantitative study, Bangkok Story Hostel was selected for this investigation. The reasons for this selection was that Bangkok Story Hostel was in the inner Bangkok area; it was a good representative that was situated in a mixed-use community; the community was an old, outstanding historical trading community; the hostel was small but had a high bed capacity; and the building owner gave us full cooperation.

The objectives of this mixed study are (1) to investigate the physical, economic (Langston, 2008), and value (Avrami et al., 2000) changes that occurred after an adaptive reuse of ‘Bangkok Story Hostel’ building and (2) to examine the social impacts on its surrounding community. As for the scope of the study, we chose only this over-50-year-old building and only considered the changes from the last function of the building to the current function of a hotel although the building had been used for many functions before.

This paper comprises six sections of content included: (1) Introduction which explains the background, phenomenon concerned to AR-HB-hotel, research gap, and target area; (2) Literature review which studies on definitions and four main approaches—physical, economic, and value changes as well as social impact—associated with the small AR-HB-hotel including research framework; (3) Research methodology which explains target case study, issues of concern, research tools, data collection, and mixed qualitative and quantitative method; (4) Research results which are separated into five sections, general information on ‘Bangkok Story Hostel’, physical change, economic change, value change, and social impact; (5) discussion which explains analyze the results in the overview, and result guideline; and (6) research conclusion.

#### Nomenclature

AR: Adaptive Reuse

AR-hotel: Adaptively Reused Hotel from an old building

AR-HB-hotel: Adaptively Reused Hotel from a Heritage Building

## 2. Literature Review

In this section are definitions and four main approaches—physical, economic, and value changes as well as social

impact—associated with the small AR-HB-hotel. They were guidelines for our studying of changes and impacts that occurred after an AR-HB-hotel named ‘Bangkok Story Hostel’ came into operation. The following are our application of these approaches.

Firstly, ‘Hotel’ means a place of temporary serviced accommodation with fee charged excluding non-profit government accommodation and monthly serviced accommodation (Policy Research for SMEs, 2004), and an accommodation that has the total number of the rooms in one or more buildings of more than 4 and can accommodate more than 20 people (Ministerial Regulation, 2008). ‘Small hotel’ is a currently and widely used term in small hotel business or small and medium-sized hotel enterprises (SMEs). Small hotels can have different numbers of room such as less than 60 rooms (National Statistical Office, 2014), less than 100 rooms (Grey and Liquori, 2004 in Suksuthi, 2015), and less than 50 rooms (Ministerial Regulation, 2008). Here in this paper, small hotel means hotel where has a number of rooms of less than 50. ‘Small hotel type’ is classified according to the hotel business characteristics and management such as a boutique hotel (Choochote, 2014), guest house, home stay, budget hotel, hostel, and so on. For this case, ‘Bangkok Story Hostel’ is considered the small hotel in terms of hotel business and marketing but legally, it was a temporary shelter that charged a fee for a stay. This hotel was a boutique hotel which was compact in size with the unique style; it was also a budget hotel (Jones, 2002) with shared bedrooms and bathrooms; it can also be considered a hostel since it had a small common area on the first floor as well.

Secondly, according to the physical change approach focused on building renovation, there were architectural and interior design standards that were applicable to small hotel design, e.g., a small hotel had to have four main distinct types of areas: guest room, public area, administration office and ‘back-of-house’ facility (Pickard, 2002). In comparing physical changes, there were five main issues to consider (Langston et al., 2010): (1) the building’s structural strength—pile system, column, beam, floor, and roof frame (Srisompong, 2004) ; (2) the building’s architectural condition—wall, ceiling, finishing, door and window, sanitary-ware, stucco, and decoration systems (Sthapitanonda, 2011); (3) the various building systems— electrical, water supply, drainage, water treatment, air-conditioning, and fire protection systems (Sthapitanonda, 2011; Thirakamen, 2009); (4) the interior conditions—built-in furniture, movable furniture, appliances, and decoration; and (5) the conditions of the exterior and the surroundings—landscape, plants, and fence.

Thirdly, according to the economic change approach focused on small hotel business, there were five main issues concerning small hotel business operation: service design, operation, sales and marketing, finance and accounting as well as management (Somsawadi, 2015). In comparing economic change involving AR-HB-hotels, there were five main economic issues to consider: (1) building price or financial investments (Dzhandzhugazova et al., 2017), (2) exact operational cost per month, (3) average income per month, (4) owner’s satisfaction, and (5) consumers’ rating score or tourist satisfaction (Choochote, 2014).

Fourthly, according to the value change approach focused on heritage value, there were two main types of value—cultural and socio-economic values—detailedly expressed as identity, artistry, rarity, functional, economic, educational, social, and political values (Jokilehto, 1998). Authenticity is significant in evaluation of cultural heritage which UNESCO has used as a criterion for world heritage— form and design, material and substance, use and function, traditions—techniques and management systems, location and setting, language and other forms of intangible heritage, spirit and feeling, and other internal and external factors (WHC, 2012). In comparing the value change in AR-HB-hotels, there were five main issues to consider: (1) value of cultural heritage identity—uniqueness, pride of ownership (Khanjanusthiti, 2009; WHC, 2012) (2) design value—form, structural technique, functional concept, and craftsmanship (Jokilehto, 1998); (3) aesthetic value; (4) cultural value and —reflection of the local way of life (ICOMOS, 1994; Jeungsiriarrak, 2005); and (5) an integrated view of all values.

And lastly, according to the social impact approach focused on tourism impact, there were several key independent variables that influence attitudes toward tourism (Lankford & Howard, 1994). Although tourism causes a positive economic outcome, it can exert negative impacts on the socio-cultural, economic, environmental and political development of the destination country (UNEP, 2003; Mohammadi et al., 2010) as well depending on the way that they are managed. In our study of social impact on the communities surrounding AR-HB-hotels, five main issues were considered: (1) environmental impact and pollutions—noise, odor, daylight, air flow through the block, traffic condition, and population density; (2) community economic development—income from tourism, income from other means; (3) stakeholders’ relationship—community interaction, and participation (Polnyotee, 2015); (4) privacy impact—original way of life, serenity, reputation to outsiders (Altman, 1975) ; and (5) security impact focused on danger that may happen—robbery, crime, and encounter with strangers (Jeffery, 1971; Bynum & Purri, 1984).

The constructed procedure from these 4 main approaches can be a good general guideline for constructing a new research procedure for other studies of AR-HB-hotels’ changes and impacts. The overview of our usage of these four

approaches is illustrated in the flow chart below as shown in Figure 2.

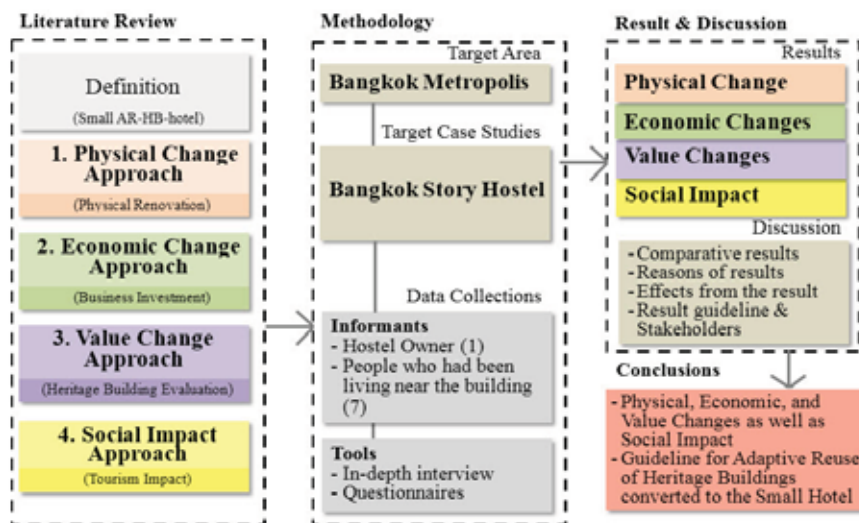


Figure 2. Research Process Framework

### 3. Research Methodology

The study focused on one representative case, Bangkok Story Hostel and used data collection methodology constructed according to the four main issues of concern.

#### 3.1 Target Case study

‘Bangkok Story Hostel’ was located in the old downtown, Sampantawong district, Bangkok metropolis (see Figure.3). It was a representative of AR-HB-hotel cases that was situated in a historical commercial area named ‘Chiang Kong’ in Talaad Noi community. It was a widely-known trading area of used metal, auto spare parts, and other mechanical engine parts.

#### 3.2 Issues of concern

Four main issues were in focus in this study of changes and impacts: (1) Physical change—building’s structural strength, building’s architectural condition, various building systems, interior conditions, and conditions of the exterior and the surroundings; (2) Economic change—building price, exact operational cost per month, average income per month, owner’s satisfaction score, and overall score from consumers’ rating; (3) Value change—value of cultural heritage identity, design value, aesthetic value, cultural value, and an integrated view of all values; and (4) Social impact on surrounding community—environmental community, economic development, stakeholders’ relationship, privacy and Security. All the concerned issues and sub-issues are shown in Table 1.

Table 1. Four main approaches, issues of concern, and sub-issues

Code	Approach	Issues of concern	Description
P	Physical Change	P01: Building’s structural strength	Pile system, Column, Beam, Floor, and Roof framing
		P02: Building’s architectural condition	Wall system, Ceiling, Finishing, Door/Window, Sanitary-ware, and stucco and decoration system
		P03: Various building systems	Electrical, Water supply, Drainage, Water treatment, Air-conditioning, and Fire protection systems
		P04: Interior conditions	Built-in furniture, Movable furniture, and appliance and decoration
		P05: Conditions of the exterior and the surroundings	Landscape, plants, and fence
E	Economic Change	E01: Building price	Estimated building value
		E02: Exact operational cost per month	Estimated building improvement expenses such as for structural work, building work, interior work, and mechanical system work
		E03: Average income per month	Average income per month assessed from hotel operation with deducted operational expenses

		E04: Owner’s satisfaction score	Level of satisfaction toward the income from hotel operation
		E05: Overall score from consumers’ rating	Level of satisfaction scored by on-line visitors
V	Value Change	V01: Value of cultural heritage identity	Value that reflected uniqueness, pride of ownership of the architectural heritage that was worth preserving
		V02: Design value	Value that reflected architectural design principles and heritage including form, structural technique, functional concept, and craftsmanship
		V03: Aesthetic value	Beauty with highly-valued arts and architecture
		V04: Cultural value	Value reflect the ways of life and traditions of the local community
		V05: Integrated view of all values	High architectural integrity
S	Social Impact	S01: Environmental impact and pollutions	Noise, Odor, Daylight, Air flow though the block, Traffic condition, and population density
		S02: Community economic development	Income from tourism, and Income from other means
		S03: Stakeholders’ relationship	Community interaction, and Participation
		S04: Privacy	Original way of life, Serenity, and reputation to outsiders
		S05: Security (Danger)	Robbery, Crime, and Encounter with Strangers

3.3 Research tools

Being a qualitative study, the data on physical and surrounding changes, as well as on economic changes were collected from the survey, observation, and in-depth interview with the building owner. The data on value changes were obtained by questionnaires from building owner and seven informants from the surrounding community while the data on social impact were gathered and analyzed from informants in the surrounding community as well. Moreover, digital camera, sound recorder, and interview guideline form were used as tools for data collection. A gratuity gift was offered to each participated building owner and informant.

3.4 Data collection

There were two main steps in data collection. (1) In the pilot survey, the first round of in-depth interviews with the building owner and seven informants from the community surrounding Bangkok Story Hostel was in November 2016. (2) For the final stage of data collection, the in-depth survey and the second interviews were performed in April 2017. The interview guideline form for the building owner and informants was adjusted from that used in the pilot study so that it was easier to understand and suitable for differentiation of changes between the past and the present. Photos of the atmosphere of the interviews are shown in Figure 4. The collected data were results of site analysis—location, accessibility, sun path and wind direction, and characteristics of the surrounding buildings as well as floor plans of Bangkok Story Hostel.

3.5 Qualitative method

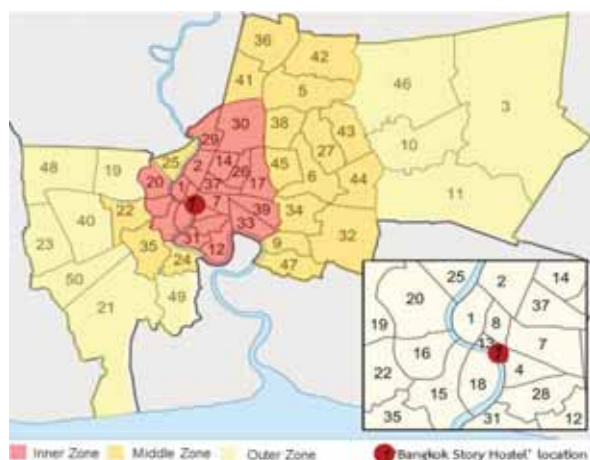


Figure 3. Location of ‘Bangkok Story Hostel’



Figure 4. Atmosphere of interview activities

For describing background information, phenomenon, and building details, qualitative methodology—secondary data collection, surveys, and in-depth interview—was used. For assessing the level of changes and impacts from AR-HB-hotels, Bangkok Story Hostel, questionnaires with Likert scale were used.

#### 4. Results

##### 4.1 General information on 'Bangkok Story Hostel'

###### (1) Building History and Project Background

'Bangkok Story Hostel' is a small 3-storey hotel, adapted from an over-100-year-old colonial heritage building. This hostel is located in a traditional trading district on Songward Street, Sampantawong district, Bangkok. This trading district called 'Chiang Kong' was consisted of shops that sold automobile parts and other mechanical engine parts. This converted building had also been an automobile part shop then converted to a franchised mini-mart under the brand 'Fresh Mart', but afterwards it was left vacant for a period of time before gotten converted again into the 'Bangkok Story Hostel' at the end of 2015. The inspiration behind the conversion of this heritage building into a small hotel was the love of heritage building of Mr. Sanpop Poolsuwan, a 40-year-old interior designer. He had seen a lot of examples of conversion projects in recent past and decided to rent this old building and renovate it into a small hotel.

The timeline history of this hostel is as follows. Around 2015, Mr. Poolsuwan had surveyed several buildings in the inner Bangkok area such as at Phra Nakorn, Dusit, Sampantawongse districts. He focused on the location, accessibility, and form of the heritage building, and at the end of 2015, he chose this building and converted it into a small hotel. Regarding the business side of the conversion, Mr. Poolsuwan signed a rental contract with the owner of the building in August 2015 then renovated the building for 8 months before the official opening of the hostel in April 2016. The hostel was open for 1 year when it was investigated by the author around March 2017.

###### (2) Location and the surrounding community

**Location:** The address of 'Bangkok Story Hostel' was 40-42, Songward Road, Talad Noi Subdistrict, Sampantawongse District, Bangkok. The hostel was a 3-storey row house situated at a corner of Songward Intersection where Soi Charoenpanich started. A map of it and surrounding area are shown in Figure 5. **Accessibility:** Bangkok Story Hostel was directly accessible by car, public bus (bus #1), underground train, boat, and foot. The distance to the nearest bus stop was 100 meters; the distance to the nearest underground train station (Mahanakorn underground train, MRT) was 600 meters; and the distance to the nearest pier was 400 meters (the pier was along Chao Phraya River) as shown in Figure 6.

Site analysis in terms of the relationships between the location of the building and sun path, wind direction and surrounding noise were performed. Some of the analysis results which are also illustrated in Figure 7 were the following. The front of the building faced Song Wad Intersection in the northeast direction, so in the afternoon it would not face the sun; consequently, the space in the front of the building would be in the shadow and comfortably functional as a common area during that time.

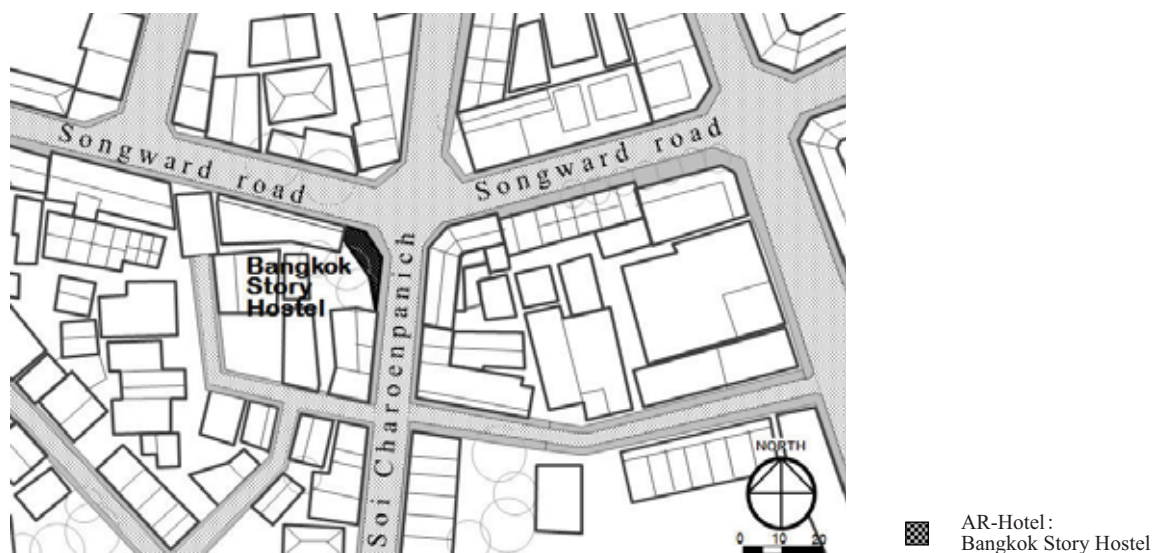


Figure 5. Location map of 'Bangkok Story Building' and surrounding community

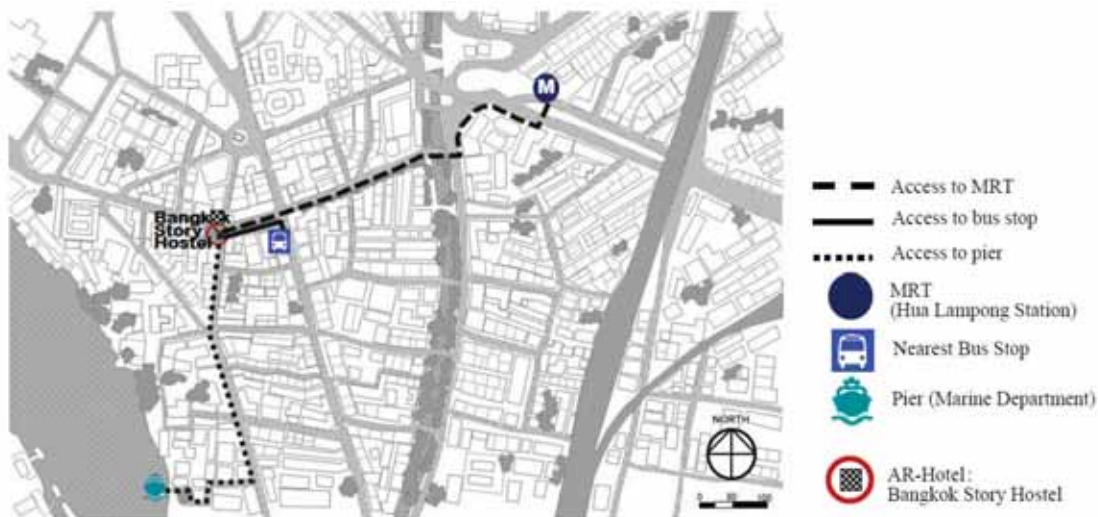


Figure 6. Accessibility map of 'Bangkok Story Hostel'

Regarding wind direction, this location was influenced by the southwest monsoon during summer and the northeast monsoon during winter. The west wall and south corner of the building were opaque masonries and the rooms on the second and third floors were air conditioned, so the wind direction did not have much effect on room usage. However, the common areas on the first (café and reception) and third (shower area) floors would be cooler from the wind during winter.

Regarding surrounding noise, most noises were traffic and community noises coming from Song Wad Road and Soi Charoen Panich in the north and east directions, respectively.

Regarding the type of district, Bangkok Story Hostel was situated in a 100-year-old commercial district of automobile and engine part trade. Most other buildings were row buildings at least 50 years old and of colonial or modern style. Some of which were also deserved to be preserved due to their architectural heritage. Their photos are shown in Figure 8.

(3) Building characteristics

The Bangkok Story Hostel building was a colonial-style building located at the corner of Songward intersection (see figure 9). Its shape was of an angular water drop. It had a total area of 180 square meters. Each floor had a total area of 60 square meters. The ground floor consisted of a reception area, an office area, a dining area, a storage area, a lavatory, a stair hall, and a water pump room. The second floor consisted of a stair hall, two lavatories, a garden area, and a large 18-bunk-bed bedroom. Lastly, the third floor consisted of a stair hall, a lavatory, a garden area, six shower rooms, five big wash bowls, and a medium-sized 12-bunk-bed bedroom. The floor plans are shown in Figure 10.

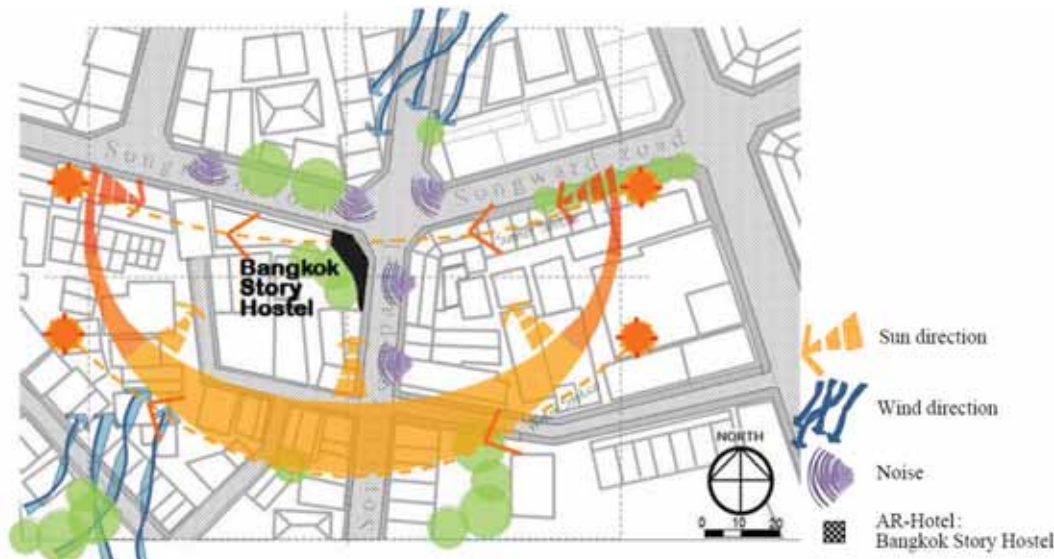


Figure 7. Site analysis map of 'Bangkok Story Hostel'



4.2 Physical Change

For the physical change study, we focused on five sub-issues: (1) building’s structural strength, (2) architectural condition, (3) various building systems, (4) interior conditions, and (5) conditions of the exterior and the surroundings. Before having been adapted to a small hotel, the ‘Bangkok Story Hostel’ building was left vacant for a period of time after it had been used as a mini-mart. The physical condition was in disrepair due to lack of use. As for the building’s structural strength, the pile system, column, beam, floor, and concrete deck roof were all in good condition. There was no change in structural strength after renovation. For the building’s architectural condition, the former conditions of the brick wall, gypsum board ceiling, and door-window system were moderate and got better after renovation. The former ceiling was demolished in order to build a higher ceiling and the old steel beam was covered with gypsum board to make it look more like a concrete beam. The old aluminum door and windows on the ground floor were totally demolished and timber accordion doors and windows were built in place of it. The former stairs were relocated from the corner triangular space in the south to the middle space and made wider. The stairs’ new location allowed more daylight from above. The corner triangular space on each floor was adapted to be a lavatory instead. Interestingly, the concrete deck space on the third floor was adapted to be a shower and wash bowl area connected to a medium-sized 12-bunk-bed bedroom. All of the finishing materials such as floor and wall finishing materials were in dilapidated condition and were improved after the renovation.

On the other hand, the window frames, stucco, and decoration had already been in good condition and were kept intact. Several views of the exterior architecture are shown in Figure 11. As for the various previous building systems, the electrical, air-conditioning, and fire protection systems had been in the worst condition or nonexistent and were improved into a good, very good, and moderate condition, respectively. The moderate condition of the former drainage and water treatment system was improved into a good condition while the bad condition of the water supply system was improved into a good condition as well. As for the interior conditions, all built-in furniture, movable furniture, appliances, and decoration were previously non-existent. They were installed in good condition except the movable furniture was in a moderate condition. Several views of the interior are shown in Figure 12. Lastly, as for the exterior and the surroundings, previous landscape, and plants had been non-existent. They were built or planted and were in moderate condition. A summary with numerical evaluations of the physical changes is shown as a bar chart in Fig 13.

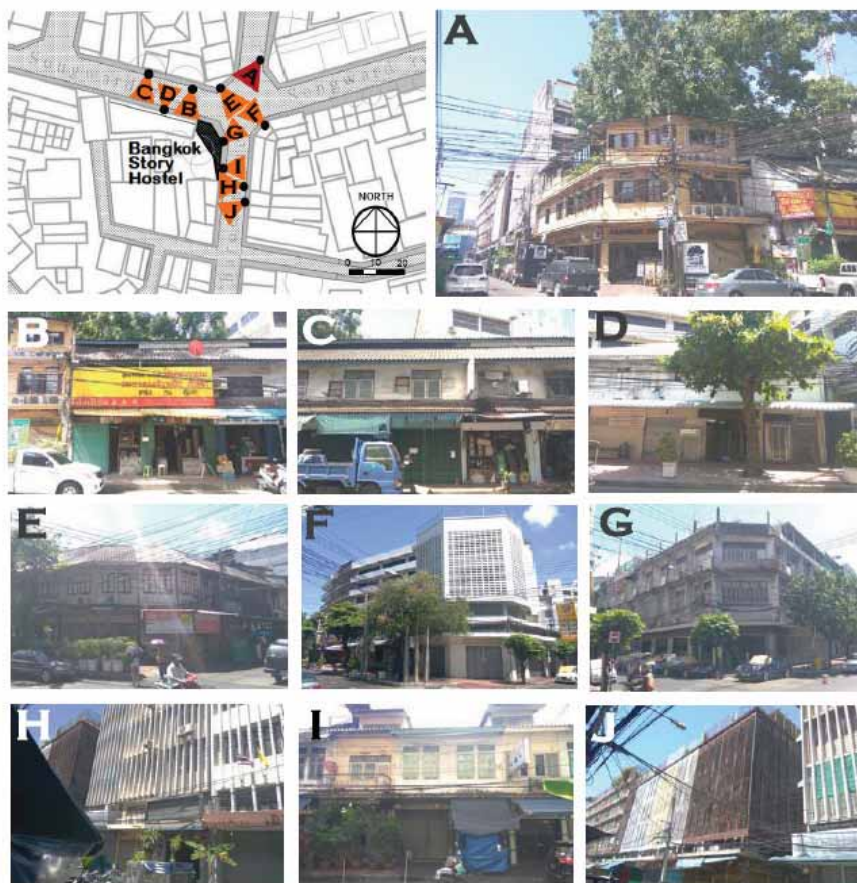
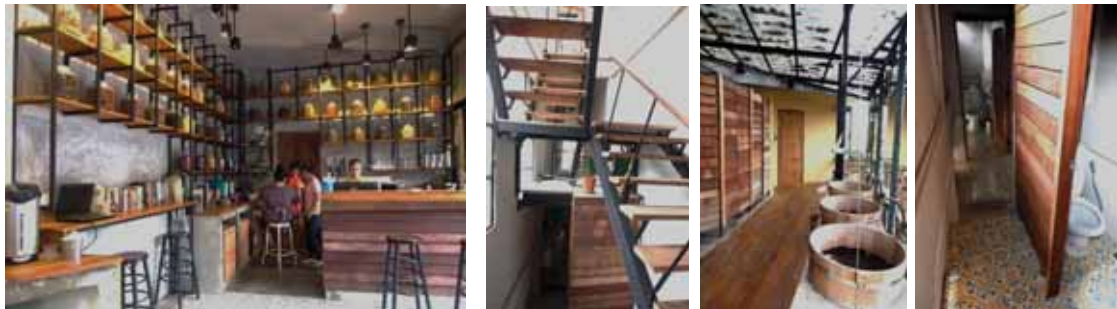


Figure 8. Survey map showing views of the surroundings and the building’s exterior





Figure 11. Views of the exterior, decoration, and timber accordion door on the ground floor



(1) Views of the interior of the welcome hall, stair hall in the middle space, shower area, and lavatories



(2) Views of the interior of two shared multi-bunk-bed bedrooms

Figure 12. Views of the interior of Bangkok Story Hostel

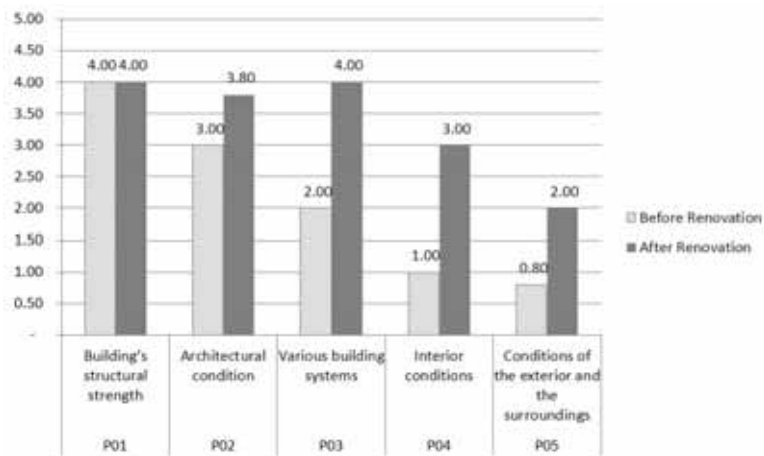


Figure 13. Bar chart of physical change analysis of 'Bangkok Story Hostel'

#### 4.3 Economic Change

For the study of economic changes, we focused on five sub-issues that affected hotel owners: (1) building price, (2) exact operational cost per month, (3) average income per month, (4) owner's satisfaction score, and (5) overall score from consumers' rating. From in-depth interviews with the hostel owner, all concerned sub-issues were evaluated with a rating scale of one to five. Cannot-be-revealed raw data regarding hostel investment was collected and compared to those from five other studied cases. The conclusion was that the economic value of Bangkok Story Hostel was at a

moderate level before the renovation and rose to a high level after the renovation. The exact operational cost per month and average income per month for the formerly vacant building were at the lowest level. After renovation, the exact operational cost per month was at a moderate level while the average income per month was at a high level. The owner’s satisfaction level was at a moderate level before renovation and rose up to a high level after that. In addition, the hotel’s overall score from consumer’s rating ([www.booking.com](http://www.booking.com)) was between the high and the highest level, much improved from the lowest score when it was a vacant building. A summary of the issues of economic changes is shown as a bar chart in Figure 14.

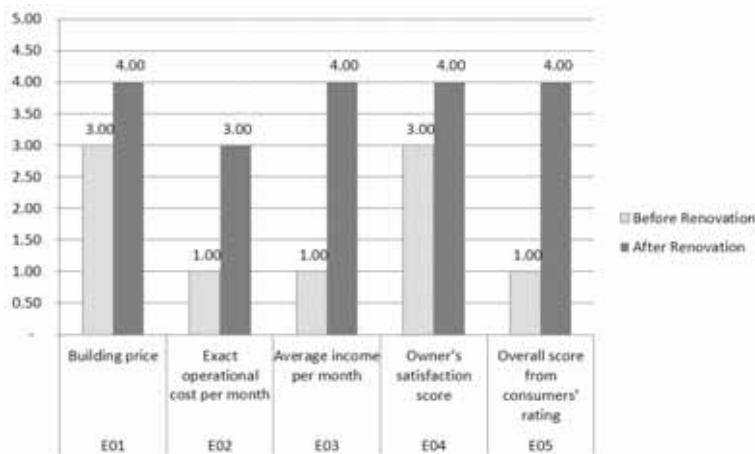


Figure 14. Bar chart of economic change analysis of ‘Bangkok Story Hostel’

4.4 Value Change

For the study of value changes, we focused on five sub-issues: (1) the value of cultural heritage identity, (2) design value, (3) aesthetic value, (4) cultural value, and (5) an integrated view of all values. From in-depth interviews with the owner and seven informants who had been living near the building, we found that the overall level of perception of the hotel building’s value increased almost twice after the building was reused. On the average, almost every perceived value of the former building got a lower score than the perceived value after renovation into a hotel. The perceived values of cultural heritage identity and design rose up to almost double before renovation while the aesthetic value rose up to slightly more than double. However, the new perceived cultural value was only at a moderate level, increased only one and a half times of that before the renovation. The integrated view of all perceived values was at a good level, rose up twice from the value before the renovation. Some interesting details are as follows. The informants paid the most attention to the functional concept, followed by the form of hotel design. They thought that the designer was successful in converting a small dilapidated building into a fully-functional hotel. On the contrary, most informants thought that the hotel still didn’t reflect their ways of life and traditions adequately. A summary of the changes in perceived values is shown as a bar chart in Figure 15.

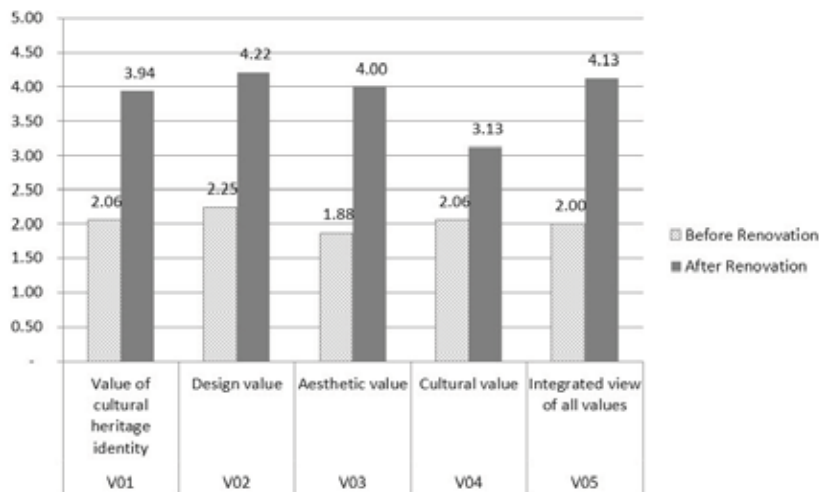


Figure 15. Bar chart of value change analysis of ‘Bangkok Story Hostel’

#### 4.5 Social Impact

For the study on social impact, we focused on five sub-issues: (1) environmental impacts and pollutions, (2) community economic development, (3) stakeholders' relationship, (4) privacy impact, and (5) security impact (danger). From in-depth interviews with seven informants who had been living near the building, we found that the overall impact on the community both before and after the AR-HB-hotel project was at a moderate level. On average, the level of each impact was moderate and only slightly different. The before-and-after levels of perceived impact on the environment and pollutions were the same at a low level, while those of stakeholders' relationship were also the same but at a slightly higher level. The AR-HB-hotel made the community's physical environment better, but they did not have much effect on the community's infrastructure. For the level of perceived impact on the community economic development, it was slightly higher than that before the project was done on the average. Apparently, this increase was from the consideration of higher income from tourism development. For the stakeholders' relationship, there was more public social interaction but more than half of the informants expressed a neutral opinion, no positive or negative comments. For the impact on privacy, former lifestyle and tranquility were not affected even though the community became better known to outsiders. The perceived level of impact on security was higher than before shown from the lower level of the possible danger. Some informants thought that the security at night was heightened because of more luminance in front of the AR-HB-hotel. A summary of the perceived social impacts is shown as a bar chart in fig. 16.

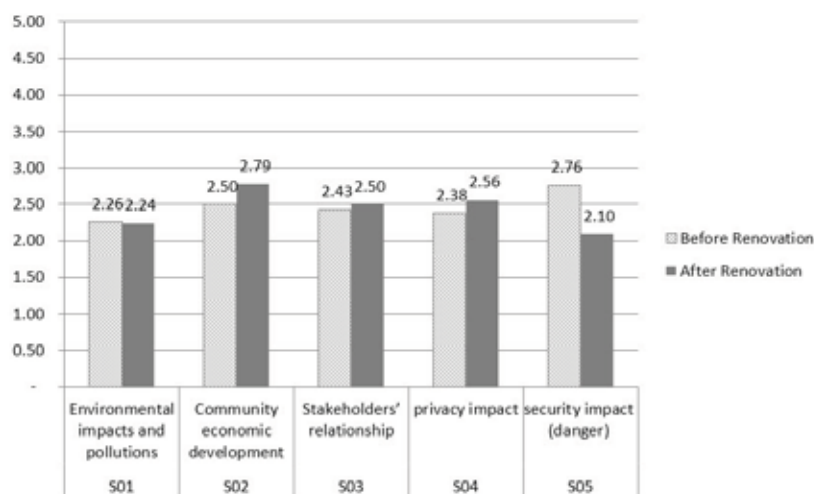


Figure 16. Bar chart of social impact analysis of 'Bangkok Story Hostel'

### 5. Discussion

To understand this research, the procedure for data analysis under this research was set out in 4 parts as follows: part (1) Building description, part (2) Changes and Impacts affected by AR-HB-hotel, part (3) Caused of the results, and part (4) Result guideline.

#### 5.1 Building description

'Bangkok Story Hostel' was an interesting heritage building adapted to a small boutique hotel. With the hostel owner's—Mr. Poolswan's—awareness in heritage building value and potential renovation, he was able to solve all of the limitations including building size, dilapidated condition, and new hostel function successfully and turned it into a lucrative hostel.

Legally, 'Bangkok Story Hostel' was not considered a hotel because it had fewer than 5 rooms for visitors to stay in even though there were beds for 30. This configuration may conflict with the 2008 Hotel Act that stated that a hotel was an accommodation that had the total number of rooms in one or more buildings of more than 4 and could accommodate more than 20 people. Hence, this hostel was considered a temporary shelter that charged a fee for a stay.

Nevertheless, this project was worth investigating because it was a good case of adaptive reuse of a heritage building that did not make a lot of negative impacts on the surrounding community and should get some support from the state in one way or another.

#### 5.2 Changes and Impacts affected by AR-HB-hotel

Referring back to the introduction, our four main investigational approaches were changes in the physical building, economic, and value as well as social impact. For the physical change, we found that the average level of physical change perceived by the owner rose up from a low level (2.16) before renovation to a level between moderate and high

(3.36) after renovation. The former building’s structural strength was in good condition but the levels of architectural condition, various building systems, interior condition, and conditions of the exterior and the surroundings were successively lower. After renovation, the building’s structural strength, architectural design, and building systems were perceived to be at a good level, followed by interior conditions at a moderate level, and conditions of the exterior and the surroundings at a low level.

For the economic change, the average perceived level of economic aspect increased from a level between low and moderate (2.60) to a level between moderate and high (3.40). The owner evaluated the former building’s economic value and satisfaction at a moderate level while the other sub-issues of economic changes were at the lowest level due to the dilapidated condition. After renovation, the levels of economic changes mostly were at a good level but the exact operational cost per month was at a moderate level.

For the value change, the perceived level of this change altered drastically from the former to the renovated building. The average level of value change increased from a low level (2.05) to an almost high level (3.86). The informants who were the building owner and the people living near the building and recognizing the changes of the building gave priority to the design value the most, followed by the aesthetic value and value of cultural heritage identity.

For the social impact issue, the average levels before and after renovation was almost the same between low and moderate at 2.47 and 2.42, respectively. The social impact affected by this ‘Bangkok Story Hostel’ trended in a positive direction, especially for the security issue. For example, some informants thought that the security during the night became better because of more luminance in front of the AR-HB-hotel. A summary and assessment of changes and impacts according to the four main approaches are shown in Figure 17.

With respect to the four main approaches, the results from the survey of the AR-HB-hotel named Bangkok Story Hostel showed that the level of physical change rose up a little more than one (1.20) while the level of economic change rose up a little less than one (0.80). Interestingly, the level of value change increased to almost two (1.81) while the level of social impact was at the same level or a little less than before renovation (-0.05).

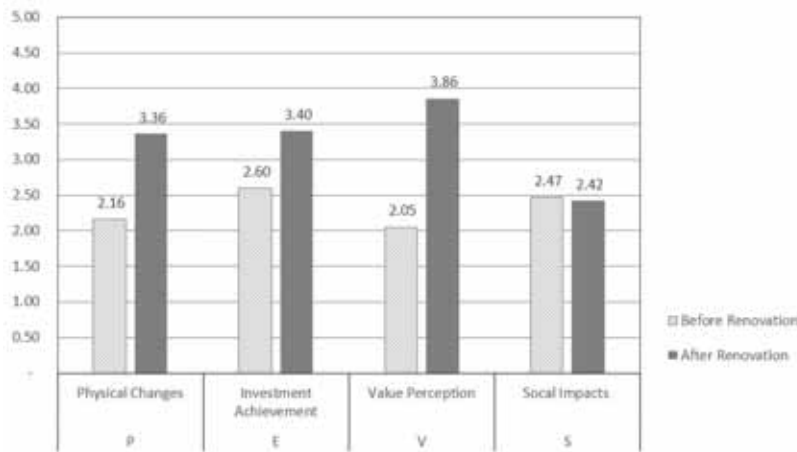


Figure 17. Bar chart of levels of changes and impacts affected by ‘Bangkok Story Hostel’

5.3 Cause of the results

As mentioned in the introduction, we expected to learn a lot about both the positive and negative social impacts on the community around the AR-HB-hotel, but the results on social impact did not show much negativity. In my point of view, this is a mixed qualitative and quantitative study hence all of the results were contingent upon the specific context of each case such as location, existing building condition, and management including investment; therefore, the results from ‘Bangkok Story Hostel’ case may not be generalizable to another case with a significantly different context. For example, some case studies in our pilot work heavily affected the communities nearby them. Some former residents who had lived close to a particular hotel were not able to go on signing a rental contract after the hotel was adapted and had to move out unexpectedly from their residence that they had lived in for over 20 years. Therefore, the perceived level of social impact, in this case, was different from that of ‘Bangkok Story Hostel’.

As a mixed qualitative and quantitative research, the qualitative aspect focused on general information on the AR-HB-hotel named ‘Bangkok Story Hostel’: building history, project background, location, the surrounding community, and building characteristics, while the quantitative aspect focused on analyzing data in such a way that we could numerically compare the results easily.

#### 5.4 Result Guideline

Nevertheless, the four main approaches: physical, economic, value, and social issues, used in this study can be a good general guideline for constructing a research procedure for other studies of AR-HB-hotels' changes and impacts. We could compare other types of AR-HB-hotels in terms of these approaches. For example, one case study at a Thonburi site had a high score of value perception and high score with respect to the physical issue but moderate score with respect to the economic issue and low score with respect to the social issue. In another case, a small AR-HB-hotel in a suburb area had high scores with respect to value perception and economic issues but moderate with respect to the physical issue and low with respect to the social issue. Hence, the results showed that a good economic return might not depend on the amount of investment alone. Good business management and focus on the intended target guests that match well with a particular project are very significant for business success.

In addition, AR-hotels that were not heritage buildings can also be studied this way. The four main approaches can be used to examine any old buildings turned into hotels with similar procedures. Comparatively, these AR-hotels might have low scores on value perception and social impact issues but high score on the level of physical changes and it might achieve a high score in economic changes.

No matter what they may be, the results from this kind of studies can make the hotel owner and other participants realized their situation more clearly. Most hotel owners may be a newcomer to the community that the hotel is located in. If there is not much negative social impact to the surrounding community, the owner can run their hotel business happily and proudly. On the other hand, if there are a lot of social impact issues to the community, the owner and stakeholders can examine what the causes are and make an effort to solve the problems such as participating with the community more and developing the environment of the community more, and so on. The hotel owner can compare the levels of physical and economic changes of his or her AR-hotel to those of other AR-hotels. Moreover, if the owner can add some values to the building, he or she can enhance his or her hotel business as well.

Referring to the introduction, this case study is a good representative of AR-HB hotels of which changes and impacts to the community were clear. However, the author thinks that other cases may differ markedly. For example, the case where the hotel owner was not fully cooperative may provide very different results. As another example, the case where there were hotels, more than one, in only one community was also not studied because the changes and impacts may not be clearly attributed to a particular one of these hotels.

#### 6. Conclusions and Recommendation

For changes and impacts, this study focused on the physical, economic, and value changes, as well as social impacts of adaptive reuse of a heritage building, turned into a small hotel named 'Bangkok Story Hostel' in Bangkok, Thailand. We found that the level of physical, economic, and value changes rose up 1.20, 0.80, and 1.71, respectively, from before the reuse while the level of social impact stayed the same or decreased very little from the level before the renovation (-0.05).

For generalization of the results, although this mixed qualitative and quantitative research may not be generalized wholly to another case with a significantly different context, but the four main approaches: physical, economic, value, and social issues, used in this study can be a good general guideline for constructing a research procedure for other studies of AR-HB-hotels' changes and impacts.

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#### References

- Altman, I. (1975). *The Environment and Social Behavior: Privacy, Personal Space, Territory, Crowding*. Brooks/Cole Pub. Co.
- Architecture, Silpakorn University, NAJUA. Retrieved from <https://www.tci-thaijo.org/index.php/NAJUA-Arch/article/view/45310>
- Avrami, E., Mason, R. & Torre, M.D.L. (2000). *Values and Heritage Conservation*. The Getty Conservation Institute. *Research Report*. Los Angeles. Page 8.
- Bynum, T. S., & Purri, D. M. (1984). Crime and architectural style: An examination of the environmental design hypothesis. *Criminal Justice and Behavior*, 11(2), 179-196.

- Choochote, K. (2014). Factors affecting the selection of Boutique Hotel of tourist in Phuket Province. *International Journal of Business and Management Study – IJBMS*, 1(3). ISSN 2372 –3955
- Dzhandzhugazova, E.A., Zaitseva, N.A., Larionova, A.A., Petrovskaya, M.V. & Chaplyuk, V.Z. (2015). Methodological Aspects of Strategic Management of Financial Risks during Construction of Hotel Business Objects. *Asian Social Science*, 11(20), 229. doi:10.5539/ass.v11n20p229
- Environmental Impacts of Tourism in Kermanshah (Iran). *Asian Social Science*, 6(11), 220-225. Retrieved from: <http://www.ccsenet.org/journal/index.php/ass/article/view/6675/6001>
- Giddings, B., Hopwood, B. & O'Brien, G. (2002). Environment, economy and society: fitting them together into sustainable development. Sustainable Development, Sustainable Cities Research Institute, Newcastle upon Tyne, UK, Page 187-196. DOI: 10.1002/sd.199
- Grey, William S. & Liguori, Salvatore C. (2004). Hotel and Motel Management and Operations. *Translated by* Bangorn Chatrungrong & Worapol WattanaLeongarun. Pearson Education Indochina. ISBN 9749206894
- ICOMOS (1994). The Nara Document on Authenticity. International Council on Monuments and Sites. Retrieved from <https://www.icomos.org/charters/nara-e.pdf>
- Jeffery, C. R. (1971). Crime prevention through environmental design SAGE Publications.
- Jeungsiriarrak, S. (2005). The Concepts of Architectural Conservation from the 18<sup>th</sup> to the End of the 20<sup>th</sup> Century: From Sentiment and Faith to the Shared Heritage of Humankind. Journal of the Faculty of
- Jokilehto, J., & Feiden, B. M. (1998). Management Guildelines for World Cultural Heritage Site. ICCROM, Italy.
- Jone, P. (2002). *Introduction Hospitality Operations: An Indispensable guide to the industry* (2nd ed.). Jennifer Pegg. London
- Khanjanusthiti, P. (2009). *Architectural Heritage and Community Conservation*. Chulalongkorn Publishing. Bangkok.
- Langston, C., Liu, C., Beynon, D., Jong, U. D., Langston, Y. L., Merlino, D., ... Williams, P. (2010). *Strategic assessment of building adaptive reuse opportunities ARC Linkage Project LP0776579 Final report 2010*. Mirvac School of Sustainable Dev. Retrieved from [http://epublications.bond.edu.au/sustainable\\_development/141](http://epublications.bond.edu.au/sustainable_development/141)
- Langston, C., Wong, F. K. W., Hui, E. C. M., & Shen, L. (2008). Strategic assessment of building adaptive reuse opportunities in Hong Kong. *Building and Environment*, 43, 1709-1718. doi:10.1016/j.buildenv.2007.10.017
- Lankford, S. V. & Howard, D. R. (1994). Developing a Tourism Impact Attitude Scale. Journal of Travel Research. Volomn. 21, No. 1. <https://doi.org/10.1177/004728759403200374>
- Ministerial Regulation. (2008). Determine the type and Criteria of Hotel Business. Ministry of Interior
- Mohammadi, M., Khalifah, Z. & Hosseini, H. (2010). Local People Perceptions toward Social, Economic and
- Naseer, N. (2003). Planning for Urban Heritage Places: Reconciling Conservation, Tourism, and Sustainable Development. *Journal of Literature*, 17(4), 467-470. <http://dx.doi.org/10.1177/0885412203251149>.
- National Statistical Office. (2014). *The 2014 Hotels and Guest Houses Survey*. Ministry of Information and Communication Technology. Retrieved from [service.nso.go.th/nso/nsopublish/themes/files/questFullReport57.pdf](http://service.nso.go.th/nso/nsopublish/themes/files/questFullReport57.pdf)
- Pickard, Q. (2002). The Architects' Handbook. Oxford, United Kingdom: Blackwell Publishing. ISBN 0-632-03925-6
- Policy Research for SMEs. (2004). Hotel Act. Macroeconomic strategies. Office of Small and Medium Enterprises Promotion (OSMEP). Bangkok.
- Polnyotee, M., & Thadaniti, S. (2015). Community-Based Tourism: A Strategy for Sustainable Tourism Development of Patong Beach, Phuket Island, Thailand. *Asian Social Science*, 11(27), 90. doi:10.5539/ass.v11n27p90
- Pongsermpol, C. & Upala, P. (2017). Impacts of Adaptive Reuse of Heritage Buildings to Small Hotel Buildings in Bangkok. *Procedia - Social and Behavioral Sciences*, 2, 449-458. <http://dx.doi.org/10.21834/e-bpj.v2i5.621>
- Pongsermpol, C. (2011). Participants' Attitudes for Adaptive Reuse in Heritage Buildings for Thai Context. ICOMOS Thailand International Conference 2011, Phuket, Thailand. *Proceedings Report*. Page 217-227.
- Pongsermpol, C. (2017). Association of Location and Accessibility of Small Adaptively Reused Hotels from Heritage Buildings in Bangkok with the hotels' rating. 12<sup>th</sup> International Conference of EASTS. 18-21 September, 2017. Ho Chi Minh City, Vietnam.
- Remoy, H. & Van Der Voordt, T. (2014). Adaptive reuse of office buildings into housing: opportunities and risks. *Building Research & Information*, 42(3), 381–390. <http://dx.doi.org/10.1080/09613218.2014.865922>



- Somsawasdi, A. (2015). Small hotel business operation. Lifestyle Workshop for Small Hotel: Practical Scene for Efficient Result. *Seminar*. The Campus Room, Grand Hyatt Erawan Hotel, Bangkok, 7 October 2015.
- Srisompong, S. (2004). Building Renovation for the Re-use. *Journal of the Faculty of Architecture King Mongkut's Institute of Technology Ladkrabang*, 1(1), 87. Retrieved from: <https://www.tci-thaijo.org/index.php/archkmitl/article/view/4149/3603>
- Sthapitanonda, L. (2011). Building and facility design standards. Facility Management Office. Chulalongkorn University (Book in Thai).
- Suksithi T., Pongsiri K. & Kanchanapairote C. (2012). Guest's Expectation and Alternative Problem Solution of Boutique Hotel to Standardize Enhancement. Suan Sunandha Rajabhat University. Retrieved from <http://ssruir.ssu.ac.th/handle/ssruir/769>
- Thirakomen, K. (2009). Basic Knowlegde: System Engineering. (Book in Thai) ISBN: 974-686-034-8
- UNEP, U. N. (2003). Impacts of Tourism. United Nations Environment Programme. Retrieved December 6, 2016, Retrieved from <http://www.unep.org/resourceefficiency/Business/SectoralActivities/Tourism/FactsandFigures/aboutTourism/ImpactsofTourism/tabid/78774/Default.aspx>
- WHC, U. (2012). Operational Guidelines for the Implementation of the World Heritage Convention. Intergovernmental Committee for the Protection of the World Cultural and Nature. World Heritage Centre. UNESCO. Paris. Page 22

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# Palestine's Joining the World Trade Organization

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## Abstract

The current study attempts to highlight the stages of Palestine's joining the World Trade Organization (WTO) and steps that should be followed by Palestine to join the World Trade Organization from the observer to the member. It also clarifies how Palestine joins the World Trade Organization as a state and then as a customs territory. The problem of this study lies in determining the legal effects of Palestine's joining the World Trade Organization as a state on the one hand and as a customs territory on the other. The study aims at clarifying the stages that Palestine will go through in case of joining the World Trade Organization, the steps that Palestine should take to join the World Trade Organization, and the mechanism that should be followed when Palestine joins the World Trade Organization as a state, and then as a customs territory. The study concluded that Palestine must join the World Trade Organization as a customs territory as soon as possible in order to avoid any discussion about the final legal status of its territories according to the Oslo Accords.

**Keywords:** World Trade Organization, General Agreement of Tariffs and Trade (GATT), State, Customs Territory, Observer, Member

## 1. Introduction

The integration of Palestine into the international commercial community is through the establishment of preferential trade agreements with neighboring states or with other friendly states on a bilateral or regional basis. Such integration can be achieved by joining the World Trade Organization as the main organization interesting in international trade.

## 2. The stages and steps of Palestine's joining The World Trade Organization

Palestine passed several stages in its attempt to join the World Trade Organization, from the British Mandate to the membership of the Observer State that is not a member in the United Nations.

### 2.1 First section: the stage of Palestine's joining the World Trade Organization.

The negotiations on the establishment of the World Trade Organization culminated in the convening of Havana Conference. This conference was concluded by adopting Havana Charter for the establishment of the World Trade Organization. All members of the United Nations were automatically invited to the charter. The Provisional Committee of the World Trade Organization recommended the Economic and Social Council of the United Nations that non-member states of the United Nations, which interest significantly in the international trade, must be invited, with reference to non-member countries of the United Nations. The Secretary General of the Provisional Committee, Erbek Wyndham White, stated that the state or sovereignty is not a condition for joining. Therefore, the Provisional Committee recommended that Ceylon, Burma and South Rhodesia should be participated. The committee said that these states subject to the political sovereignty of a fully independent UN member concerning matters covered by the charter. Erbek Wyndham White stated that the final decision on Palestine had been left to the UN Economic and Social Council (Mr. E. Wyndham White 1947) where Palestine has been represented at the Havana Conference by the United Kingdom.

Internationally, the British Government was responsible for Palestine from 1923 to 1948 and under the League of Nations (Nations 1920). As such, the United Kingdom represented the interests of the territory of Palestine which was mandated at the Havana Conference for establishing the World Trade Organization in 1947 and the General Agreement on Tariffs and Trade (GATT). The state that did not ratify the Havana Charter is the United States.

Concessions granted to the custom area covering the territory of Palestine were different from those granted to the United Kingdom. Interim Application Protocol has been approved by the United Kingdom. Such protocol led to the activation of the GATT Agreement on behalf of the territory of Palestine, which was commissioned on 20 March 1984

(Van der Borgh and Awwad 2016).

When the United Kingdom notified the United Nations of its intention to finalize its mandate in 1948, this had an impact of Palestine's position in the GATT. The termination of the mandate did not automatically end Palestine's obligations in GATT where the United Kingdom declared that the changes took place were of a political nature and completely outside the control of the United Kingdom (GATT 1949). The United Kingdom stated that Palestine was no longer a member of the GATT, and that Israel was the successor state (GATT 1949). The GATT Contracting Parties did not agree with this view and they felt that the situation could be determined in two legal ways: the first, it was to consider Israel the successor state to Palestine's obligations in the GATT. The contracting Parties rejected this view because the law of succession of states was not clear on this point, and Israel did not give any indication of its willingness to be committed to it (Kunugi 1965). In fact, Israel explicitly rejected this matter. It stated that it did not consider itself bound by the timetable contracted by the United Kingdom as the mandatory power of Palestine (Kunugi 1965, Kunugi 1965). The contracting parties considered that the decision of the United Kingdom to cede its mandate should be interpreted in terms of GATT as an application for withdrawal from the Agreement under article 27. United Kingdom was no longer a contracting party in respect of custom lands that previously included in its jurisdiction such as Palestine (Kunugi 1965). This means that Palestine's obligations expired and that other contracting parties were free to renounce their obligations to Palestine provided that all other contracting parties are notified, and according to the request of Palestine to consult with the contracting parties that have a great interest in this matter (GATT 1949). The British mandate included two areas (GATT 1949). The first was Palestine, which was directly administrated by the United Kingdom. The second was East Jordan that enjoys greater autonomy (Van der Borgh and Awwad 2016). This led to the withdrawal of three states from the United Kingdom, which had submitted applications for joining the GATT. These states are Israel, Jordan and Palestine. Israel had not shown its willingness to abide by the General Agreement on Tariffs and Trade (GATT) (GATT 1959). In 1959, Israel requested joining the General Agreement on Tariffs and Trade (GATT) (GATT 1959). The contracting parties agreed to the provisional acceptance of Israel in the same Year (GATT 1959). In 1962, Israel became a contracting party to the GATT (GATT 1961). As for Jordan, the issue of its joining GATT backs to the first days of the World Trade Organization. At a press conference held before the Havana Conference, the Executive Secretary of the Interim Committee included East Jordan as one of the invited countries (GATT 1961). However, in 1994, Jordan requested to become a signatory to the General Agreement on Tariffs and Trade. When the World Trade Organization was established, the application was converted into application to join the WTO in 1995 (WTO 1995). Jordan became a member of the WTO on 11 April 2000 (Agreement 2000). As for Palestine, it was represented at the Havana Conference by the United Kingdom, which negotiated specific concessions to Palestine. However, the abandonment of the mandate served as withdrawal from the GATT. After the establishment of the state of Israel, the West Bank and Gaza Strip were controlled by both Jordan and Egypt respectively until 1967. After the 1967 War, Israel captured the Palestinian territories and largely integrated the Palestinian economy into its economy. Israel's Protectionist economic policy had made all Palestinian imports and exports under full control of Israel, and has hampered the activity of Palestinian enterprises in order to avoid competition with its counterparts (Roy, 1999; Harpaz, 2006). This status served as an incomplete custom union, leading to major trade obstacles to the Palestinian economy (Arnon & Weinblatt 2001).

In the context of the peace process in 1994, the economic agreements were reached. The Protocol of Economic Relations between the Government of Israel and the Palestine Liberation Organization – Paris Protocol – was signed in 1994 following the Declaration of Principles concerning Interim Self- Government Arrangements (Oslo I Accord). The Paris Protocol represents the formalization of economic realities on the ground. And Exemption Some Palestinian goods from customs fees or to grant them a discount in fees (Amsha, 2011). The transfer of control to the Palestinian people is initiated, and control is transferred in two stages where the agreement on the Gaza Strip and the Jericho area on 4 May 1994 confirmed the Palestinian commercial autonomy within the limits of the agreement in the two areas. These areas were of strategic importance because they represent the main border crossings with Egypt and Jordan. Nevertheless, the actual control of the border crossings remained in the hands of the Israeli authorities. This interim agreement, the Gaza- Jericho Agreement, expanded to include area in the West Bank and Gaza Strip (Oslo II Accord)(Agreement 1995). The areas of Palestinian control were divided into A and B. The civilian authority of the Palestinian National Authority has been granted in these areas. The Paris Protocol was temporary for five years period aimed at enabling the Palestinian National Authority to prepare and arrange its economic affairs prior to final position negotiations. However, the Paris Protocol was not fully implemented, and was not make any significant progress in the final status negotiations after the transitional period ended in 1999.

## *2.2 The second section: the steps of Palestine's accession to the World Trade Organization.*

### *2.2.1 First: Joining as an observer*

States endeavors initially to join the World Trade Organization as an observer in the General Council of the

Organization and its subsidiary bodies in order to be acquainted with the organization and the procedures of negotiation for joining it (Agreement 1996, Stoll & Schorkopf, 2006). The rules of procedure for the session of the Ministerial Conference and the meetings of the General Council maintain that the representatives of separate states or customs territories may attend meetings as observers at the invitation of the General Council in accordance with the guidelines contained in Annex 2 to these rules (Agreement 1996). Annex 2 distinguishes between two types of observer status: the first observer is assigned to the ministerial meeting. The second is an observer member, where the request can be submitted to the ministerial meeting to which the request was submitted (Agreement 1996). In 1997, the Palestinian National Authority showed interest in joining the international trading system for the first time (Abdullah, 2010). The Palestinian National Authority attended the Hong Kong Ministerial Meeting in December 2005 where a request for obtaining the observer status was submitted and accepted (Agreement 2005, Agreement 2008, Berends, 2008).

Article 4 of Annex 2 to the Rules of Procedure states that: “governments, wishing to submit an application for observer status in the General Council, must send a message to that body, informing that it expresses its intention to commence the negotiations of joining the WTO agreement within a maximum period of five years. The state, wishing to join, provides a description of its current economic and trade policies, as well as any future reforms in these policies. In October 2000, Palestine formally expressed its wish to join the World Trade Organization. It provided instructions to the Permanent Observer Mission of Palestine to the United Nations and other international organizations to contact the General Council of the World Trade Organization in order to request Palestine to be observer status at the World Trade Organization (Agreement 2000). Palestine's officials met with the representatives of various WTO members in September 2009 in Geneva, including representatives from the United States, the European Union, China and Japan (Bahalim, 2009). They also met with the WTO Director-General, Pascal Lamy, to discuss the request (Bahalim, 2009). An official request for obtaining observer status for Palestine was submitted in October 2009, followed by responses to questions from WTO members.

In 2009, the Palestinian government declared its goal of membership in the World Trade Organization (WTO) clearly (Bank 2011), to end the occupation and the establishing of the state, and went through some processes to help them obtain their membership in the World Trade Organization. The National Task Force is the advisory Palestinian team of the World Trade Organization (NTF) which was formed by including representatives from the public and private sectors, and have a meeting every two months with the chairman of the Minister of National Economy. The team's duty is to provide political guidelines to the Palestinian government and advise them on how to become a member of the NTF (Bank 2010). The Technical Advisory Group is the operational team which comprises of professionals from public and private organizations. This team holds meetings every month and is responsible for implementing all the policies. The transparency committee includes members of the national task force and the technical advisory team. Its mission is to review the transparency rules applied in Palestine in order to achieve compliance with the special transparency requirements. The World Trade Organization (WTO) Unit of the Ministry of National Economy consists of several expert staff to provide technical support to the Technical Advisory Group and the National Task Force, and to advise the Minister of Economy on all issues related to the World Trade Organization. In addition, there is a process of legislative and institutional reform - such as the revision of the regulatory framework of the telecommunications sector, the drafting of new intellectual property laws - to comply with WTO rules (Bank 2009).

In November 2009, Palestine was allowed to participate as a special observer at the Ministerial Conference held in Geneva (Agreement 2009). However, its request to become an observer member was unable to mobilize the necessary support to reach a consensus decision in accordance with WTO Practice. Although the Agreement of Marrakesh establishing the World Trade Organization (The Uruguay Round Agreement)(Agreement 1999) requires only approval of two – thirds majority of WTO members (Agreement 1999), Israel and the United States opposed this request.

The Palestinian request for obtaining the status of observer to the World Trade Organization was re-submitted in April 2010 with the hope that it would be approved at the May 2010 meeting of Ministerial Council (WTO 2009). For reasons far from the General Council, the request did not include on the agenda of the meeting. These procedural wrangles indicate the politically sensitive nature of the demand. Although the WTO is proud to be an organization based on legal rules, the process of joining is a political process by nature (Lee and Ullrich 2009). Although this matter is not a legal requirement according to the Agreement of Marrakesh, the customary legal basis is to take all decisions on the basis of consensus (Lee & Ullrich, 2009), meaning that the United States must be supportive of the resolution (Wikileaks, 2010).

A delegation headed by the Deputy Director – General of the World Trade Organization, Alejandro Garra, visited Palestine in June 2010. The visit served as a recognition of the progress made by the Palestinian Ministry of National Economy in preparation for joining the World Trade Organization. In December 2013, Palestine attended – as a special observer – the 9<sup>th</sup> session of the ministerial conference held in Bali, Indonesia (Agreement 2013). Although procuring

observer member is an essential step to join the WTO, the success of this initial step depends, for political reasons, largely on the selected procedural method to join organization.

### 2.2.2 Second: joining as a member.

The members of the World Trade Organization are either original members or joined ones (Agreement 1999). Palestine was represented in the original negotiations of the Havana Charter of the World Trade Organization and the General Agreement on Tariffs and Trade (GATT). It became a founding member of the GATT where it was represented through the United Kingdom. When the United Kingdom abandoned its mandate, the contracting parties considered this abandonment as Palestine's withdrawal legally. Palestine did not request the re- entry of the GATT in 1947. Therefore, it could not be a member of the World Trade Organization.

Palestine is now seeking to join the World Trade Organization where procedures and conditions differ from those of the GATT in 1947 (Lanoszka, 2001). Joining the World Trade Organization of the new member requires the acceptance of the new member of all the rules of the Uruguay Round Agreement (one project). Palestine must join the World Trade Organization in accordance with article 1/12 of the Marrakesh Agreement (Gallagher, 2005), which states: "any state or a separate customs territory, which enjoys full autonomy in managing its foreign trade relations or other matters stipulated in this agreement and in the Multilateral Trade Agreement, may join this agreement according to agreed conditions with the World Trade Organization.

Article 12 of the Agreement states that joining the World Trade Organization will be based on mutually agreed terms between the applicant and the WTO members. In fact, this means negotiating on terms between the applicant and the current members wishing to engage in bilateral talks with the joined member. Article 12 does not provide legal criteria for joining process. Thus, every joining process is different from another. Furthermore, in the context of the procedures to be used for joining requirements, article 12 does not specify any clear steps, and does not provide any advice. Also, the WTO has no clear rules on membership, and the circumstances and elapsed time may vary considerably (Evenett, 2005). Article 12 does not stipulate any rules or principles for joining negotiations. Additionally, it does not indicate terms that could be agreed between applicant and WTO members (Qin, 2003; Nguyen, 2008). History knows that such terms are not relevant to the WTO at all.

### 3. Palestine's joining the WTO as a state.

The article 12 of the Marrakesh Agreement allows Palestine to join as a state or separate customs territory. Palestinian President Mahmoud Abbas issued the Presidential Decree No. 1/2013 announcing the change of status from the Palestinian National Authority to the State of Palestine (Wafa 2013). The state of Palestine has been recognized by 138 of member states of the United Nations. The decisions of joining the WTO have been taken according to article 12/2 of the Marrakesh Agreement. This article stipulates that: "the Ministerial Conference takes the decisions of joining and approves the terms of joining agreement by a two- thirds majority of the members of the Organization". On the assumption that the countries recognize Palestine as state in the UN General Assembly would be able – under the right economic conditions – to vote for Palestine's membership in the World Trade Organization, the result is a positive two- thirds majority for Palestine. Thus, it will receive 111 votes of 159 votes. It is expected that Israel will object to such scenario, but this objection contradicts Israel's long- standing policy in the international trading system. Israel has been a strong supporter of the trading club since its joining the GATT, even in difficult or politically sensitive circumstances. An example of this is the treatment of Israel with joining Egypt – the United Arab Republic as it was called at that time – in 1970. Israel will not confuse political considerations with the economic objectives of the WTO. To demonstrate this, it issued a declaration to Egypt. However, the formulation of this declaration remained general where Israel declared that it supports the accession of any country to the GATT provided that it is prepared to fulfill the obligations of the agreement (GATT 1962). When Israel came under pressure to withdraw from the working group on Egypt's joining, Israel resisted pressure from the Secretary – General of the GATT and some of the strong contracting parties of the GATT. Israel stressed that GATT should be a non – political organization, and these Egyptian pressures will form a dangerous precedent(GATT 1962). When Israel questioned Egypt on political issues such as the Arab boycott, the Egyptian negotiator stressed that such matters were the result of political conflict and were not the subject of discussion under the General Agreement on Tariffs and Trade (Van der Borgh and Awwad 2016). In accordance with previous procedures established by Israel and confirmed by Egypt, Israel should avoid political discussions within the World Trade Organization. Nevertheless, it voted against joining but would not be able to prevent it if the decision – taking rules were followed. Israel would have the option of resorting to the article (13) of the Marrakesh Agreement – the so-called non- application of multilateral trade agreements between specific members.

It seems, however, that this scenario will fail, and the reality in WTO decision – making does not reflect the procedures of the agreement where decisions in the General Council have been taken by consensus (WTO 1995). Therefore, voting became the exception and decision – making by consensus became the norm. There is only one case for joining

on the basis of voting, the case of Ecuador (WTO, 1995; Steger, 2000). The special circumstances of this one case decrease its value (Footer, 2006). Moreover, this case is preceded by the implementation of the decision of the General Council in decision – making by consensus concerning the joining of the states. In fact, decisions on joining are taken by consensus. Thus, the de facto veto of current members of the World Trade Organization has been established in order to impede the admission of new applicants (Van der Borgh and Awwad 2016). Given the continued Israeli occupation of the state of Palestine, it is inconceivable that Israel would accept Palestine's joining the World Trade Organization as a sovereign state.

#### **4. Palestine's joining The World Trade Organization as a customs territory.**

Given the reality of WTO's decisions – making, it is likely that Palestine may seek to join the WTO as a separate customs territory. By choosing this path, Palestine will use the strategy that other WTO member states have tried to avoid for discussing any final legal status of its territory in accordance with the Oslo Accords. This makes it possible to have a less politicized process in line with the diplomatic tradition of the GATT that prefers a compromise instead of a strict legal outcome (Van der Borgh and Awwad 2016). Palestinian Minister of Economy, Bassem Houry, said that Palestine could achieve full membership in five years, even without establishing a state such as Hong Kong, Taiwan and Macao (Ammad Bahalim 2008).

There is a useful comparison to the case of Jordan. Jordan chose to apply to join the GATT in 1994, then return to apply to become a membership in World Trade Organization in 1995. The general council of the World Trade organization approve the application of Jordan to become a state after studied their application in 17 December 1999 (AlKhaldi, 2015).

Also there is a useful comparison to the case of Taiwan (O'Quinn 1996). It has chosen to give priority to WTO membership on promoting the diplomatic recognition of its status as a sovereign state through the joining process. It has accepted terms aimed at avoiding conflict with the People's Republic of China by calling itself “a separate Taiwan customs territory”, [Bing, Kinmen, Matsu (Chinese Taipei)], and avoiding carefully any reference to sovereignty or state. Taiwan has been joined WTO by the Director – General's good offices. This led to agreement between China and the People's Republic of China on Taiwan's joining WTO despite differences over sovereignty over Taiwan territory.

Palestine takes a cautious approach by defining itself as “a separate customs territory on the road to statehood” (Van der Borgh & Awwad 2016). Most UN documents referred to Palestine as “an occupied Palestinian territory” before the recognition Palestine as a non – member observer state. However, after acceptance by the United Nations, the term “state of Palestine” was used for the purpose of the United Nations. The use of the term Palestine became prevalent. As the World Trade Organization's request precedes this development, the margin of the document showed that the term Palestine refers to the West Bank and the Gaza Strip. In order to avoid diplomatic obstacles of terms, the explanatory margin continues to use the term Palestine to facilitate reading without prejudice to the question of the status (O'Quinn 1996). Accordingly, the Palestinian demand is based on the assurance that Palestine is a separate territory, and thus it is eligible to consider membership under article (12).

The application of joining World Trade Organization as a separate customs area creates a new challenge for Palestine because this qualification is defined by the Marrakesh Agreement. When the establishment of the state outside the framework of the World Trade Organization is decided, the WTO decides eventually to qualify the state as a separate customs area in accordance with article (12) of the Marrakesh Agreement. The decision requires the separate ad hoc territory to be fully independent in the management of its external trade relations and other matters stipulated in the Marrakesh Agreement and the Multilateral Trade Agreement of the World Trade Organization. Palestine is a fully independent separate customs area so that it can develop its external trading relations and manage its domestic economic affairs.

#### **5. Conclusion**

Palestine has the right to join the World Trade Organization after obtaining resolution (67/19) of the United Nations General Assembly to grant Palestine the status of observer non- member state of the United Nations. It is preferable for Palestine to start joining the World Trade Organization in order to avoid any discussion on the legal status of its territories in accordance with Oslo Accords. This makes the process less politicized in line with the diplomatic tradition of GATT. This tradition prefers a compromise instead of strict legal outcome. Within next five years, it has the right to become a full member as a state without the establishment of a state in the United Nations.

#### **References**

- Agreement (1995). *Palestinian-Israeli Interim Agreement on the West Bank & Gaza Strip*.  
<https://doi.org/10.1177/0967010695026004014>
- Agreement (2000). Letter of Director-General regarding the Notification of Acceptance and Entry into Force of the

- Protocol of Accession of the Hashemite Kingdom of Jordan to the Marrakesh Agreements Establishing the World Trade Organization WTO.
- Agreement, W. (1996). Rules of Procedure for Sessions of the Ministerial Conference and Meetings of General Council—Annex II: Guidelines for Observer Status for Governments in the WTO.
- Agreement, W. (1996). *Rules of Procedure for Sessions of the Ministerial Conference and Meetings of the General Council*.
- Agreement, W. (1999). "Marrakesh Agreement Establishing the World Trade Organization, Apr. 15, 1994." The legal texts: The results of the Uruguay round of multilateral trade negotiations 4: 1867
- Agreement, W. (2000). "Palestine—Request for Observer Status: Communication from Palestine." WT/L/770
- Agreement, W. (2005). Request for Observer Status by the Palestinian Liberation Organization on behalf of the Palestinian Authority. S. S. o. t. M. Conference. Geneva.
- Agreement, W. (2008). Request for Observer Status by the Palestinian Liberation Organization on behalf of the Palestinian Authority. S. S. o. t. M. Conference. Geneva.
- Agreement, W. (2009). "Seventh Session of the Ministerial Conference." WT/L/775.
- Agreement, W. (2013). "Ninth Session of the Ministerial Conference, Request for Observer Status by Palestine." WT/L/884.
- AlKhaldi, R. (2015). "The Endeavours of the Palestine's accession the World Trade Organization : Evaluation and Lesson " Palestine Economic Policy Research Insitute - Mas: 27.
- Ammad Bahalim, T. B., Paige McClanahan, Jessica Thorn, Daniel Villar , Paige McClanahan (2009) Palestinians Seek Observership Status at the WTO. 13, 1.
- Ammad Bahalim, T. B., Paige McClanahan, Jessica Thorn, Daniel Villar , Paige McClanahan. (2008). 58 Despite Obstacles, EU Expects Russia to Join WTO This Year. Bridges.
- Geneva, International Centre for Trade and Sustainable Development (ICTSD). 12: 1.
- Amsha, M. K. A. (2011). "The World Trade Organization and the efforts of the State of Palestine to join to the agreements, obligations, rights and procedures." Arab Democratic Center.
- Arnon, A., & Weinblatt, J. (2001). Sovereignty and economic development: the case of Israel and Palestine. *The Economic Journal*, 111(472), 291-308
- Bank, T. W. (2011). Building the Palestinian State: Sustaining Growth, Institutions, and Service Delivery. *Economic Monitoring Report to the Ad Hoc Liaison Committee*.
- Bank, W. (2009). A Palestinian State in Two Years: Institutions for Economic Revival. *Economic Monitoring Report to the Ad Hoc Liaison Committee*, World Bank.
- Bank, W. (2010). The Underpinnings of the Future Palestinian State: Sustainable Growth and Institutions. *Economic Monitoring Report to the Ad Hoc Liaison Committee*.
- Berends, G. (2008). Fear and loading in West Bank/Gaza: the state of Palestinian trade. *J. World Trade* 42: 151
- Evenett, S. J. (2005). "WTO accession: lessons from experience."
- Footer, M. E. (2006). An institutional and normative analysis of the World Trade Organization, Nijhoff.
- Gallagher, P. (2005). *The first ten years of the WTO: 1995-2005*, Cambridge University Press.
- GATT (1962). Summary Record of the Ninth Meeting Held at the Palais des Nations. Geneva, GATT: 135.
- GATT (1962). Summary Record of the Ninth Meeting Held at the Palais des Nations. Geneva, GATT: 790.
- GATT, A. (1949). The Position of Palestine in Relation to the Agreement, Note by the Secretariat. GATT/CP.3/17. Geneva, GATT.
- GATT, A. (1949). Summary Record of the Eleventh Meeting. GATT/CP.3 /SR.II. Geneva, GATT.
- GATT, A. (1959). Accession to the General Agreement, Request by Israel. L/968. Geneva, GATT.
- GATT, A. (1959). Declaration on the Provisional Accession of Israel—Entry into Force. Geneva, GATT. **L/1040**.
- GATT, A. (1961). Accession of Israel—Entry into Force of the Protocol for the Accession of Israel—Note by the Executive Secretary. L/1795. GATT. Geneva.
- Harpaz, G. (2006). "The New Israeli Anti-Dumping Legislation: One More Modest Step in Israel's Gradual Advance

- from Unilateralism Towards Trans-National Co-operation." 238
- Kunugi, T. (1965). "State Succession in the Framework of Gatt." *The American Journal of International Law* 59(2): 279.10.2307/2196968
- Lanoszka, A. (2001). World Trade Organization Accession Process. *The J. World Trade* 35: 575.10.1023/A:1011892125917
- Lee, D. & H. Ullrich (2009). "The Diplomacy of WTO Accession." *The Hague Journal of Diplomacy* 4(1): 1-5
- Mr. E. Wyndham White, E. S. o. t. P. C. o. t. U. N. (1947). Trade and Employment on Friday. Geneva, European Office of the United Nations Information Center 234: PP.10-11.
- Nations, L. o. (1920). Mandate for Palestine. San Remo Conference.
- Nguyen, N. (2008). "WTO Accession at Any Cost-Examining the Use of WTO-Plus and WTO-Minus Obligations for Least-Developed Country Applicants." *Temp. Int'l & Comp. LJ* 22: 243
- O'Quinn, R. (1996). "Bringing Both China and Taiwan into the World Trade Organization." *CHINESE YEARBOOK OF INTERNATIONAL LAW AND AFFAIRS* 14: 19-37
- Qin, J. Y. (2003). WTO-Plus Obligations and Their Implications for the World Trade Organization Legal System. *J. World Trade* 37: 483
- Roy, S. (1999). De-development revisited: Palestinian economy and society since Oslo. *Journal of Palestine studies* 28(3): 64-82. DOI: 10.2307/2538308
- Samir Abdullah, W. T. O. (2010). Palestine Economic Policy Research Institute. Palestine: 10.
- Steger, D. P. (2000). The World Trade Organization: A new constitution for the trading system.
- Stoll, P.-T. & Schorkopf, F. (2006). World economic order, world trade law. *Leiden: Martinus Nijhoff*. <https://doi.org/10.1163/ej.9789004144965.i-292.2>
- Van der Borgh, K. & Awwad, H. (2016). Palestine and the World Trade Organization: A Legal Roadmap for Accession. *The Palestine Yearbook of International Law Online* 18(1): 147. [https://doi.org/10.1163/2211-6141\\_007](https://doi.org/10.1163/2211-6141_007)
- Van der Borgh, K. & Awwad, H. (2016). Palestine and the World Trade Organization: A Legal Roadmap for Accession. *The Palestine Yearbook of International Law Online* 18(1): 148. [https://doi.org/10.1163/2211-6141\\_007](https://doi.org/10.1163/2211-6141_007)
- Van der Borgh, K. & Awwad, H. (2016). Palestine and the World Trade Organization: A Legal Roadmap for Accession. *The Palestine Yearbook of International Law Online* 18(1): 155. [https://doi.org/10.1163/2211-6141\\_007](https://doi.org/10.1163/2211-6141_007)
- Van der Borgh, K. & Awwad, H. (2016). Palestine and the World Trade Organization: A Legal Roadmap for Accession. *The Palestine Yearbook of International Law Online* 18(1): 156. [https://doi.org/10.1163/2211-6141\\_007](https://doi.org/10.1163/2211-6141_007)
- Van der Borgh, K. & Awwad, H. (2016). Palestine and the World Trade Organization: A Legal Roadmap for Accession. *The Palestine Yearbook of International Law Online* 18(1): 157. [https://doi.org/10.1163/2211-6141\\_007](https://doi.org/10.1163/2211-6141_007)
- Wafa (2013). Presidential Decree Orders Using 'State of Palestine' on all Documents Archived 15 January 2013 at the Wayback Machine.
- WIKILEAKS (2010). Palestinian Authority Request for WTO Observer Status: USTR Meetings with Palestinian Officials and Private Sector.
- WTO (1995). Accession of Ecuador. 16/8/1995.
- WTO (1995). Decision-Making Procedures under Articles IX and XII of the WTO Agreement.
- WTO, A. (1995). Accession of Jordan: Communication from Jordan. [WT/ACC/JOR/1](#). WTO. Geneva, WTO.
- WTO, A. (2009). Palestine-Request for Observer Status: Communication from Palestine – Application for Observership in the General Council and its Subsidiary Bodies. WT/L/792.

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# The Present and Future of Kuwaiti-Iranian Relations and Their Influence on the Security of the Arabian Gulf

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## Abstract

*Objective:* The objective is to study the present and future of Kuwaiti-Iranian relations through the determinants of the geographical, social, economic and political relationship and the reflection of that relation on the security of the Gulf. The study also examines the future of Gulf security in light of the Kuwaiti-Iranian relations.

*Method:* The study used the approach of the national interest because it is linked to the theory of power, according to Hans Morgenthau, since power is the goal of the foreign policy maker, a major objective of the state in its external relations. Where the political interactions of Kuwait with the Gulf States and Iran is considered in accordance with its national interest.

*Results:* The study concluded that the Kuwaiti-Iranian relations were positive at most stages and that security is one of the most important problems for small countries, but it is capable of playing a role in regional security. The future of Gulf security is linked to the relations of Gulf countries and Iran with major countries and for Kuwait specifically in its relationship with the United States of America and Western Countries through the security and military agreements.

*Conclusion:* The study shows that the State of Kuwait as a small country played a major role through its political and geographical determinants in resolving regional disputes and conflicts.

**Keywords:** Determinants, Iran, Kuwait, Regional Security

## 1. Introduction

The study discusses the present and future of the Kuwaiti-Iranian relations and their influence on the security of the Arabian Gulf. The study deals with the role of Kuwait in working to resolve disputes and conflicts between the Gulf countries and an example of those disputes is the Saudi Arabia and Qatar crisis in 2014, and the crisis of the United Arab Emirates in 2012, in addition to Kuwait's quest for the role of mediator in the Gulf-Iran conflicts, the most important of which is the Iranian-Gulf dispute and its role in convergence of views and work to solve them as the strategic geographical location of the State of Kuwait distinguished its role within the Gulf system, in addition to the policy of neutrality and balance adopted by Kuwait in its relations with the countries of the Gulf region, especially since it is located between countries that consider large countries such as Saudi Arabia, Iraq and Iran compared to a small country like Kuwait which is located in the same region. There is no doubt that the Kuwaiti-Iranian relations are affected by the development of Kuwait in relation to countries of Gulf Cooperation Council, and also affected by the general framework governing those relations, which witnessed many disputes and crises. Despite the improvement in Kuwaiti-Iranian relations, Kuwait has not emerged from the Gulf situation on key issues such as border disputes (the three UAE islands) and some other disputes. This study will help researchers understand the historical nature of Kuwaiti-Iranian relations which are extended from 2003-2015 in addition to the future relations that will be addressed through the most important determinants of the relationship between the two countries, political and economic, geographical and social-demographic, which lead to create a kind of understanding and mutual trust in some Gulf and regional issues, The study will also discuss the future of Gulf security and the future of Kuwaiti-Iranian relations.

## 2. The Problem of the Study

In view of the policy of the State of Kuwait in its regional environment in the past and present, we believe that the State of Kuwait has taken a policy of strategic hedging and balance in its relations with Iran on the one hand and its relationship with the GCC countries on the other hand taking into account not to deviate from the policy in some main issues that gather the GCC countries, so the study seeks to answer the main question which is to what extent the nature of Kuwait - Iran relations, whether it is a conflict or cooperation, on the security of the Persian Gulf in the future?

This study deals with the present and future of Kuwaiti-Iranian relations through the following points:

1. Introducing the concepts of the study.

2. The reality of the Kuwaiti-Iranian relations.
3. Determinants of Kuwaiti-Iranian relations.
4. The future of Kuwaiti-Iranian relations.
5. Conclusion

### 3. Concepts of the study

#### 3.1 *The concept of regional security:*

Regional security is a relatively recent term that has emerged during the period of the two world wars. It reflects the policy of a group of countries belonging to one region and seeking through their military cooperation to prevent any outside force from intervening in that region. The essence of this policy is territorial mobilization from one hand, to counter internal power on the second hand and protect the status quo on the third hand (Alawi, 2005). Regional security mediates between individual and national security and collective or international security. Another definition of the concept of security is that by linking its components, such as security and order or between security and security partnership, as some people define the term of regional security partnership as a security arrangement within an area rooted in the consensus of States to cooperate to reduce violence and promote stability and peace in the region through various types of agreements and mechanisms such as formal security treaties and international security organizations (Jones, 1998). There are developments that have led to the importance of regional security in the post-cold-war; the first is that the emergence of regional security has become an important issue for the superpowers as they possess the necessary energy for most countries of the world and the second is the outbreak of regional conflicts and wars, which lead to the threat of the world order, in addition to increased demand for regional security arrangements.

#### 3.2 *Concept of Mini-State*

The concept of the nation state emerged after the Westphalia Convention of 1648, and the issue of discrimination between states exists. This process has gone through a number of stages, as classification has become a shift dominated by political, economic, military and technological data and there has been a so-called Mini-State, Middle State, Power State and Superpower State. The State has been addressed from two perspectives, the first being legal, which equates countries from two perspectives, the first of which is the law, which equates States in terms of their sovereignty, their right to exist, and not allowing others to interfere in their internal affairs. The second is the real one that the states vary in terms of the capacities available to them, and therefore vary in terms of the capacities available to them and from this potential; States have the opportunity to influence the other parties (Al-Ebraheem, 1984). However, the most common definition is the size of the population, but it has not been concluded that a small or medium state considering its power in its population. Some believe that a country with a high population is not necessarily a medium or large country, in other countries, the size of a small state is relative. It depends on the influence of the superpower, or the influence of the middle state on the small state (Morgenthau, 1972), because the small state has no ability to influence the international system (Keohane 1969). Thorhalson believes that there are many factors that give the small state power in the international system, such as the degree of control over its internal affairs, its boundaries, its political and economic power, and more importantly, it is its cognitive size, that is, how these states are being seen internally and externally (Thorhallsson, 2006)

#### 3.3 *Concept of Middle State:*

Some researchers define the middle power as a state that has greater economic and military capabilities and resources than smaller powers, and less capabilities and resources possessed by superpowers. Others have classified the middle power across a continuum, depending on the scope and depth of initiatives and issues of concern to them (Cooper, Higgott, Nossal 1993). Others rated the middle power across a continuum, depending on the scope and depth of the initiatives and issues of concern to it, while others categorize the middle power as the state that has military power, economic resources, and geographical or strategic location, that's why the superpowers demand their assistance in times of peace, although they can not win the war against the major powers. There is another criterion for determining the situation of the middle power based on non-economic criteria, including the degree of influence possessed by the middle power, which some researchers consider it as a regional power (Christie, Dewitt, 2006). Another concept of an middle state is based on its foreign behavior, its foreign policy, as using its diplomatic capabilities to serve peace, stability and international security, its tendency to pursue multilateral cooperative initiatives (Jordan, 2001). The middle state was classified as a combination of solid and soft power as it is classified as a capable state that includes elements of solid power, and focus on specific issues through which it can deal with it to a high degree and the ability to provide innovative solutions to solve dispute, the formation of coalitions linked to participation in multilateral institutions, the strengthening of it, the belief that work for the global interest is an important and supportive factor for national interests, and the credibility of a middle state in demonstrating the coherence of its external policy options based on fixed principles (Abu Laila, 2012).

### 3.4 Concept of National Interest

The concept of national interest is a concept that emerges from the school of realism, because it is linked to the theory of power, where the concept of national interest was linked to power according to Hans Morgenthau, since power is the goal of the foreign policy maker and a key objective of the State in its external relations (Al-Kibsi, 1997). Morgenthau has classified national interests into eight main interests: primary interests, which included political and geographical unity, cultural identity and the survival of the nation against cultural excesses. The secondary interests are the interests of the citizens of the State abroad by protecting it, protecting the diplomatic immunities of their missions. The permanent interests, which are stable for a period of time but changing slowly. The changing interests are the interests that the nation determines at any time in accordance with its national interest; there is also a public and private interest. The public interests are those applied by the nation to large geographical areas and to a large number of countries, or in several fields such as economy, trade, diplomacy and international law. The private interests are determined at specific time and place, and often reflect the evolution of the logic of public interest (Tawfiq, 2012).

## 4. The present of Kuwaiti-Iranian relations

### 4.1 Kuwaiti-Iranian relations at the political level

The Kuwaiti-Iranian relations have witnessed a series of ups and downs, as well as international relations in general. The course of these relations was positive in most of its stages. The period of tension and crises between Kuwait and Iran did not exceed more than eight years which is Kuwaiti-Iraq war. Since the independence of Kuwait in 1961, the two countries' situations have been positive which led to the strengthening of relations between them. In 1973, Iran announced its support for the State of Kuwait in the face of the Iraqi aggression on its territory in Alsamtah incident, as well as supporting Kuwait during the Iraqi invasion in 1990, in addition to the official recognition of Kuwait in 1979 by the Islamic Revolution of Iran and the visit of the first senior Kuwaiti official from the Gulf States to Iran after the Iranian Revolution. However, after the outbreak of the Iraq-Iran war at the beginning, Kuwait committed neutrality and demanded Iraq and Iran to stop fighting and after Kuwait was attacked by Iran with rocket fire, the Kuwaiti situation changed. The Kuwaiti-Iranian relations deteriorated. The tension increased in 1985 after Kuwait accused Iran of attempting to assassinate the Amir of Kuwait and carrying out bombings by pro-Iranian people after the State of Kuwait declared its material and political support for Iraq. After the end of the Iraq-Iran war, calm returned between Iran and Kuwait until Iraq invaded Kuwait in 1990. Iran rejected the Iraqi occupation of Kuwait. In order to find a peaceful solution and stop the war, Iranian President Hashemi Rafsanjani announced in February 1991 a peace initiative through his willingness to meet Iraqi President for direct talks to stop the war, and Kuwait welcomed the Iranian initiative, but the Iraqi president rejected the initiative (Gulf Center for Iranian Studies, 2011).

With the increase of the US campaign in 2003 to bring change in Iraq, and the repercussions that will have on the region in general, and the State of Kuwait and Iran in particular, the Kuwaiti Foreign Minister Sheikh Sabah Al-Ahmad Al-Sabah visited Iran, this visit was very important, especially for the Iraqi file, and the Kuwaiti Foreign Minister said that I hope to avoid military action against Iraq (Toumi, 2014), pointing to the preference of Kuwait that the change must be from the inside of Iraq, and nothing guarantees security and stability only the cooperation of the Iraqi government with the United Nations and its inspectors, and the Kuwaiti and Iranian views coincided with that issue and both sides agreed to increase support for efforts to advance political will towards the issue of the continental shelf, and a joint committee was assigned to define the limits of the continental shelf.

In February 2006, Iranian President Mahmoud Ahmadinejad visited Kuwait and discussed bilateral relations with the Emir of Kuwait. This may have given the impression for the Iranian political leadership after the fall of the Iraqi president in 2004 with the rise of Shiite influence in Kuwait (Kuwait News Agency, 2006). In 2007, some saw that Kuwaiti-Iranian relations should improve because Kuwait and Iran are interested in the Iraqi issue, but some had another point of view as they see that there is real fear of Iranian expansion in southern Iraq because it is adjacent to the Saudi and Kuwaiti borders (Abdul Rahman, 2007).

The Kuwaiti-Iranian relations began to take the feature of tension in 2011 after the expulsion of Kuwait 3 Iranian diplomats working for the Iranian embassy in Kuwait, proved to be involved in an Iranian espionage network, and the Kuwaiti Foreign Ministry summoned its ambassador in Tehran for consultation after the Kuwaiti judiciary sentenced to execute 3 Iranians and Kuwaiti accused of involvement in the espionage network working for Iran (The Gulf Center for Iranian Studies, 2017), and this strained situation did not calm between the two countries in 2012 because of the statement of the President of the Iranian continental shelf oil company Mahmoud Zadeh, where he said that if the Iranian diplomacy will be rejected, it will continue its efforts to develop the Arash Marine Gas Field in the Gulf unilaterally, as we did in Hengam field, which is shared by Tehran with the Sultanate of Oman, unless they the State of Kuwait shall respond to the offer of joint development.

On the first conference of donors to support the humanitarian situation in Syria, which was held in Kuwait in January 2013, Kuwait invited Iran to participate in the conference. Tehran participated by the Assistant Foreign Minister for Arab and African Affairs Hussein Abdullahian (Kuwait News Agency, 2013) and provided 200 million dollars to

support the humanitarian situation in Syria (Arab East Center for Civilizational and Strategic, 2013).

Kuwait welcomed the preliminary agreement on the Iranian nuclear program during the GCC summit held in Kuwait. In the opening speech, the Amir of Kuwait affirmed on the satisfaction of the GCC countries toward the Geneva preliminary agreement on Iran's nuclear program and hoped that it would succeed and will lead to a permanent agreement that will remove the specter of tension from the region (Al-Hayat Newspaper, 2013).

In 2014, Iranian President Hassan Rowhani called on the Emir of Kuwait to visit Tehran in a message delivered to the Amir by Assistant Foreign Minister for Arab and African Affairs Hussein Abdullahian. The Amir welcomed the invitation and called for bilateral cooperation to confront extremism and reach a political solution in the Syrian crisis (Iran Arabic Radio, 02 April 2014).

On 01 June 2014, the Amir of Kuwait visited Tehran at the invitation of the Iranian President. During the visit, he met with the Supreme Leader of the Islamic Revolution in Iran and described the Leader of the Revolution as a guide for the whole region. He said that Kuwait is ready to turn a new leaf in relations between the two countries.

The Kuwaiti Foreign Minister, speaking at the opening of the GCC meeting in Jeddah, addressed the level of foreign ministers to Iran's nuclear program as he said during his speech that we should have a close relationship with Iran (Fars News Agency, 2015).

As for the explosion of the Al-Sadiq Mosque, which took place on 26/6/2015 in Kuwait City, which resulted in a number of deaths and injuries (Kuwait News Agency, 2015), Iran condemned the terrorist attack through a letter sent by the Iranian President to the Amir of Kuwait. He expressed his condolences to the Amir of Kuwait and its government and people. A telephone call to the Iranian Foreign Minister to the Kuwaiti counterpart, through which he expressed his sympathy with the government and the Kuwaiti people. The religious authorities in Tehran also condemned the bombing and called on them to promote unity and solidarity. A delegation headed by Ayatollah Mohammad Al-Taskhiri, representative of the Iranian Revolutionary Leader, accompanied by Ayatollah Abbas, a member of the Board of Experts, presented condolences to the government and people of Kuwait.

After the nuclear agreement between Iran and the P5+1 in Vienna, the Amir of the State of Kuwait sent a cable of congratulations to the Leader of the Islamic Revolution of Iran and the Iranian President congratulated them on the historic agreement. He expressed his hope that this agreement will contribute to enhance security and stability in the region (Fars News Agency, 2015). The first visit of The Iranian foreign ministry, after the nuclear agreement, was to the State of Kuwait to discuss the outcome of the nuclear talks and bilateral relations. The aim of the visit is to reassure the Gulf States on its nuclear agreement, as his visit to Kuwait comes as a result of good political relations between Tehran and Kuwait (Al-Alam TV, 2014)

Back to the strained relations between Kuwait and Iran, the State of Kuwait revealed an espionage network group called Al-Abdali group and the prosecution charged the accused with committing acts that would undermine the unity and territorial integrity of Kuwait, and the accusation of seeking and communicating with the Islamic Republic of Iran, and with Hezbollah to carry out hostilities against Kuwait (Kuwait News Agency, 2017), Iran expressed, through the statement of the Iranian Embassy in Kuwait, its deep dissatisfaction with the statement issued by the Public Prosecution, which put name of Tehran in the Al-Abdali group, considering that the accusation was based on vague charges. Kuwait expressed its deep regret of the Kuwaiti Foreign Ministry through an official source and refused the statement of the Iranian Embassy, in order to overcome the most basic rules and diplomatic norms, is that the expression of official states' situations and their desire to obtain any information on any issue should be through the official channels, not through the media. The foreign ministry handed over a memorandum to the Iranian ambassador explaining Kuwait's situation on the case (Al-Watan newspaper, 2015).

As a follow-up to the tension of the Kuwaiti-Iranian relations, Tehran announced through the National Iranian Oil Company that two projects were proposed to develop the extension of the Al-Durra field (Arash) to foreign companies, ignoring the Kuwaiti rejection of any development projects in the field prior to the delineation of the continental shelf, consequently, The Kuwaiti Foreign Ministry summoned the acting of Tehran Embassy at Kuwait and submitted a protest note including Kuwait's rejection of any development in the field before the demarcation of the continental shelf, which is still the subject of regional negotiations between Iran, Saudi Arabia and Kuwait (BBC, 2015).

On 24 September 2015, the stampede of pilgrims in Mina killed a number of Iranian pilgrims and wounded others. After the Iranian Minister of Culture and Islamic Guidance revealed, during a closed session in the Shura Council, that the Saudi Foreign Minister refused to meet with the Iranian Foreign Minister and after the failure of the Iranian delegation to hold talks with the Saudi side to send an Iranian team to study the dimensions of the Mina incident, the Iranian Foreign Minister held talks with the Amir of Kuwait at the United Nations General Assembly, which led to Saudi Arabia's approval of the Iranian Health Minister to Saudi Arabia (Shoma News, 2015).

During the press conference held between the Kuwaiti and German foreign ministers in Kuwait, the Kuwaiti Foreign Minister stated that we are ready to start a dialogue with Iran. The GCC countries always find that there are rules for

cooperation with neighboring Iran. We hope to start this dialogue for the security and stability of the region (Al-Alam channel, 2015).

In the context of what was mentioned in the political relations between Kuwait and Iran, we find that in its policy with Iran, the State of Kuwait has taken the principle of balance, working to resolve the controversial issues between them and bringing the issue closer to being a small state and played a positive and effective role to protect it from Iran's expansionist ambitions. In view of Iran and its policy of intervention, which is part of the religious faith and political ideology of the State of Iranian, as well as its main determinant based on expansionist ambitions and playing a prominent role in the region. Therefore, we see that the State of Kuwait and its maintenance of the level of relations with Iran may avoid it Iran's ambitions to a certain extent, and add space for maneuver away from severing relations between them.

#### *4.2 Kuwaiti-Iranian relations at the economic level:*

After the independence of the State of Kuwait in 1961, economic relations between Kuwait and Iran began, by establishing economic and trade relations, as Kuwait lacked of employment and expertise, and they signed agreements and economic treaties, the most important being the Transit Agreement, trade exchange between the ports of Kuwait and Al-Muhammarah, Bushehr and Bandar Abbas and the economic and trade relations between the two countries continued, but with slow growth.

In 2004, Kuwait and Iran signed a number of memorandums of understanding on economic, cultural, scientific and military cooperation, the second on electricity and water, the third on import of gas from Iran and the establishment of bilateral investment companies in oil and gas field and Kuwait welcomed the recruitment of the Iranian labor force specialized in some sectors of labor, however, some issues remain unresolved such as the transfer of drinking water and gas from Iran to Kuwait.

During the 12th meeting of the Kuwait-Iran Joint Committee held in Tehran, the head of the Trade Development Organization announced Tehran's readiness to export gas to Kuwait via a pipeline, as well as the export of sulfur and liquefied gas at reasonable prices (Arabic CNN, 2014).

On 01 June 2014, the Amir of the State of Kuwait visited Tehran at the invitation of the Iranian President and it was agreed to raise the level of economic and trade relations. This visit led to the signing of a number of agreements between the two sides in the field of air transport, customs cooperation, environmental cooperation, as well as the security agreement (Al- vefagh Online, 2014).

The Kuwaiti-Iranian relations during the year 2015 witnessed a number of mutual visits. The Minister of Economy and Financial Affairs of Iran paid a visit to the State of Kuwait at the head of an economic and commercial delegation. The official data from the Central Administration of Statistics showed that Iran ranked 14th among the importing countries for non-oil goods and derivatives and its derivatives. The volume of Kuwaiti exports in the third quarter of 2014 reached 5.3 million dinars, an increase of 1.4% in the same period of 2013. The data revealed that the volume of Iranian exports to Kuwait in the third quarter of 2014 amounted to 22.8 million dinars (Tabank newspaper, 2014). The President of the Iranian Shura Council visited Kuwait to study the development of economic relations and discuss important developments in the region (Fars News Agency, 2014).

In conclusion OF the process of Kuwaiti-Iranian relations during the period from 2003 to 2015, we note that the relationship between the two countries was positive in most of its stages, despite the existence of some tensions, and the State of Kuwait was able to maintain its normal relations in most periods with Iran and pursued the policy of balance as a member of the Gulf Cooperation Council, which differs in its relations with Iran, and through the consideration of the historical relations of Kuwait and Iran will address in another part of the research the future of Kuwaiti-Iranian relations in the light of regional and international changes.

### **5. Determinants of Kuwaiti-Iranian relations**

The Kuwaiti-Iranian relations are influenced by a combination of data and common factors that push the two countries closer to one another or lead to divergence and conflict. Relations between Kuwait and Iran can be on the path of positive development through bilateral interaction between them that is controlled by a number of determinants, including:

#### *5.1 Political determinant*

- The State of Kuwait has sought to make its policy consistent with its geographical position, which requires it to deal with a great deal of flexibility and balance. Robert Duchin illustrates this in his book "Alliance and Minor Powers". He pointed out that these countries are limited in their ability to defend themselves, and that they must rely primarily on another State or other institutions in order to preserve their integrity (Hilal, 1991). The State of Kuwait, when conquered by Iraq, used a large international coalition led by the United States of America, Britain,

France, Germany, Egypt and Syria to achieve stability (Al-Majalla, 1993) and set criteria for determining the future vision of its Foreign Policy to achieve security, the most important of which are:

- Non-interference in any external conflicts, including the Arabian Gulf.
- Reforming its relations with neighboring countries, without relying on international alliances.
- Pay attention and focus on the security of Kuwait.

The policy of Iran and Kuwait coincided with most issues. The two countries have always preferred to settle their conflicts by peaceful means without any escalation or complication of these conflicts, which allows their containment and minimization of their negative repercussions and effects, as well as resorting to quiet and peaceful methods (Hamdan, 2014).

- Given the policy of Kuwait and Iran in the previous period, we find that the future of relations between them will be dominated by the intensity of political contacts at various levels.
- Based on the basic features that characterized Iran and Kuwait in their relations, it can be said that the Kuwaiti-Iranian relations are of an integrated nature, characterized by a positive character, move away from tension, tend to peace, and resolve any dispute by peaceful means.

### 5.2 Economic determinant:

The Iranian-Kuwaiti relations will be limited to a stage of cooperation in the economic field. At the 12th meeting of the Kuwait-Iran Joint Committee held in Tehran, Tehran announced readiness to export gas to Kuwait via a pipeline, as well as the export of sulfur and liquefied gas at agreed prices. Kuwait and Tehran signed a number of economic and trade agreements in the field of air transport and customs cooperation. According to official data released by the Central Administration of Statistics, Iran ranked 14th among the importing countries for non-oil goods and derivatives. In the third quarter of 2014, the amount of Kuwaiti exports reached 5.3 million dinars with an increase of 1.4% in the same period of 2013. The data revealed that the amount of Iranian exports to Kuwait in the third quarter of 2014 reached 22.8 million dinars, indicating that relations between the two countries are moving towards more cooperation in economic and trade fields, and therefore increased economic cooperation leads to increased mutual trust, which is the basis for any development in other areas (Al-Mutairi, 2004).

### 5.3 Geographical determinant

Geographical location is one of the determinants affecting relations between States; the location of the state determines its strength, in addition to its regional and international weight. It is an important factor that draws the country's foreign relations, through the Kuwaiti-Iranian relations and the impact of the geographical location. Kuwait is a small country with an area of 17,820 km<sup>2</sup>, located on the top of the Arabian Gulf, is the passage to the northeast of the Arabian Peninsula, and is a link between the island and the plains Tigris and Euphrates and the Iranian plateau behind it, which makes it acquired commercial importance (Kuwait Research and Studies Center, 2014). Kuwait as a small country located among countries which are considered in the region as a medium, competitive and influential countries, thus imposing restrictions on movement and limits the maneuver, and therefore its policy characterized by neutrality and balance, but it took a mediating role between the regional middle powers because it enjoys balanced relations among them.



Figure 1. Map showing the geographical location of Kuwait and Iran

Iran, which covers an area of 1,633,188 km<sup>2</sup>, located on Central Asia, the Caspian Sea on the north, Afghanistan and Pakistan on the east, the Arabian Gulf on the south, the Gulf of Oman, and Iraq on the west. It is considered as a natural passage for international trade and oversees the most important water straits, the Strait of Hormuz (Akram, 2002).

The geopolitical status surpassed by Iran, has given it the ability to influence, and the potential to create a kind of human communication that is important in influencing the relations between the two countries. Kuwait and Iran have a common maritime border, which led to some kind of communication between them, and make Kuwait one of the closest points of convergence between the Iranian plateau, and the Arabian Peninsula, and thus Iran's geographic advantage, led to the State of Kuwait took a policy of caution, cooperation and taking a close position with Iran as a bridge between the Arab and Iranian blocs.

#### *5.4 Social determinant*

The demographic determinant are one of the important determinants of the Kuwaiti-Iranian relations, and as a result of the geographical proximity that led to the formation of relations between the Kuwaiti and Iranian peoples, as well as the presence of families in Kuwait whose origins are in Iran, which led to cultural and social ties between the two countries. Shiites are considered as component of the Kuwaiti society, whether they are Arab Shiites or those who have long migrated and settled in Kuwait and became Kuwaiti citizens, and their percentage in Kuwait is estimated to be about 20% of the total population of Kuwait (Ezz Al-Arab, 2012).

The sectarian factor has greatly contributed to the rapprochement of Kuwaiti-Iranian relations, and we see many Kuwaiti citizens who belong to the Shiite community always travel between Kuwait, Iranian cities with religious reference (Qom-Mashhad) and visit the holy shrines in Iran. The Kuwaiti Shiite factor has played several roles between the two countries, but at the same time it has raised fears that it is a fertile environment for Iran that can exploit it as a pressure card if it needs it in its relations with Kuwait, especially the Shiite clerics in Kuwait, which are always their situations are always in defense of Iran and reference and its leaders (Salem, 2017).

### **6. The future of Kuwaiti-Iranian relations and Gulf security**

The security issue in the Gulf is one of the main issues of concern to all the countries of the region and the major international powers in particular. This regional and global interest in security in the Gulf stems from the strategic centrality of this region and its role in securing world energy security represented by oil supply, natural gas. The issue of Gulf security, whose security was linked to the security of the world, remains one of the most difficult issues, especially given the nature of this region, which is characterized by a clear imbalance in power, increasing ambitions, multiplicity of conflicts, and the diversity of sources of internal and external threats as over modern and contemporary history, the security of the Gulf has continued to be imported from abroad, provided by the major international powers, because of the lack of self-strength or inability to reach a formula and security equation in which the countries of the region cooperate to provide security (Al Hamed, 1997).

The problem of maintaining security in the Gulf is one of the most important challenges facing the countries of the region, which sought to establish the Gulf Cooperation Council in the early 1980s to fill the gap in the security vacuum in the region after the withdrawal of British forces from the Gulf in the early seventies of the twentieth century (Jamal Zakaria) and the security challenge in the Gulf stems from imbalance of power in favor of the larger regional parties, Iran and Iraq, and the inability of the small, newly independent Gulf States to secure their own security and maintain stability in the region on their own (Peterson, 1986).

Foreign presence and foreign protection of Gulf security will continue, due to the lack of self-security and regional stability, as well as the fact that the Gulf region is one of the most important global regions providing oil and natural gas (Gresh, 2015).

The Gulf region of great geopolitical importance to the world will remain an influential player on global energy security and potentially vulnerable to potential regional crises that are primarily aimed at directing and rationalizing global energy more than anything else (Abdullah, 2014).

A new concept of Gulf security is gradually taking shape, and this will have implications for the GCC decision-maker's understanding of the changes in the Gulf security equation, especially with respect to the sources of threat, where the internal threat sources are more than or equal to or equivalent to external threats.

The relations between Kuwait and Iran have a role in determining the future of security in the Gulf region. These relations have an impact on the mutual relations between the two countries, as well as on their internal Gulf relations and foreign policies. The strengthening of security cooperation between Kuwait and Iran depends on many variables including the nature of the relationship between the United States of America and Iran, where the United States occupied a large and vital part of the Gulf security arrangements after having had a major role in the military operations to liberate the State of Kuwait, so any convergence between Kuwait - Iran, especially on the security aspect must depend on the extent of coordination between the United States and Iran. This is a matter is well aware by the State of Kuwait and puts into its policies (Almutairi, 2004).

The increase in the volume of trade and economic exchange between Kuwait and Iran during the last period may lead to the spread of mutual trust, which is the basis for any development in the field of security cooperation.

Iran has to show its good intentions in seeking to address the first issue of the Gulf, to which the State of Kuwait attaches importance to this issue, namely, the file of the dispute over the three islands, or to refer the matter to the International Court of Justice if bilateral talks between Tehran and Abu Dhabi fail (Almutairi, 2004).

The State of Kuwait and the Gulf states believe that Tehran should abandon interfering in the internal affairs of the Gulf States and understand that citizenship encompasses all sectors of the Gulf. It must be aware that it is not responsible for Shiites and that it is not the guardian of the Shiites of the world.

Kuwait and Iran must increase cooperation and agreement to build positive relations and to overcome the causes of divergence, with the promotion of bilateral cooperation. Cooperation will not be at the expense of Kuwait's relations with the Gulf countries, self-reliance and mutual interests. This will contribute to the common good of both parties and provides alternative protection for external international alliances.

In order to enhance Gulf security, the Istanbul initiative of 30 June 2001, which calls for dialogue with the GCC states to create a new regional balance in the Middle East as part of the broader alliance in the Middle East, was accepted by the State of Kuwait in 2005 and its participation in the initiative, Iran has shown strong opposition to the Istanbul initiative, accusing it of increasing foreign presence in the region (Baabood, 2014).

The continued renewal of Kuwait's security agreements with the United States of America is due to its inability as a small country in the region, as well as the inability of the GCC countries to formulate a common security policy (Baabood, 2014).

## 7. Conclusion

The Kuwaiti-Iranian relations during the period from 2003 to 2015 were positive in most of their stages, despite some tension. Kuwait was able to maintain normal relations in most periods with Iran, concluded several memorandums of understanding and agreements with Iran, and adopt policy of balance and strategic hedging, as it is a member of the Gulf Cooperation Council (GCC), which varies in its relations with Iran.

Security is one of the most important dilemmas for small countries. Therefore, since the liberation of Iraq from the Iraqi invasion and its signing of defense security agreements, Kuwait has been renewing these agreements because there is no effective security system, despite the presence of the Al-Jazeera Shield Forces. However, this force does not deter the external threat represented in Iran, which is militarily superior.

Three scenarios can be developed for the Kuwaiti-Iranian relations, which determine the nature of their relations in the future, namely, the stalemate in relations, which is often the predominant feature between Iran and Kuwait in the most prominent issues. These include opposing the Kuwaiti and Iranian visions of the foreign presence in the Gulf, the issue of the UAE islands and the issue of the continental shelf between Kuwait and Iran.

The second scenario in the Kuwaiti-Iranian relations is the compatibility between them and the cautious cooperation through the strategy of containment and engagement. Kuwait does not deal with Iran as a source of threat, and they involved in resolving bilateral disputes on one hand and through the GCC system on the other.

The other scenario is the tension between Kuwait and Iran. This tension is related to Iran's interference in Kuwait's domestic affairs and to the Shiite citizens whom Iran considers to be interfering in Kuwait's internal affairs, as well as the continued disclosure by the Kuwaiti government of espionage networks working for Iran as in the past years.

As for the future of the Gulf security, there must be a consensus between the Gulf States and Iran, since Gulf security is linked to the countries of the region, and security will be achieved only in the case of cooperation.

## References

- Abdullah, A. (2006). *Gulf Regional System*. UAE, Dubai: Gulf Research Center.
- Abdul Rahman, S. (2007). *Kuwaiti - Iranian relations serious stage and convergence cautious*. Al-Jazeera Net.
- Abu L. S. (2012, July). The role of the traditional and emerging middle states in the international system after the end of the Cold War. *International Politics Journal*, 189, 12.
- Al Hamed, M. A. (1997). *Gulf Security and its Implications for the GCC Countries*. Emirates Center for Strategic Studies and Research. Lecture Series. UAE. No. 16. p.22.
- Al-vefagh Online. (2014). *Kuwait and Iran sign a number of bilateral agreements*. <http://www.al-vefagh.com/Search/Quick>
- Al-Alam Channel. (2015). *Kuwait talks about the readiness of the Gulf countries to dialogue with Iran*. <http://www.alalam.ir/print/1746152>
- Al-Alam TV. (2014). Assistant Iranian Foreign Minister visits Kuwait. <http://www.alalam.ir/news/1580858>



- Alawi, Mustafa. (2005). Regional Security between National Security and International Security. *Journal of Concepts of the Scientific Foundations of Knowledge*, vol. 4, Cairo.
- Al-Ebraheem, H. A. (1984). *Kuwait and the Gulf: Small States and the International System*, Kuwait University. p8.
- Al-Hadrami, O. (2013). Small State, Capacity and Role Theory Approach, *Al-Manarah*, Volume 19 Issue 4. Amman.
- Al-Hayat Newspaper. (2013). *Kuwait Summit: Welcome to the nuclear agreement and condemnation of Hezbollah in Syria*. <http://www.jbcnews.net/article/35812>
- Al-Kibsi, A. (1997). *Principles of Political Science* (1st ed.). Institution of Textbook Press.
- Al-Majalla Magazine. (1993). Reading in Foreign Policy, Issue 687.
- Al-Mutairi, N. (2004). Contemporary Kuwaiti-Iranian Relations (pp. 163-164). Master Thesis, Faculty of Economics and Political Science, Cairo University.
- Al-Watan newspaper. (2015). *Kuwait refutes Tehran's allegations*. <http://alwatan.kuwait.tt/articledetails.aspx?id=448133>
- Cooper, A. F., Higgott, R. A., & Nossal, K. R. (1993). *Relocating Middle powers: Australia and Canada in Changing world order*, Vancouver: UBC, Press.
- Arabic CNN. (2014). Iran to export gas to Kuwait <https://arabic.cnn.com/business/2014/05/05/iran-kuwait-trade>
- Azari, A., & Akram, M. (2002). An overview to problems of subsurface drainage studies, and implementation in Iran. Iranian National Committee on Irrigation and Drainage (IRNCID).
- Baabood, A. (2014). *The Future Role of Major International Powers in Gulf Security, The Gulf in a Changing Strategic Context* (1st ed.). Qatar, Doha: Al-Jazeera Center for Studies.
- Badri, M., & Abdullah, J. (2014). *Regional Developments and their Economic Implications for the Gulf States and Energy Security* (1st ed.). The Gulf in a Changing Strategic Context. Aljazeera Center for Studies, p. 304.
- Badri, H., & Abdullah, J. (2014). *Regional Developments and their Economic Implications for the Gulf States and Energy Security* (1st ed.). The Gulf in a Changing Strategic Context, Research Group, Al Jazeera Center for Studies.
- BBC News. (2015). *Hajj stampede: At least 717 killed in Saudi Arabia*. <http://www.bbc.com/news/world-middle-east-34346449>
- Christie, R., & Dewitt, D (2006). *Middle power and regional security*. Paper presented at the Universidad de san Andres Buenos Aires.
- Ercomishvili, D. (2016). One for All, Each on Its Own: Analyzing the Post-Soviet System of Collective. *Security journal of regional security*. University of Belgrade/Faculty of Political Science.
- Ezz Al-Arab, M. (2012, October). *How Gulf Governments Deal with Shiite Demands*. Cairo: Al-Ahram Strategic File.
- Fars News Agency. (2014). *The visit of the President of the Iranian Shura Council to Kuwait 2014*. <http://arabicfarsnews.com/print news/13931218001469>
- Fars News Agency. (2015). Amir of Kuwait Congratulates Leader and President on Nuclear Agreement. <http://ar.farsnews.com/iran/news/13940504001424>
- Fars News Agency. (2015). Kuwaiti Foreign Minister: We must have a close relationship with Iran. <http://en.farsnews.com/newstext.aspx?nn=13930312001333>
- Gresh, G. F. (2015). Gulf Security and the U.S. Military, Regime Survival and the Politics of Basing.
- Gulf Center for Iranian Studies. (2011, August). Iranian-Kuwaiti Relations between Continuity and Change, Gulf Center for Iranian Studies.
- Gulf Center for Iranian Studies. (2017). Expulsion of Iranian diplomats from Kuwait and the closure of cultural and military attaches.
- Hamdan, M. (2014). *Kuwait and Neighboring Countries* (p. 143). Cairo: Al-Raya Center.
- Hilal, R. (1991). The Struggle over Kuwait, the Issue of Security and Revolution (1st ed., p. 115). Cairo:Sinai Publishing. <http://www.asharqalarabi.org.uk/barq/b-qiraat-1319.htm>
- Iran Arabic Radio. (2014). Iranian president calls on Amir of Kuwait to visit Tehran. <http://arabic.irib.ir/component/k2/item/141322>
- Jones, P. (1998). Towards A Regional Security Regime of the Middle East: Issues and options. Stockholm International peace Research Institute. Canada. p.8.
- Jordan, E. (2001). Conceptualising the Difference between Emerging and Traditional Middle powers. paper presented

- at the national conference of the south African Association of political studies, University of Durban Westville, South Africa.
- Keohane, R. O. (1969, April). Lilliputians' Dilemmas: Small States in International Politics. *International Organization*, 23(2), 291-310.
- KUNA. (2015). Explosion in Al-Sadiq Mosque in Kuwait City, Deaths and injuries. <http://www.kuna.net.kw/ArticleDetails.aspx?id=2448467>
- KUNA. (2015). Kuwait hosts third donors' conference with wide international participation. <http://www.kuna.net.kw/mobile/ArticleDetails.aspx?id=2433087>
- KUNA. (2016, December). *Report on the most important local events for 2016*. Kuwait News Agency (KUNA).
- KUNA. (2017). Discrimination Abolishes the execution sentence of the accused in the case of the Al-Abdali terrorist group and makes him a permanent prisoner. <http://www.kuna.net.kw/ArticleDetails.aspx?id=2619684&language=ar>
- KUNA. (2017). Discrimination cancel the death sentence of the accused in the case of the terrorist group of Al-Abdali and makes him a permanent prisoner. <http://www.kuna.net.kw/mobile/ArticleDetails.aspx?id=2619684>
- Kuwait News Agency (KUNA). (2014). Kuwait hosts third donor conference with wide international participation. <http://www.kuna.net.kw/mobile/ArticleDetails.aspx?id=2433087>
- Kuwait Research and Studies Center. (2014). *Kuwait Geography*, Kuwait Research and Studies Center, Kuwait.
- Maoz, Z. (2013). *Regional Security in the Middle East: Past Present and Future*. Routledge.
- Morgenthau, H. (1972). *Science: Servant or Master?* New American Library.
- Peterson, J. E. (1986). *Defending Arabia*. London: Croom Helm; New York: St. Martin's, press, p88.
- Rabee, H. (1995). *The Theory of Arab National Security and the Contemporary Development of International Cooperation in the Middle East*. Cairo: Dar Al-Mawkiif Al-Arabi.
- Salem, A. F. (2017). Shiites in Kuwait: Citizenship is the solution. *Eedaat Journal*. <https://www.ida2at.com/shiites-in-kuwait-citizenship-is-key>
- Shoma News. (2015). *Iranian president's interview with Iranian state television*. See: <http://shomanews.com/fa/news/204247>
- Tabank news. (2014). Iranian exports to Kuwait. <http://www.tabnak.ir/ar/news/25161>
- Tawfiq, S. (2012). *Principles of International Relations*. Amman: Dar Wael Publishing. pp. 92-96.
- The Arab East Center for Civilizational and Strategic Studies. (2013) *Donors Conference in Kuwait, one and half billion for the Syrian people*. London
- The Gulf Center for Iranian Studies. (2017, July). *The expulsion of Iranian diplomats from Kuwait and the closure of the cultural and military complexes*.
- Thorhallsson, B. (2006). The Size of States in the European Union: Theoretical and Conceptual Perspectives. *Journal of European Integration*, 28(1), 7-31
- Toumi, H. (2014). *Kuwait and Iran: A Fluctuating History*, Gulf news Iran.
- Viorst, S. (1995, November). The limits of the revolution. *Foreign Affairs*, 74(6).
- Zakaria, J. *Security in the Arabian Gulf since the British withdrawal to the Second Gulf War*. Emirates Center for Strategic Studies and Research, Lecture Series, UAE No. 11, pp. 3-4.

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# Public Participation and the Development of Transportation Infrastructure towards Sustainable Transportation and Regional Development in Medan, North Sumatra, Indonesia

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## Abstract

The purpose of this study is to analyze and explain the influence of public participation and the development of transportation infrastructure towards sustainable transportation and regional development in the city of Medan in North Sumatra Indonesia. This research was conducted by an explanatory approach using primary data with purposive sampling technique method based on criteria of 300 respondents. Data analysis techniques used was SEM (Structural Equation Modeling). The results of this study indicate that public participation has positive influence on sustainable transportation in the city of Medan, the development of transportation infrastructure has positive effect on sustainable transportation at the city of Medan, public participation has positive effect on the regional development in the city of Medan, the development of transportation infrastructure has positive effect on the regional development in the city of Medan, sustainable transportation has positive effect on the regional development in the city of Medan, public participation has indirect influence to the regional development through sustainable transportation in the city of Medan, and the development of transportation infrastructure has indirect influence to the regional development through sustainable transportation in the city of Medan, North Sumatra Indonesia.

**Keywords:** SEM, Public Participation, Development of Transportation Infrastructure, Sustainable Transportation, Regional Development

## 1. Introduction

The regional development is basically aimed to improve the welfare of the people of a region in a sustainable manner. Transportation system (sustainable transportation) is one aspect of sustainability (global sustainability), which has three interrelated components, namely: environment, society and economy. Big cities can not be separated from the transportation system if they want to grow and develop well in the future, in this occasion, we will analyze the city of Medan.

Urban areas, home to more than half of the world's population, face unprecedented transportation and mobility challenges. With rapid population and economic growth, the demands for urban mobility are steadily rising. Globally, some 8 billion trips are made every day in cities of which nearly half (47%) are by private motorized modes. Almost all of which are propelled by fossil fuels (Pourbaix, 2011). In 2050, there may be 3 to 4 times as many passenger-kilometers travelled as half a century earlier (International Transportation Forum, Robert Cervero, 2011). Therefore, the need of infrastructure and energy is needed.

Medan is the gate of west area of Indonesia as well as the gate for the tourist to go to Brastagi in Karo highland, orangutan tourism object in Bukit Lawang and water tourism in Lake Toba. Medan is rapidly growing as the third largest city in Indonesia with high population growth, increasing activities and high mobility. However, without area enlargement, problems are occurred, especially in the regional development.

Several issues that can be recognized are the flood management, transportation, traffic jam, cleanliness and garbage handling, street vendors' arrangement, lack of open areas, slums and other issues. The handling of those issues should be conducted in well planned and coordinated actions, something that has not happened yet. A comprehensive and integrated action that involve public is something that must be done immediately. Public planning and participatory planning are applicable approaches that can be used so that the public feels the ownership of the city.

Table 1. GRDP, The Population Growth and Total Area of Medan 2003 -2013

Year	GRDP (billion)	Economic Growth (%)	Population	Area (Km2)	Population Density/Km	Long Road			
						State	Province	City	Total
2003	22.017,78	5,75	1.993.602	265,10	7,520	79,250	45,10	2.951.380	3.035,41
2004	23.623,14	7,29	2.006.142	265,10	7,567	79,250	45,10	2.951.380	3.035,41
2005	25.271,63	6,97	2.036.185	265,10	7,681	79,250	45,10	2.951.380	3.035,41
2006	27.210,12	7,67	2.067.288	265,10	7,798	70,920	45,10	2.951.380	3.035,41
2007	29.352,92	7,87	2.083.156	265,10	7,858	79,520	45,10	2.951.380	3.035,41
2008	31.334,34	6,75	2.102.105	265,10	7,929	79,520	45,10	2.951.380	3.035,41
2009	33.430,69	6,69	2.121.053	265,10	8,001	79,520	45,10	2.951.380	3.035,41
2010	35.822,22	7,15	2.097.610	265,10	7,913	140,70	11,94	3.017.400	3.170,04
2011	38.576,23	7,68	2.117.224	265,10	7,987	121,40	24,48	3.032.560	3.102,32
2012	41.519,32	7,62	2.122.804	265,10	8,008	111,80	33,20	2.951.380	3.096,38
2013	44.696,27	7,65	2.123.210	265,10	8,009	73,030	40,20	2.951.380	3.064,61

Table 1 shows the population growth of Medan in the last 12 years, from 1,993,602 in 2003 became 2,497,187 in 2014. That means the population had increased about half million people. On the other hand, the total area is still the same (265,100 m2). This is the fact that stirs various issue as described by Prof. Sirojuzilan in his book "Problematics of urban and regional areas" 2011. This population growth is of course followed by the increase of activities, mobilities, and various life requirements as clothing, food and home.

Various aspect of area development will surely cause transportation issue as happened in many big cities in Indonesia; issues that including network operational aspects, financial, economy, environment and health. The indications of those problems can be seen in traffic jam, the increase of proportion of personal usage, high level of accidents, inefficient consumption of fuel and etc. The regional development issues remind us that transportation problem requires participation from public, comprehensive thoughts and handling with emphasis on increasing the efficiency and effectiveness of the existing infrastructures, and optimize the limited resources in order of transportation system development to anticipate the area increasing (Sjafruddin, 2011).

Table 2. Personal and Public Transportation in Medan 2004 – 2013

Year	Passenger Car (amount and growth)	Car Cart (amount and growth)	Bus (amount and growth)	Motorcycle (amount and growth)	Total
2004	140.302 (8,04 %)	104.776 (5,34%)	12.108 (5,34%)	756.560 (5,34%)	1.022.755 (5,34%)
2005	164,134 (14,02 %)	112.001 (6,89%)	12.406 (2,46%)	883.406 (16,76%)	1.172.127 (14,6%)
2006	175.198 (6,62%)	116.184 (3,73%)	12.619 (2,46%)	985.745 (16,76%)	1.289.746 (10%)
2007	189.157 (7,96%)	120.328 (3,56%)	12.751 (2,46%)	1.103.707 (11,96%)	1.425.943 (10,55%)
2008	209.527 (11,80%)	140.986 (17,20%)	22.130 (73,60%)	2.104.026 (90,60%)	2.476.669 (73,68%)
2009	222.891 (6,40%)	144.865 (2,80%)	22.123 (-7%)	2.318.632 (10,20%)	2.708.511 (9,36%)
2010	241.012 (8,13%)	149.182 (2,98%)	21.680 (-2%)	2.914.520 (25,7%)	3.326.394 (22,81%)
2011	268.198 (11,28%)	154.657 (3,67%)	22.013 (-1,54%)	3.464.198 (18,86%)	3.909.066 (17,52%)
2012	293.945 (9,6%)	158.987 (2,80%)	22.277 (-1,20%)	4.188.215 (20,9%)	4.663.424 (14,76%)
2013	315.461 (7,32%)	161.689 (1,70%)	22.633 (-1,60)	4.881.783 (16,56%)	5.381.566 (15,4%)

Source: Medan Statistic Biro (BPS), Department of Transportation of Medan 2015

The number of personal and public transportation in Medan has increased in the last 10 years from 1,022,755 units in 2004 to become 5,381,566 units in 2013 or 4,358,811 units increasing (426%) as described in Tabel 2. On the other hand, the road length in Medan had only increased 29,2 km (0,096%). In 2003, the road length in Medan (state, province and city properties) was 3.035,41 km and became 3.064,61 km in 2013, which was barely grown. This condition will become even harder in the future without proper handling. Not to mention, the centre of economy, social, cultural and politics is the city area that causes a high increase of transportation’s sector.

ANTARA News (2013) published the wasted social cost that caused by traffic jam in Jakarta Indonesia and the surroundings which was approximately 68 trillion rupiahs annually. How about Medan? Are there any calculation about the wasted cost? Analisa News (2014) published the lost social cost alone caused by traffic jam at Medan North Sumatra Indonesia was 5,2 trillion annually. These 68 trillion and 5,2 trillion are huge amount which will bring great benefits should they are allocated to improve the welfare of the society, education health system and or to develop infrastructures and public facilities. Therefore, for a better future development of areas in Medan, there must be knowledge about the effect of public’s participation role, development of transportation’s infrastructures, and well integrated sustainable transportation to be able to create a successful regional development of Medan with more benefits for all parties in long term.

Referring to the description of problems and possibility of problems that may be faced by Medan in the future, the researchers present the title of research “Public Participation and The Development of Transportation Infrastructure towards Sustainable Transportation and Regional Development in Medan, North Sumatra, Indonesia”.

**2. Method**

*2.1 Conceptual Frame of Research*

Based on the purpose of the research and literatures study that had explained in previous chapter, the conceptual frame of research as follows:

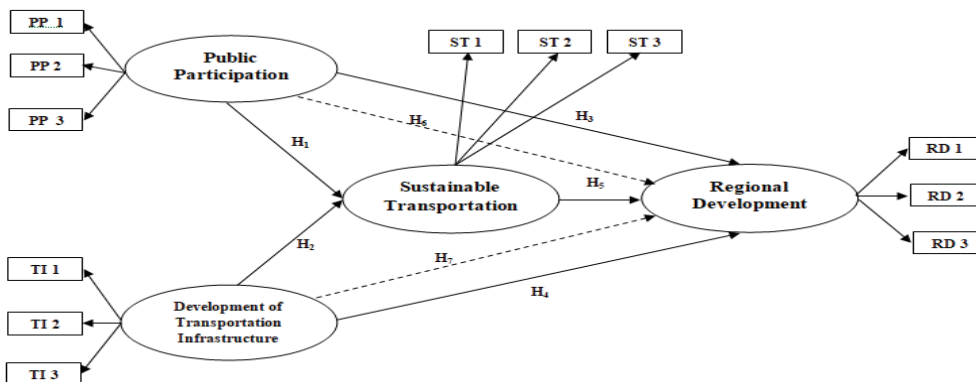


Figure 1. Conceptual Framework

Description of Symbols

→ : Direct Impact

- -> : Indirect Impact

Public Participation

PP<sub>1</sub> : Decision Making

PP<sub>2</sub> : Implementation

PP<sub>3</sub> : Evaluation

The Development of Transportation’s Infrastructure

TI<sub>1</sub> : Physical Hard Infrastructure

TI<sub>2</sub> : Non-Physical Hard Infrastructure

TI<sub>3</sub> : Soft Infrastructure

Sustainable Transportation

ST<sub>1</sub> : Social

ST<sub>2</sub> : Economy

ST<sub>3</sub> : Environment

Regional Development

RD<sub>1</sub> : Enhancement of Local Revenues

RD<sub>2</sub> : Economical Growth

RD<sub>3</sub> : Labor

Public participation is an active involvement of the society in the process of decision making, application, result's utilization and evaluation. Regarding that, the public participation can be described as involvement of public in ideas, mentally and emotionally during the process of decision making, implementation, result's utilization and evaluation of development of Medan. The indicators of public participation in this research were measured by (1) decision making; (2) implementation and (3) evaluation.

### 2.2 Research Design

This is an explanatorial research, that is a research that conducted by explaining generated symptoms of the research object, and aim to explain the causality relation. This is to find whether there is connection between public participation and the development of transportation infrastructure towards sustainable transportation and regional development at Medan North Sumatra Indonesia.

### 2.3 Time and Location of Research

The location of this research was in centre area, middle area, and suburban area of Medan. It was specifically conducted in main stations in Medan and also several offices for principals and staffs of related institutions; Regional Planning Agency (Badan Perencanaan Daerah), Land Transportation Employers' Organization (Organisasi Angkutan Darat), Department of Transportation (Dinas Perhubungan), Public Transportation Organization of Indonesia (Masyarakat Transportasi Indonesia), Cooperative Public Transportation of Medan (Koperasi Pengangkutan Umum Medan). The time of research was started on June 2016 until September 2016.

### 2.4 Population and Samples

Population of this research was citizen of Medan North Sumatra Indonesia. The number of citizens in 2015 was 2,468,429; consisted of 1,241,826 males and 1,226,603 females. The objects of this research were stakeholders of public transportation (public, users, owners, and other related stakeholders) that related to the research. The sampling collection method of this research was non-probability sampling technique (purposive sampling), which was one of the sample collection techniques that was purposively conducted based on certain criteria from the researchers. The researchers decided the taken samples based on certain criteria or consideration that was related to the research. The criteria were as follows:

1. Drivers of public transportation in Medan and surrounding.
2. Users of public transportation in Medan and surrounding.
3. Drivers of *becak motor* (pedicab) in the Medan area.
4. The owners of public transportation in Medan and surrounding.
5. Committees and or members of ORGANDA of Medan (*Organisasi Angkutan Darat*).
6. Committees and or members of MTI of Medan (*Masyarakat Transportasi Indonesia*)
7. Committees and or members of KPUM of Medan (*Koperasi Pengangkutan Umum Medan*)
8. Officials and staffs of department of transportation of Medan (*Dinas Perhubungan*)
9. Officials and staffs of urban planning of Medan (*Perencanaan Kota*)
10. Officials and staffs of bina marga of Medan (*Dinas Pekerjaan Umum*)
11. Officials and staffs of BAPPEDA of Medan (*Badan Perencanaan Daerah*)

The number of respondents was decided according to Roscoe opinion (Sugiono, 2003), that mentioned that regardless the population number in social research, the appropriate number of samples should be between 30 to 500 persons. The determination of sample numbers used Slovin formula because the number population in this research was known (Sangadji et.al., 2010). The Slovin formula is :

$$n = N / (1 + Ne^2)$$

Note

$n$  = samples number

$N$  = population size

$e$  = Percentage of allowance because of mistakes in sample collection that can be tolerated (10%).

The number of population ( $N$ ) in the research is 2,468,429 of citizens of Medan in 2015, with the mistake assumption ( $e$ ) of 10%, the minimum sample numbers to be used in this research is:

$$n = \left( \frac{2,468,429}{1 + 2,468,429(0.10)^2} \right)$$

$$n = 100.0$$

The minimum number of samples chosen was 100 persons to anticipate the outlier sample data (not suitable with the need of data measurement) and also because there will be application of maximum likelihood estimation technique, it will require 300 samples. Based on that opinion, the sample numbers will be 300 respondents related to the research.

### 2.5 Data Analysis Technique

The analysis technique used to answer the hypothesis test is Structural Equation Model (SEM) with programme AMOS 21.0 and SPSS 15.0. Structural Equation Model (SEM) is a series of statistical techniques that enable test of a sequence of relatively complicated relations simultaneously (Ferdinand, 2000: 3). Steps of SEM development are as follows:

1. Theory-based model development.
2. Development of line chart to show a causality relation.
3. Conversion of line chart into series of structural equation and measurement model specification.
4. Choosing of input matrix and estimation technique regarding developed model.
5. Evaluating identification issue.
6. Model evaluation with goodness-of-fit criteria.
7. Interpretation and model modification.

### 2.6 Hypothesis

Hypothesis is temporary assumptions using prior to the research (Sugiyono, 2010:84). A research hypothesis is the statement created by researchers when they speculate upon the outcome of a research or experiment (Martyn Shuttleworth). Based on the above conceptual frame figure, the hypothesis can be formulated as follows:

H<sub>1</sub>: The public participation is positively affecting the sustainable transportation in Medan.

H<sub>2</sub>: The development of transportation's infrastructures is positively affecting the sustainable transportation in Medan.

H<sub>3</sub>: The public participation is positively affecting the regional development of Medan.

H<sub>4</sub>: The development of transportation infrastructures is positively affecting the regional development in Medan.

H<sub>5</sub>: The sustainable transportation is positively affecting the regional development in Medan.

H<sub>6</sub>: The public participation is indirectly affecting the regional development through sustainable transportation in Medan.

H<sub>7</sub>: The development of transportation's infrastructures is indirectly affecting the regional development through sustainable transportation in Medan.

## 3. Results

### 3.1 Confirmatory Factor Analysis

The CFA test was intended to know whether the indicators are representative enough to shape each inherent variable including Public Participation (X1), Transportation Infrastructure development (X2), Sustainable Transportation (Y1) and Regional Development (Y2); all with the help of AMOS 21.0

#### 3.1.1 CFA of Public Participation Variable (X1)

The data processing result of confirmatory analysis of Public Participation can be seen in figure 2 as follows:

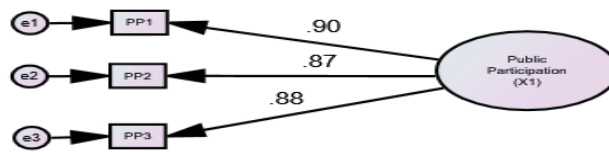


Figure 2. Confirmatory analysis of Public Participation

Based on the confirmatory analysis in figure 2, the variable indicators of public participation consist of decision making (PP1), implementation (PP2), and evaluation (PP3) have convergent validity score (loading factor) above 0,5. That means all three indicators are eligible to shape the public participation variable.

3.1.2 CFA of Transportation Infrastructure Development Variable (X<sub>2</sub>)

Data processing result of confirmatory analysis of transportation infrastructure development can be seen in figure 3, as follows:

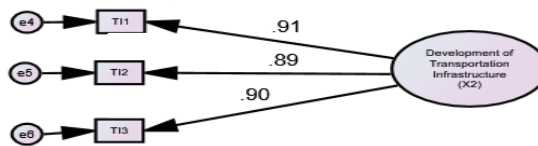


Figure 3. Confirmatory Analysis of Transportation Infrastructure Development

Based on confirmatory analysis in figure 3, variable indicators of transportation's infrastructure development that consists of physical hard infrastructure (TI1), non-physical hard infrastructure, (TI2) and soft infrastructure (TI3) are in convergent validity value (loading factor) above 0,5. Those three indicators are eligible to shape the variable of transportation's infrastructure development.

3.1.3 CFA Variable of Sustainable Transportation

Data processing result of confirmatory analysis of sustainable transportation can be seen in figure 4 as follows:

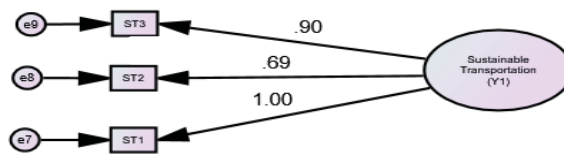


Figure 4. Confirmatory Analysis of Sustainable Transportation

Based on confirmatory analysis in figure 4, the variable indicators of sustainable transportation that consists of social (ST3), economy (ST2), and environment (ST1) are in convergent validity value (loading factor) above 0,5. That means those three indicators are eligible to shape the variable of sustainable transportation

3.1.4 CFA of Regional Development Variable

The data processing result of confirmatory analysis of regional development can be seen in figure 5 as follows

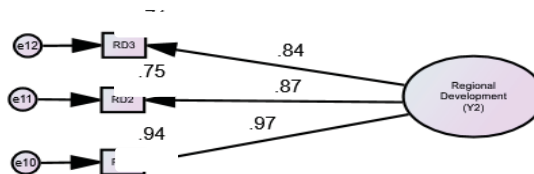


Figure 5. Confirmatory Analysis of Regional Development

Based on confirmatory analysis in figure 5, the variable indicators of regional development consist of increasing of district own revenue (RD1), economical growth (RD2), and labors (RD3) are in convergent validity value (loading factor) above 0,5. That means those three indicators are eligible to shape the variable of regional development.



3.2 Construct Reliability and Variance Extract Test

The test result of construct reliability can be seen in table 3 that explained the construct reliability of latent variables in this research as follows;

Table 3. Test Result of Construct Reliability

Construct	Indicators	Standardize Factor Loading	SFL Kuadrat	Error [εj]	Construct Reliability	Variance Extrated
Public Participation (X1)	PP 1	0.900	0.810	0.190	0.916	0.78
	PP 2	0.874	0.764	0.236		
	PP 3	0.881	0.776	0.224		
Development of Transportation Infrastructure (X2)	TI 1	0.908	0.824	0.176	0.926	0.81
	TI 2	0.886	0.785	0.215		
	TI 3	0.900	0.810	0.190		
Sustainable Transportation (Y1)	ST 1	0.995	0.990	0.010	0.901	0.76
	ST 2	0.690	0.476	0.524		
	ST 3	0.897	0.805	0.195		
Regional Development (Y2)	RD 1	0.968	0.937	0.063	0.922	0.80
	RD 2	0.868	0.753	0.247		
	RD 3	0.841	0.707	0.293		
Limit Acctable					≥ 0.7	≥ 0.5

Source: data processing result using AMOS 21.00, 2017

Table 3 shows that the result of internal consistency reliability test for every construct indicated good result, that is the coefficient of cosntruct reliability achieved is suitable wis the appropriate limitation > 0.7 (Ferdinand, 2002:193).

3.3 Result of AMOS

AMOS or measurement model testing. Model measurement is part of SEM model that consist of latent variable (construct) and several manifest variables (indicators). The purpose of test is to see how exact those manifest variables are able to explain the existing latent variable. The test result can be seen in figure 6 and tabel 4.

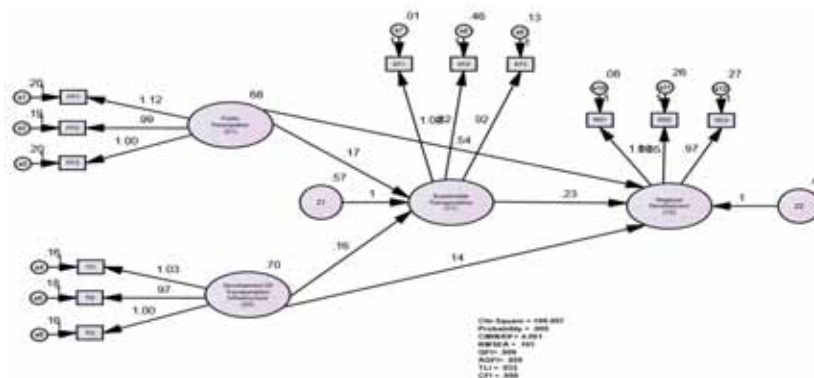


Figure 6. Measurement Model before Modification

Table 4. Evaluation of criteria Goodness of Fit Indices before Modification Model

Criteria	Results	Critical Values	Model Evaluation
Chi-Square	199.007	≤ χ² tabel (85.351)	Not Fit
Probability	0.000	≥ 0,05	Not Fit
CMIN/DF	4.061	≤ 2,00	Not Fit
RMSEA	0.101	≤ 0,08	Not Fit
GFI	0.909	≥ 0,90	Not Fit
AGFI	0.855	≥ 0,90	Not Fit
TLI	0.933	≥ 0,95	Marginal Fit
CFI	0.950	≥ 0,94	Marginal Fit

Source: data processing result using AMOS 21.00, 2017

The calculation result of SEM model had yielded index goodness of fit as shown in tabel 4. Based in tabel 4, the chi-squares value and probability is showing a slightly bad result. But then the chi-squares value are highly sensitive to the amount of samples, and the RMSEA value is quite bad.

Therefore, it is recommended to apply SEM model modification. The result of SEM modification can be seen in figure 7 and table 5

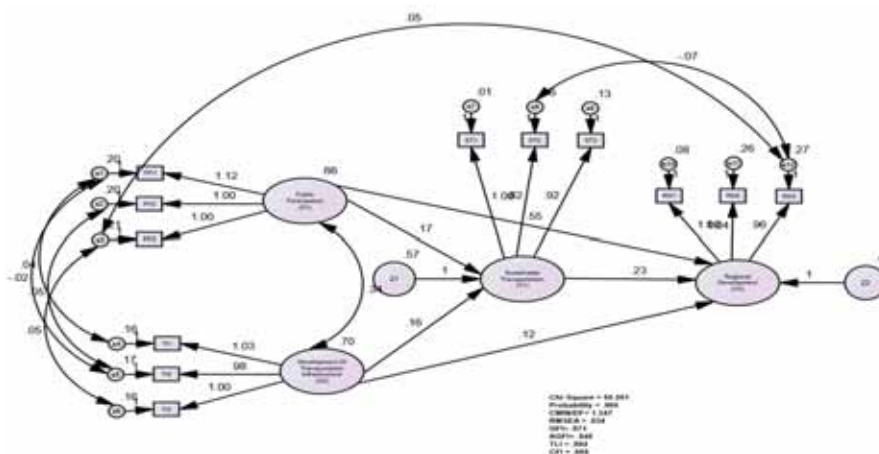


Figure 7. Model Measurement after Modification

Table 5. Criteria Evaluation Goodness of Fit Indices after Model Modification

Criteria	Results	Critical Values	Model Evaluation
Chi-Square	56.561	$\leq \chi^2$ tabel (74.745)	Fit
Probability	0.066	$\geq 0,05$	Fit
CMIN/DF	1.347	$\leq 2,00$	Fit
RMSEA	0.034	$\leq 0,08$	Fit
GFI	0.971	$\geq 0,90$	Fit
AGFI	0.946	$\geq 0,90$	Fit
TLI	0.992	$\geq 0,95$	Fit
CFI	0.995	$\geq 0,94$	Fit

Source: data processing result using AMOS 21.00, 2017

### 3.4 Hypothesis Testing

#### 3.4.1 Direct Effect Analysis

The test result of direct effect hypothesis that submitted for this research is briefly shown in tabel 6.

Table 6. Direct Effect Hypothesis Testing Result

Hipotesis	Direct Effect	Estimate	S.E.	C.R.	P	Information
Y1	<--- X1	.173	.067	2.590	.010	Significant
Y1	<--- X2	.159	.064	2.473	.013	Significant
Y2	<--- Y1	.230	.056	4.130	***	Significant
Y2	<--- X1	.553	.066	8.442	***	Significant
Y2	<--- X2	.123	.061	1.996	.046	Significant

Source: data processing result using AMOS 21.00, 2017.

Table 6 shows the result of direct effect hypothesis testing, explained as follows:

1. Public participation (X1) is positively affecting sustainable transportation (Y1). It can be seen from positive marked path coefficient of 0,173 with C.R. value of 2,590. There is also positive probability of 0,010 that is bigger than the determined positive level of 0,05. It is concluded that public participation is positively affecting sustainable transportation. The first hypothesis that mentioned “public participation is positively affecting the sustainable transportation in Medan” is proven.

2. The transportation infrastructure development (X2) is positively affecting sustainable transportation (Y1). It can be seen from positive marked path coefficient of 0,159 with C.R. value of 2,473. There is also positive

probability of 0,013 that is bigger than the determined positive level ( $\alpha$ ) of 0,05. It is concluded that transportation infrastructure development is positively affecting sustainable transportation. The second hypothesis that mentioned “transportation infrastructure development is positively affecting the sustainable transportation in Medan” is proven.

3. Public participation (X1) is positively affecting regional development (Y2). It can be seen from positive marked path coefficient of 0,553 with C.R. value of 8,442. There is also positive probability of 0,000 that is bigger than the determined positive level ( $\alpha$ ) of 0,05. It is concluded that public participation is positively affecting area development. The third hypothesis that mentioned “public participation is positively affecting the regional development in Medan” is proven.

4. Transportation infrastructure development (X2) is positively affecting regional development (Y2). It can be seen from positive marked path coefficient of 0,123 with C.R. value of 1,996. And there is also positive probability of 0,046 that is bigger than the determined positive level ( $\alpha$ ) of 0,05. It is concluded that transportation infrastructure development is positively affecting regional development. The fourth hypothesis that mentioned “transportation infrastructure development is positively affecting the regional development in Medan” is proven.

5. Sustainable transportation (Y1) is positively affecting regional development (Y2). It can be seen from positive marked path coefficient of 0,230 with C.R. value of 4,130. And there is also positive probability of 0,000 that is bigger than the determined positive level ( $\alpha$ ) of 0,05. It is concluded that sustainable transportation is positively affecting area development. The fifth hypothesis that mentioned “sustainable transportation is positively affecting regional development in Medan” is proven.

### 3.4.2 Indirect Effect Analysis

Test result of indirect effect hypothesis proposed in this research is briefly shown in tabel 7.

Table 7. Indirect Effect Hypothesis Testing Result

	X2	X1	Y1	Y2
Y1	.000	.000	.000	.000
Y2	.037	.040	.000	.000

Source: data processing result using AMOS 21.00, 2017

Table 7 shows the testing result of indirect effect hypothesis that explained as follows:

6. Public participation (X1) is indirectly affecting regional development (Y2) through sustainable transportation (Y1). It can be seen from the positive marked path coefficient of indirect effect of 0,040. The sixth hypothesis that mentioned “public participation is positively affecting regional development through sustainable transportation in Medan” is proven.

7. Transportation infrastructure development (X2) is indirectly affecting regional development (Y2) through sustainable transportation (Y1). It can be seen from the positive marked path coefficient of indirect effect of 0,040. The seventh hypothesis that mentioned “transportation infrastructure development is positively affecting regional development through sustainable transportation in Medan” is proven.

## 4. Discussions

### 4.1 The effect of public participation to sustainable transportation

Based on data analysis result and findings in research, there is conclusion that public participation is positively and significantly affecting the sustainable transportation, so it can be said that first hypothesis “public participation is positively affecting sustainable transportation in Medan” is proven.

The result of this research is acknowledged that public participation is positively affecting sustainable transportation, according to opinion of A.R. Barter Tamin Raad (2000) who mentions sustainable transportation system must possess principles that ensures enough access to all part of society including the disables, children and elderly to at least acquire their basic needs as healthcare, education and job opportunity. Transportation system was provided for public, therefore public must have enough portion to participate in deciding the transportation mode and also to involve in the procurement process. Every level of society must be included, regardless their capability to possess certain transportation facilities such as car or motorcycle. This participation must be nurtured so that their opinion is calculated in the process of planning, implementation and management of transportation system of the city. Transparency is one important thing to keep. Availability and transparency of information during the process is a warrant for the conduct of good and public oriented system.

#### *4.2 The effect of transportation infrastructure development to sustainable transportation*

Data analysis result and findings shown that transportation infrastructure development is positively and significantly affecting the sustainable transportation, so it is concluded that second hypothesis “transportation infrastructure development is positively affecting sustainable transportation in Medan” is proven. The result of this research means transportation infrastructure developments will positively affect sustainable transportation. The article deals with the problem of the impact of transportation infrastructure on sustainable living environment. Transportation infrastructure, its components, relations with other objects, even participants play a great role in the formation of an attractive living environment. The influence of transportation infrastructure on the living environment can be described by the number of indicators which are determined and systemized while preparing development projects (Aušrinė, 2015). The result of this research is in accordance with study from Lining (2007:16) that mentioned the role of transportation infrastructure as determinant of modeled common location based on accessibility concept. the accessibility steps of difficulty to reach certain area, and that is regardless the quantity and quality of transportation infrastructure.

#### *4.3 The effect of public participation to regional development*

The data analysis result and findings from this research shows that public participation is positively and significantly affecting the regional development, so that the third hypothesis “public participation positively affecting the regional development in Medan” is proven. This finding means the public participation will give positive effect to the regional development. The public participation that supports various decisions regarding to the regional development will support the process of achieving the regional development’s target. The result of this research supports the statement of Arnstein (1969) that mentioned that participation as power redistribution will enable those whose economically and politically marginalized to be deliberately getting involved in the planning of the future development. The strategy of participation application is reached by involving public in information sharing, goal formulation, policies setting, funding resources allocation, operational of program and distribute the gained benefits. In other words, it should be involving public since the planning until implementation and the equity spreading of the results and including the controlling phase.

According to Sukawi (2010), the involvement of public in public consultation is a role manifestation of public regarding spatial planning, that in term of suggestion, advice or objection to the government. It is also stated in the opinion of Ericson (in Slamet, 1994) that participation in the stage of implementation is an involvement of a person in the work stages of a project. Sutami (2009) mentioned that the activities of public to participate in development is quite strong in PPMK.

#### *4.4 The effect of transportation infrastructure development to regional development*

The data analysis result and research finding showed that transportation infrastructure development positively and significantly affects the regional development, so that the fourth hypothesis “transportation infrastructure development is positively affecting the regional development in Medan” is proven. This research’s finding means that the sustainable transportation infrastructure development will bring positive impact to the regional development. Along with the increasing of Indonesian population that in 2035 will double from the number of population in 10 years ago or approximately 400 million people, it had brought concern about “food scarcity” condition in the future. Furthermore, along with the growing level of education and welfare of people, there will also be an increasing of per capita consumption for various food, which is in 35 years later Indonesia will need additional food availability in almost 2 times of current need (Siswono Yudohusodo, 2002). Traditionally, the impact of transportation infrastructure development is assessed in technical, economic, financial, environmental aspects and those of road safety and land use (Burinskiene et al. 2007). From a technical point of view, the attention is primarily paid to the physical development level of the infrastructure gauge: whether transportation needs are evaluated according to mobility trends, whether the realization of transportation means is determined in applying an existent or installing a new technical infrastructure (streets, sidewalks, public transportation stations, car parks). (Aušrinė, 2015).

#### *4.5 The effect of sustainable transportation to regional development*

Data analysis result and research’ findings showed that the sustainable transportation significantly and positively affects the regional development, so the fifth hypothesis “Sustainable transportation is positively affecting the regional development in Medan” is proven. This research’s findings mean that the sustainable transportation will positively affecting the regional development. According to Lawrence W. LAN research, in transportation sector, some important undertakings for sustainability are also examined. To be sustainable, overall transportation systems including infrastructures, vehicles, operation and maintenance must not endanger the public health or ecosystems while meeting the mobility needs. They must at least comply with two basic principles: use of

renewable resources at below their rates of regeneration and use of non-renewable resources at below the rates of development of renewable substitutes.

The research of Sunardi (1999) in Magelang region has proved that accessibility factor is the area potential factor that closest related with the service facilities availability compared with other area's potential factor. The accessibility factor was determined by comparing areas wide-ranging with road's length. In other word, the more crowded the transportation line is the bigger possibility is the availability of service facilities.

#### 4.6 *The effect of public participation to regional development through sustainable transportation*

The result and finding of the research declared that the public participation is indirectly affecting regional development in Medan through sustainable transportation. That means the public participation had of course through several ways, that is participation in decision making, the participation in proposing ideas in strategy and policy decision in the management of public transportation in Medan. The next is public participation in investment, That means public must be actively involved in the operational such as involved in the procurement process, and to decide the route of the transportation to avoid any route's overlapping that leads to conflict. Some crowded routes are packed with numbers of transportation owners, and the less crowded routes are less interesting for the business owners. Another problem arise is the number of unregistered public transportation that increased and caused conflict with the registered transportation owners. Also, the increasing number of illegal station in Medan. Regarding those issues, there are urgent need for supervision and strict law enforcement to those who breaks the regulation. The third is through the public participation in the evaluation of public transportation's performance. That means the public participation in term of providing inputs should have their best opportunity by creating regular meeting forum and forum for the owners of public transportation.

#### 4.7 *The effect of transportation infrastructure development to the regional development through sustainable transportation*

The result and finding of this research declared that there is an effect of development of transportation infrastructure of regional development through sustainable transportation. It showed that the sustainable transportation system is a basic element of infrastructure that affecting the development pattern of the city. The transportation development and spatial planning are holding an important role in policy and program of the government. The infrastructure development in transportation sector will need high cost without proper management. With the good management, the increasing of Level of Service will only be temporary. The service's improvement will correlate with the increasing of business activities, which will generate more traffic activity. Social transportation's sustainability in this discussion is the comfortable sense of the public to acquire the public transportation to support their daily activities, the availability of transportation in appropriate places that serves many destinations. The number of public transportation vehicles in Medan is 6,695 units with 240 permits. This number is at the moment considered enough to supply the need of public transportation, but unfortunately the spreading is still uneven. There is also certainty of travelling time, the comfort and security during travelling.

Grigg (1988) mentioned that the role of infrastructure as mediator between social and economy system with the support of nature's environmental. Less functioned infrastructures, especially transportation infrastructure will affect the daily life. On the other hand, the overly provided infrastructures that neglecting the support ability of the environment will eventually bring damage to the nature and human as well as other living creatures.

#### References

- Alavi, M., & Ghaemi, H. (2011). Application of Structural Equation Modeling in EFL Testing: A Report of Two Iranian Studies. *Language Testing, 1*. <https://doi.org/10.1186/2229-0443-1-3-22>.
- Anderson, J. C., & Gerbing, D. W. (1984). The effect of sampling Error on convergent, improper solution, and goodness of fit indices for maximum likelihood factor analysis. *Psychometrika, 49*. <https://doi.org/10.1007/BF02294170>.
- Andriani, Y. (2013). Penilaian Sistem Transportationasi yang Mengarah Pada Green Transportationasi di Kota Surakarta. Semarang: Biro Penerbit Planologi Undip.
- Ang, G., & Marchal, V. (2013). Mobilising Private Investment in Sustainable Transportation: The Case of Land- Based Passenger Transportation Infrastructure. *OECD Environment Working Papers, 56*. <http://doi.org/10.1787/5k46hjm8jpmv-en>.
- Arnstein, S. R. (1969). A Ladder of Citizen Participation. *JAIP, (35)*, 216-224, <http://dx.doi.org/10.1080/01944366908977225>
- Assis, U. W., & Silva, G. W. (2012). VLT: A sustainable solution ti urban mobility. João Pessoa-PB, Work 41 2169-2174. DOI: 103233/WOR-2012-1022-2169.

- Bentler, P. M. (1995). *EQS: Structural equation program manual*. Encino, CA: Multivariate Software Inc.
- Bertolini, L., Clercq, F., & Kapoen, L. (2005). Sustainable accessibility: a conceptual framework to integrate transportation and land use plan-making: Two test-applications in the Netherlands and a reflection on the way forward. *Transportation Policy*, 12. doi:10.1016/j.tranpol.2005.01.006.
- Black, J. A., Paez, A., & Suthanaya, P. A. (2002). *Sustainable urban transportation: Performance Indicators and Some Analytical Approaches*. [https://doi.org/10.1061/\(ASCE\)0733-9488\(2002\)128:4\(184\)](https://doi.org/10.1061/(ASCE)0733-9488(2002)128:4(184))
- Bollen, K. A. (1989). *Structural Equations with Latent Variables*. New York: John Wiley and Sons.
- Byrne, B. M. (2001). *Structural equation modeling with AMOS basic concept, application and programming*. Lawrence Erlbaum Associates. ISBN 978-0-8058-6372-7
- Cohen, J. M., & Uphoff, N. T. (1977). *Rural Development Participation*. New York: Cornell University RDCCIS
- Coromina, L. (2014). *Introduction to Structural Equation Modeling with Amos*. University of Girona, Spain.
- Daniel, W. B. (2005). *Economic Interest & Institution. The Foundation of Public Policy*. Oxford Brazil Blackwell.
- Detr. (1998). *Sustainable Development: Opportunities for change*. London: Department of the Environment, Transportation and the Regions.
- Dwiningrum, S. I. A. (2011). *Desentralisasi dan Partisipasi Masyarakat dalam Pendidikan*. Yogyakarta: Pustaka Belajar.
- Gallagher, M., & Brown, T. (2013). *Introduction to confirmatory factor analysis and structural equation modeling. Handbook of Quantitative Methods for Educational Research*, 289–314. [https://doi.org/10.1007/978-94-6209-404-8\\_14](https://doi.org/10.1007/978-94-6209-404-8_14).
- Ghozali, I. (2014). Model Persamaan Struktural; Konsep dan Aplikasi, dengan program AMOS 22.0, Update Bayesian SEM. Semarang: Badan Penerbit Universitas Diponegoro.
- Goldman, T., & Gorham, R. (2006). Sustainable urban transportation: Four innovative directions. *Technology in Society*, 28, 261-273. Doi: 10.1016/j.techsoc.2005.10.007.
- Gospodini, A. (2005). Urban development, redevelopment and regeneration encouraged by transportation infrastructure projects: The case study of 12 European Cities. *European Planning Study*, 13 (7), DOI: 10.1080/09654310500242121.
- Grabara, J. (2012). Urban Logistics in a Sustainable Development Concept on the Example of Transportation System in Gdynia City.
- Grigg, N. (1988). *Infrastructure Engineering and Management*. John Wiley & Sons.
- Griškevičiūtė-Gečienė, A., & Griškevičienė, D. (2015). The Influence of Transportation Infrastructure Development on Sustainable Living Environment in Lithuania. *9th International Scientific Conference Transbaltica 2015: Procedia Engineering*, 134, 215-223. DOI 10.1016/j.proeng.2016.01.062
- Hairulsyah. (2013). *The influence of public participation on sustainable transportation & regional development in Medan* (Unpublished doctoral dissertation). Faculty of Geography UGM and the Indonesian Geographers Association.
- Hatcher, L. (1996). *A Step-by-Step Approach to using the SAS System for Factor Analysis and Structural Equation Modeling*. Cary, NC: SAS Institute, Inc.
- Hayduk, L. A. (1987). *Structural equation modeling with lisrel: Essential and advance*. Baltimore. John Hopkin University.
- He, L. (2007). *Interregional Transportation, Trade, And Regional Comparative Advantage and Development in China* (Unpublished doctoral dissertation). Faculty of Rensselaer Polytechnic Institute.
- Hettne, B. (2001). *Teori Pembangunan dan Tiga Dunia*. Jakarta. Gramedia: Pustaka Utama.
- Hickman, R. & Hall, P. (2008). Moving the city east: Explorations into contextual public transportation-orientated development. *Planning, Practice & Research*, 23(3). DOI: 10.1080/02697450802423583.
- Hoyle, R. (1995). *Structural Equation Modeling: Concepts, Issues, and Applications*. Thousand Oaks, CA: Sage Publications. <http://doi.org/10.1787/5k46hjm8jpmv-en>.
- Jaccard, J. & Wan, C.K. (1995). Measurement error in the analysis of interaction effects between continuous predictors using multiple regression: multiple indicator and structural equation approaches. *Psychological Bulletin*, 117.
- Jung, W., & Buehler, R. (2013). Sustainable Transportation in Germany and the US: A comparison of the Washington, DC and Stuttgart Regions. *Sustainable Transportation in Germany and the US 49th ISOCARP Congress 2013*.

- Kennedy, C., Miller, E., Shalaby, A., Maclean, H. & Coleman, J. The Four Pillars of Sustainable Urban Transportation. *Transportation Review*, 25(4), 393-414. DOI: 10.1080/0144164050015835.
- Kenneth, A. Bollen & Noble, M.D. (2011). *Structural equation models and the quantification of behavior*. Department of Sociology.
- Khadiyanto, P. (2007). *Partisipasi Masyarakat dalam Pembangunan Unit Sekolah*. Semarang: Badan Penerbit UNDIP.
- Lawrence W. LAN. (2005). *Sustainable Development and Transportation: A Taiwan Perspective*. Institute of Traffic and Transportation National Chiao Tung University.
- Loehlin, J. C. (1997). *Latent Variable Models*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Maha, A. et al. (2014). Improvement and the quality and efficiency of public transportation: Strategies for the Procedia Economics and Finance, 15, 877-885.
- Melo, P. C., Graham, D. J., & Brage-Ardao, R. (2015). The productivity of transportation infrastructure investment: A meta-analysis of empirical evidence. *22nd International Economic Conference – IECS 2015 “Economic Prospects in the Context of Growing Global and Regional Interdependencies*.
- Miro, F. (1997). *Sistem Transportationasi Kota Bandung*. Penerbit Tarsito.
- Naidu, G. (2008). *Infrastructure Development in Malaysia*. International Infrastructure Development in East Asia – Towards Balanced Regional Development and Integration, ERIA Research Project Report.
- Pokharel, R., & Acharya, S. N. (2015). Sustainable Transportation Development in Nepal: Challenges, Opportunities and Strategies. *Journal of the Eastern Asia Society for Transportation Studies*, 11.
- Samuelson, P. A., & Nordhaus, W. D. (2001). *Macroeconomics: 17th Edition*. The Mc. Graw-Hill Higher Education.
- Sangadji, Mamang., E., & Sopiah. (2010). *Metodologi Penelitian Pendekatan Praktis dalam Penelitian*. Yogyakarta: Andi.
- Shim, G. E., Rhee, S. M., Ahn, K .H., & Chung, S. B. (2006). The relationship between the characteristics of transportation energy consumption and urban form. *Ann Reg Sci*, 40, 351-367. DOI 10.1007/s00168-005-0051-5.
- Sjafruddin, A. (2011). *Pembangunan Infrastruktur Transportationasi untuk Menunjang Pembangunan Berkelanjutan Berbasis Ilmu Pengetahuan*. Fakultas Teknik Sipil dan Lingkungan – ITB.
- Snyder, C., & Nicholson, W. (2007). *Theory and Application of Intermediate Microeconomics, 10<sup>th</sup> Edition*. USA: Thomson South – Western
- \_\_\_\_\_. (2012). *Structural Equation Modeling Using AMOS an Introduction*. The Division of Statistics Scientific Computation, The University of Texas at Austin.
- SuescÚn, R. (2007). *The Role of Fiscal Policy in Human Development and Growth*. LAC Regional Study, Latin America and Carribean Region. The World Bank.
- Sugiyono. (2003). *Metode Penelitian Bisnis*. CV. Alfabeta: Bandung.
- Sugiyono. (2010). *Metode Penelitian Kuantitatif Kualitatif & RND*. Bandung: Alfabeta.
- Taliziduhu, N. (1990). *Pengembangan Masyarakat: Mempersiapkan Masyarakat Tinggal Landa*. Rineka Cipta.
- Todaro, M. P. (2003). *Economic Development*. Essex: Pearson Education Limited.
- Ubeka, M. K. (2015). Examples of Sustainable Development in the Area of Transportation. *Procedia Economics and Finance*, 27, 494 – 500. doi: 10.1016/S2212-5671(15)01026-6.
- Van Den Berg, H. (2001). *Economic Growth and Development*. New York: McGraw-Hill/Irwin.
- Vanessa, S., & Mattisson, O. (2016). The Role of Public Transportation in Society—A Case Study of General Policy Documents in Sweden. *Sustainability*, 8. doi:10.3390/su8111120.
- Wijeweera, A. (2009). Wagner’s Law and Social Welfare: The Case of the Kongdom Saudi Arabia. *Applied Econometrics and International Development*, 9(2).
- William, G. C. (1977). *Sampling Techniques*. Jakarta: Universitas Indonesia Press.
- Yudhohusodo, S. (2002). *Perumahan Untuk Seluruh Rakyat*. Jakarta: Yayasan Padamu Negeri.

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# Product Design Enhancing Environmental Perception and Encouraging Behavioural Change: Eco-Information – the Relationship of Design Styles and User’s Emotions

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## Abstract

This research is to develop the products that can communicate environmental information to the user. The study investigated design styles of eco-information and impact on user’s emotions which can be used as data for product design enhancing environmental perception and encouraging behavioural change. The research aimed to 1) study design styles of eco-information and impact on user’s emotions 2) analyse the relationship of design styles and impact on user’s emotions effective in promoting environmental behaviour change. Ten-second video clips of seven design styles were presented through a computer and a projector and perception evaluation forms were employed. The sample included 60 students from the Faculty of Architecture and Design, Rajamangala University of Technology Phra Nakhon, Bangkok, Thailand. The results showed that the most effective design style could encourage emotions in the aspects of interest, excitement and preference. This study found that using living creatures to encourage emotions was the most effective attribute. Additionally, giving detailed information through the use of texts and graphs could encourage effectiveness in promoting behavioural change towards energy and resource consumption.

**Keywords:** Behavioural Change, Eco-information, Environmental Perception, Product design, User’s Emotions

## 1. Introduction

Human development is dependent on energy and natural resources. At present, the problem of energy shortage and the depletion of natural resources is a big problem. The concept of sustainable development has been adopted as a guideline for driving social, economic and environmental sustainability. Sustainable design is one that is important for sustainable energy. A concept of product design for environmental behaviour enables users to reduce environmental impact by designing product lifecycle (Lilley, 2007), which is the time when users interact with products and energy and resource consumption. The concept also aims to encourage product users to change their behaviour or to enhance chances for users to perceive appropriate behaviour towards product use. Daae (2014) summarises the scope of the theory of Design for Sustainable Behaviour. This theory consists of 3 main components including User-Centred Design, Behavioural Psychology and Sustainability. Bhamra, Lilley, and Tang, (2008) creates the concept of Design Intervention, which considers decision power between product users or product to be a controller and confidence level in behavioural change. This concept is divided into 3 main parts including provision for guidelines for change, behavioural change support and confidence in behavioural change. Design Invention is applied for development of product design, consisting of 7 design methods: Eco-information, Eco-Choice, Eco-Feedback, Eco-Spur, Eco-Steer, Eco-Technical Intervention and Clever Design.

Eco-information and eco-feedback are design methods that communicate useful information to users and that do not force users to use products, enabling users to select to do or not to do on their own. As a result, these methods enable users to have more freedom than other design methods. Eco-information and eco-feedback have been widely studied in the fields of product design, interactive design and computer engineering. At the beginning of design, the focus is on studying information and presentation styles on display that create the



strongest visual effect on users. Bao, Shaukat, Elantary and Yang (2016) divide eco-information into 2 types, consisting of quantitative information and emotional information. They also suggest that it is important to create balance on these 2 types of information for diverse users so as to create effective design styles that encourage behavioural change. As mentioned earlier, information contents and effective design styles in terms of content

### *1.1 Research questions*

1.1.1 How do visualization design styles affect user's emotions?

1.1.2 How is the relationship of design styles and user's emotions related to effectiveness of user's behavioural change?

### *1.2 Objectives*

1.2.1 To investigate visualisation design styles in the aspects of eco-information and impact on user's emotions.

1.2.2 To analyse the relationship of design styles and impact on user's emotions effective in promoting user's behaviour change.

### *1.3 Literature review*

#### 1.3.1 Product design and eco-information

According to previous studies, there are 2 types of visualisation design styles for eco-information for behavioural change. 1) Direct information from actual resources. Users can receive information from resources they use directly such as a one litter limited faucet (Do, Kim, & Oh, 2011) and a towel dispenser made for the WWF (World Wildlife Fund). An advantage is that users are highly encouraged because they receive information directly. However, a disadvantage is that it is only one dimensional-given information, which cannot create other types of information or give essential details. 2) Indirect information via information representatives. Users receive information from monitor or interface via communication representative in different design styles. An advantage of indirect information is that it provides several information dimensions and contents can be altered or added, resulting in more useful and detailed information. However, a disadvantage is that users may be less encouraged when design styles are ineffective.

Eco-information is often indirect information given through interface or monitor, using communication representatives. This is because it can create design styles which better respond to users and is more convenient than direct information. Indirect information also provides more details and its advanced technology can create different design styles. This study applied indirect information.

#### 1.3.2 Information dimensions

Information contents communicated to users are important. Previous studies divide information affecting user's behaviour into data granularity, time granularity, comparison and measurement unit (Froehlich, 2011). Petkov et al. (2011) apply the social comparative content to encourage user's energy saving behaviour. Kuznetsov and Paulos (2010) use LED bar graph to display information of average water usage. Kim, Kim and Nam (2009) display impact on nature through electric power extension cords to show changes of trees when high electricity is consumed. Data from usage is mainly focused such as real-time usage, time, real-time cost and environmental impact. However, other information can be presented to users. This study divides information contents into 4 main aspects as follows.

- Fact and situation refers to a widely-used content that presents truth and situation of energy and resource consumption and depletion such as messages or campaign signs that encourage electricity and water supply conservation.
- Usage data refers to a content derived from energy and resource consumption directly including: Volume, Cost, Environmental impacts and Time this content is a main content for eco-information during use-phase of product.
- Guideline and suggestion refers to a content that provides appropriate usage in terms of volume such as symbolic display, eco drive mode in automotive that shows appropriate driving speed for energy saving or suggestions for appropriate energy and resource consumption.
- Data for management refers to executed information. For instance, data is calculated or processed before presentation and is used to support decision for energy and resource consumption such as statistical values, values derived from comparison.

Table 1. Eco-information dimensions and contents

Eco-information dimensions	Content
Fact and situation	-The trend of scarcity of energy and resources available in the world.

Table 2. Eco-information dimensions and contents (continuous)

Eco-information dimensions	Content
Fact and situation	-Energy and resources situation -Volume
Data from usage	-Cost -Time -Temperature
Recommend for use	-Environmental Impacts -The appropriate use volume -The suitable step of use -Usage statistic
Information for management	-Average use -Comparison use with other data

### 1.3.3 Eco-information visualization design styles

Design styles have significant aspects because they can increase interest in contents. Previous studies (Froehlich, 2011) propose a concept of eco-feedback design space about primary visual encoding. It is a two-dimension design, combining texture and graphical aspects and pragmatic and artistic aspects. Bao et al. (2016) divide design styles based on clear information and strong emotion into 4 types, including text or chart, colour emphasis, metaphor using object and metaphor using creatures. Laschke, Hassenzahl, Diefenbach and Tippkämper, (2011) use abstract form to design the Shower Calendar (ambient visualization tool) to show water usage volume. Light bulbs are used to design a display to show residential electricity usage (Paay, Kjeldskov, Skov, Lund, Madsen, & Nielsen, 2014). In addition, design of Amphiro uses a figure of polar bear to design Amphiro\_Smart Water Meter to communicate natural impacts that rise from water usage. Design styles are continually explored to increase effectiveness in communication. This research employs 7 design styles to study user's perception as follows.

- Text and Graph

Refer to a design style that uses alphabets, numbers and graphs to display information. This style is widely used in communication.

- Realistic

Refer to a design style that uses realistic style to communicate without distorting.

- Icon

Refer to a design style that reduces realistic style to less detailed style yet maintains emotions towards products.

- Index

Refer to a design style that uses figures which are connected to identify or remind users of what is being presented. For instance, smoke is used to remind users of fire or moustache is used to identify masculinity or long hair represents femininity.

- Symbolic

Refer to a design style created to express meaning of a thing which individuals share the same understanding such as on-off signs on electrical appliances, mathematic symbols or traffic signs.

- Abstract

Refer to a design style with creativity that is not based on realistic style or figures in environment, focusing on making impact on emotions, feelings, thoughts such as colour selection and positions in design.

- Metaphor using living creatures

Refer to a design style that uses living creatures to invoke metaphor. It has been researched in terms of

eco-feedback and found to have the highest effectiveness in encouraging user’s energy saving behaviour. This research applied Design Style on research of Froehlich (2011) and Bao et al. (2016) as shown in Figure 1

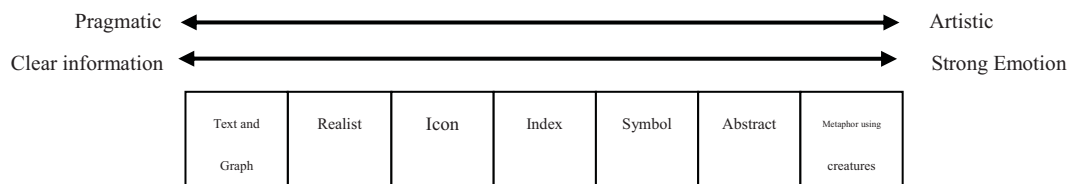


Figure 1. Design style direction on Pragmatic-Artistic form and Clear information-Strong Emotion communication design

1.3.4 Emotional dimensions

Emotions towards information and design styles are important to eco-information. An emotion is caused by the interpretation of physical response and the thought of that response (Schachter & Singer, 1962). In theories of emotions, emotional directions can be divided into 2 types: 1) Pleasantness and 2) Unpleasantness (Harlow and Stagner, 1933).

- Pleasantness consists of positive emotions, encouraging cooperation or effort. This research applied interest, excitement and enjoyment as investigation foundation.
- Unpleasantness consists of negative emotions, encouraging protective, preventive and avoiding behaviour. This research applied anxiety, guilt and depress. This research will lead to emotional directions affecting effectiveness of behavioural change.

2. Research methodology

This research investigated the relationship of design styles and user’s emotions effective in promoting behavioural change in energy and resource consumption. This research employed a case study to provide data of behavioural change in water usage, simulating water usage situation in public spaces. Images of faucets with screen (Figure 2.) were used as research tools.



Figure 2. The stimuli present the context of water use and samples of design styles

2.1 Research tools

Stimuli were 10-second video clips describing 7 design styles. The controlled colour was dark blue and blue which represented water. The content was water usage, considering to be basic information. Numbers were used to display volume of water consumed.

2.2 Methods

Video clips were presented to the sample through a computer screen and a projector in a classroom. Each video clip took 10 seconds. After that, the sample took approximately 5 minutes to evaluate each design style. The entire time was 40-45 minutes.

2.3 Design evaluation

This research explored the following aspects.

- Emotions about the design styles
- Clarity in meaningful communication
- Overall preference
- Effectiveness in promoting behaviour change

In this research, evaluations were divided into 2 aspects as follows.

- Evaluation of emotions about the design styles using semantic differential scale on 1-7 level.
- Evaluation of clarity in meaningful communication, overall preference and effectiveness in promoting behavioural change using Likert Scale on 1-7 level.

1. How do you feel about this design style?

Not interesting	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	interesting
Not excited	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	excited
Not enjoyable	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	enjoyable
Not anxious	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	anxious
Not guilty	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	guilty
Not depressed	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	depressed

2. How clearly does the content in this design?

Not clearly 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Very clearly

3. Overall, how much do you like this theme?

Dislike 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Very like

4. How effective would this design be in helping you conserve on water use?

Not effective 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

 Very effective

Figure 3. The questions example

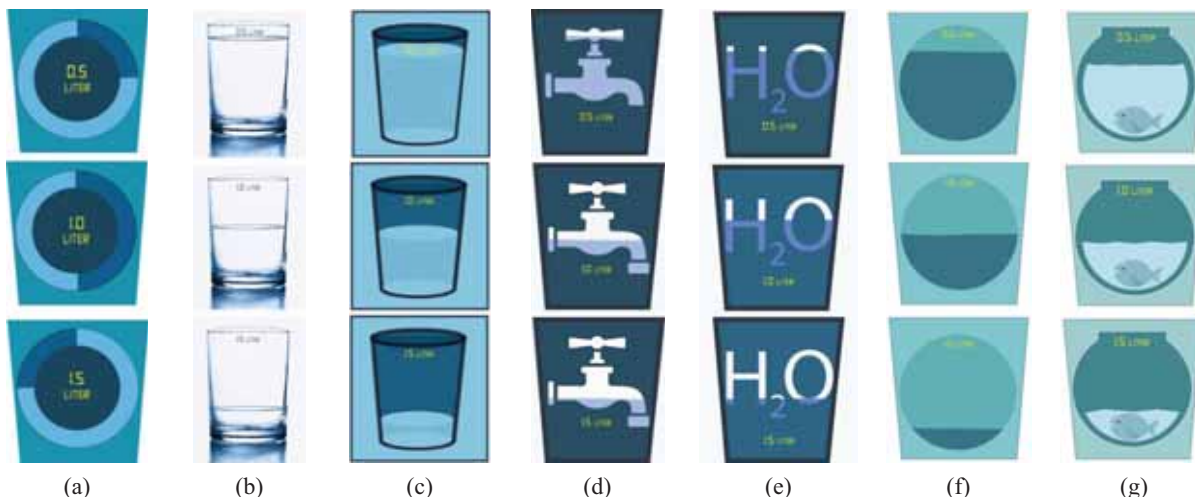


Figure 4. The stimuli 10-second video clips: (a) Text and Graph style (b) Realistic style (c) Iconic Style (d) Indexical Style (e) Symbolic Style (f) Abstract style (g) Metaphor using living creatures style

3. Results

3.1 Background of respondents

The sample included 35 male students (58.3 percent) and 25 female students (41.7 percent). The average age was 19.6 years old (minimum age was 18 and maximum age was 23 years old). Thirty eight students (58.3 percent) were the second year students in Industrial Product Program and twenty two students (36.7 percent) were the second year students from Package Design Program.

3.2 Emotions about the design styles

In overall, emotions about all design styles were at neutral level and tended to slightly positive level. Text and graph style and metaphor using living creatures style were the highest. Details of emotion about each design style are as follows.

3.2.1 Text and Graph style

Interest and excitement were high whereas enjoyment, anxiety, guilt and depress were at slightly positive level. Interest was at the highest level ( $\bar{x}$  5.40 S.D. 1.10) whereas depress was at the lowest level ( $\bar{x}$  4.43 S.D. 1.22).

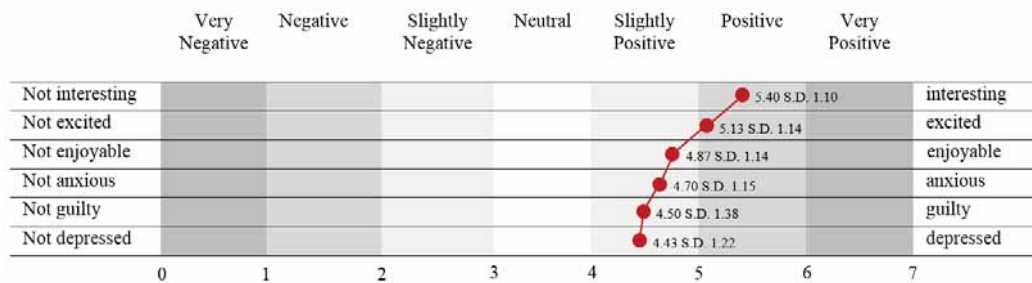


Figure 5. Emotional dimensions on Text and Graph style

3.2.2 Realistic style

In overall, realistic style was at slightly positive level. It was not clearly seen which emotions it affected. Interest was at the highest level ( $\bar{x}$  4.70 S.D. 1.53) whereas anxiety was at the lowest level ( $\bar{x}$  4.13 S.D. 1.43).

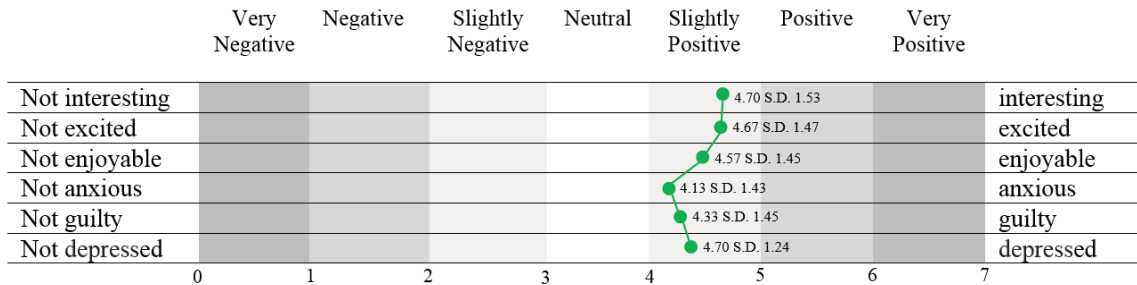


Figure 6. Emotional dimensions on Realistic style

3.2.3 Iconic Style

Iconic style was at slightly positive level and it was not clearly seen which emotions it affected, similar to realistic style. Interest was at the highest level ( $\bar{x}$  4.30 S.D. 1.24) whereas excitement was at the lowest level ( $\bar{x}$  4.17 S.D. 0.95).

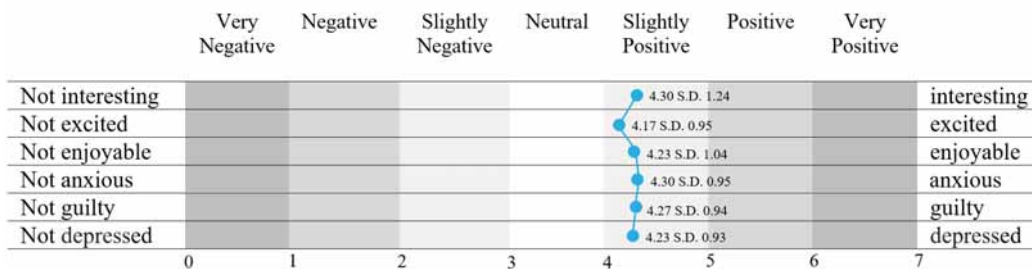


Figure 7. Emotional dimensions on Iconic Style

### 3.2.4 Indexical Style

In overall, indexical style was at slightly positive level and it was not clearly seen which emotions it affected, similar to iconic style and realistic style. Interest was at the highest level ( $\bar{x}$  4.77 S.D. 1.10) whereas anxiety was at the lowest level ( $\bar{x}$  4.07 S.D. 1.14).

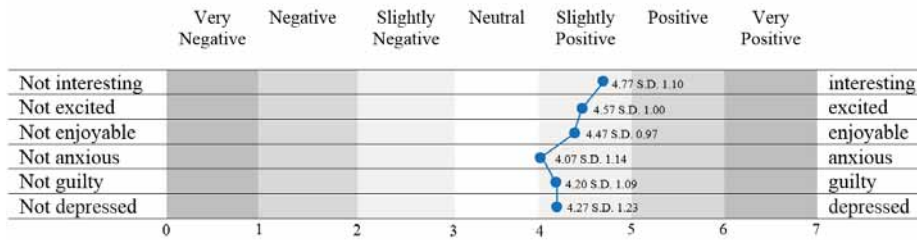


Figure 8. Emotional dimensions on Indexical Style

### 3.2.5 Symbolic Style

In overall, symbolic style was at slightly positive level and it was not clearly seen which emotions it affected, similar to iconic style, realistic style and indexical style. Enjoy was at the highest level ( $\bar{x}$  4.73 S.D. 1.08) whereas anxiety was at the lowest level ( $\bar{x}$  4.17 S.D. 1.02).

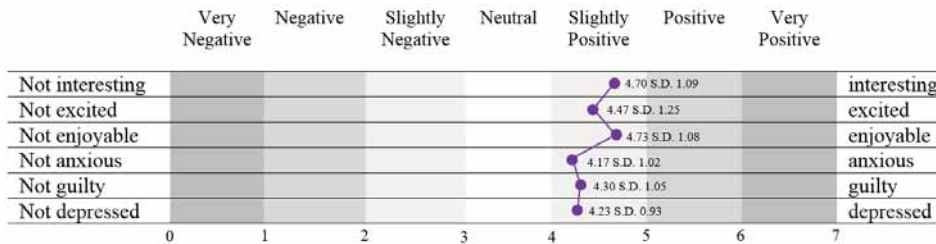


Figure 9. Emotional dimensions on Symbolic Style

### 3.2.6 Abstract style

Abstract style was at slightly positive level and it was not clearly seen which emotions it affected, similar to iconic style, realistic style, indexical style and symbolic style. Interest was at the highest level ( $\bar{x}$  4.53 S.D. 1.00) and guilt was at the lowest level ( $\bar{x}$  4.23 S.D. 1.04).

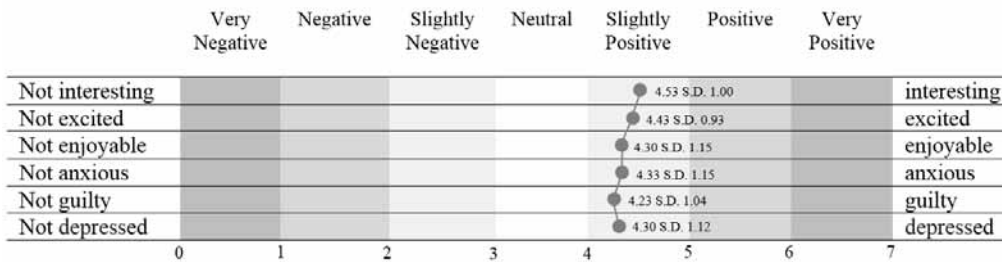


Figure 10. Emotional dimensions on Abstract style

### 3.2.7 Metaphor using living creatures style

Interest, excitement and enjoy were clearly seen at positive level. However, anxiety, guilt and depress were at slightly positive level. Interest was at the highest level ( $\bar{x}$  5.47 S.D. 0.97) whereas anxiety was at the lowest level ( $\bar{x}$  4.77 S.D. 1.04).

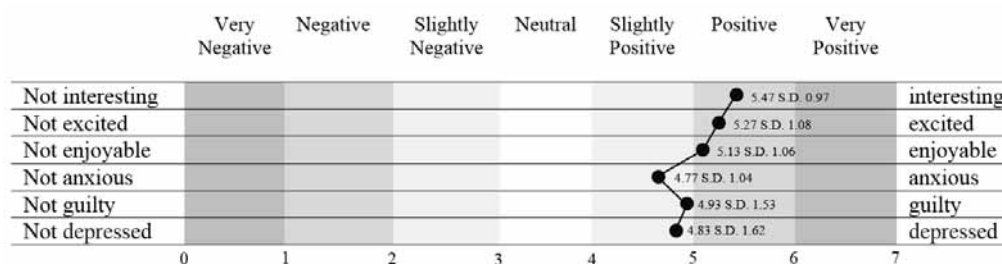


Figure 11. Emotional dimensions on Metaphor using living creatures style

3.3 Summary design style and emotion

The design styles that most aroused interest were metaphor using living creatures style ( $\bar{x}$  5.47 S.D. 0.97) and text and graph ( $\bar{x}$  5.40 S.D. 1.10) respectively whereas the design style that least aroused interest was iconic style ( $\bar{x}$  4.30 S.D. 1.24).

The design styles that most aroused excitement were metaphor using living creatures style ( $\bar{x}$  5.27 S.D. 1.08) and text and graph style ( $\bar{x}$  5.13 S.D. 1.14) respectively whereas the design style that least aroused excitement was iconic style ( $\bar{x}$  4.17 S.D. 0.95).

The design styles that most aroused enjoyment were metaphor using living creatures style ( $\bar{x}$  5.13 S.D. 1.11) and text and graph style ( $\bar{x}$  4.87 S.D. 1.14) respectively whereas the design style that least aroused enjoyment was iconic style ( $\bar{x}$  4.23 S.D. 1.04).

The design styles that most aroused anxiety were metaphor using living creatures style ( $\bar{x}$  4.77 S.D. 1.40) and text and graph style ( $\bar{x}$  4.70 S.D. 1.15) whereas the design style least aroused anxiety was indexical style ( $\bar{x}$  4.07 S.D. 1.14).

The design styles that most aroused guilt were metaphor using living creatures style ( $\bar{x}$  4.93 S.D. 1.53) and text and graph style ( $\bar{x}$  4.50 S.D. 1.39) respectively whereas the design style that least aroused guilt was indexical style ( $\bar{x}$  4.20 S.D. 1.09).

The design styles that most aroused depress were metaphor using living creatures ( $\bar{x}$  4.83 S.D. 1.62) and realistic style ( $\bar{x}$  4.50 S.D. 1.50) respectively whereas the design style that least aroused depress was symbolic style ( $\bar{x}$  4.23 S.D. 0.93).

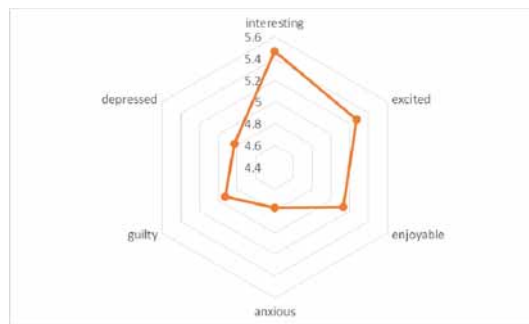
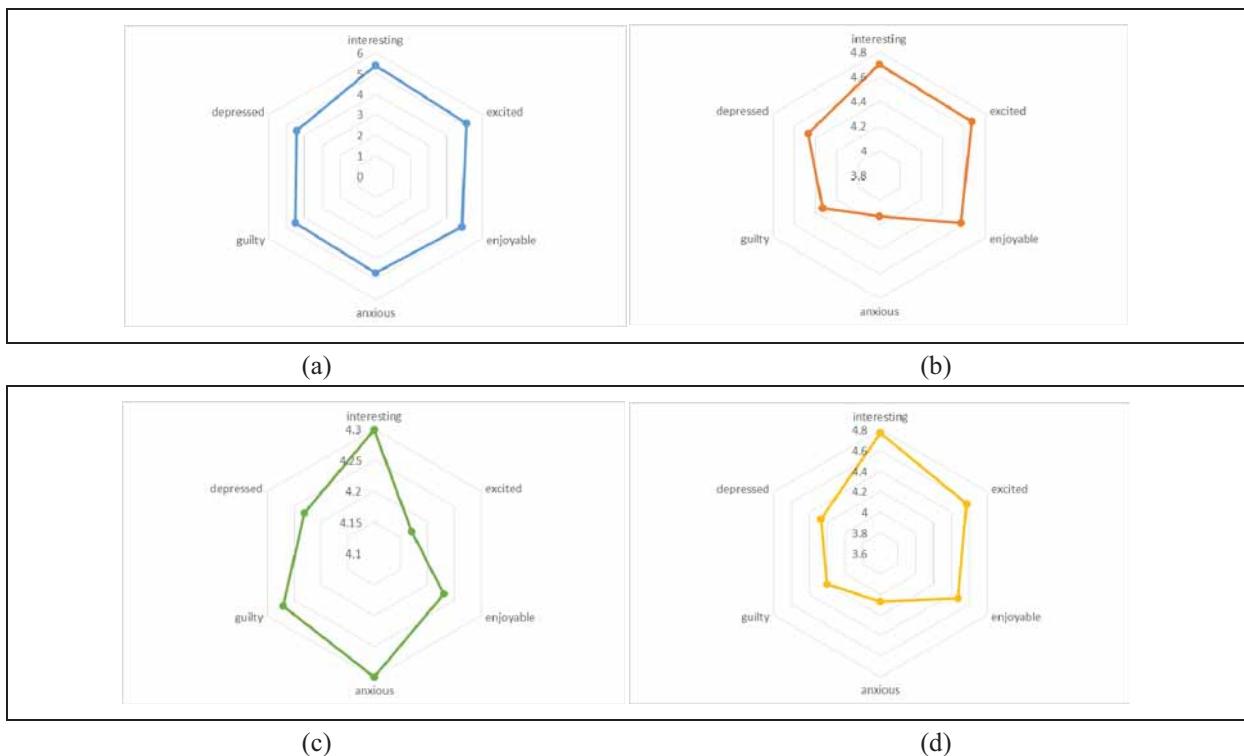
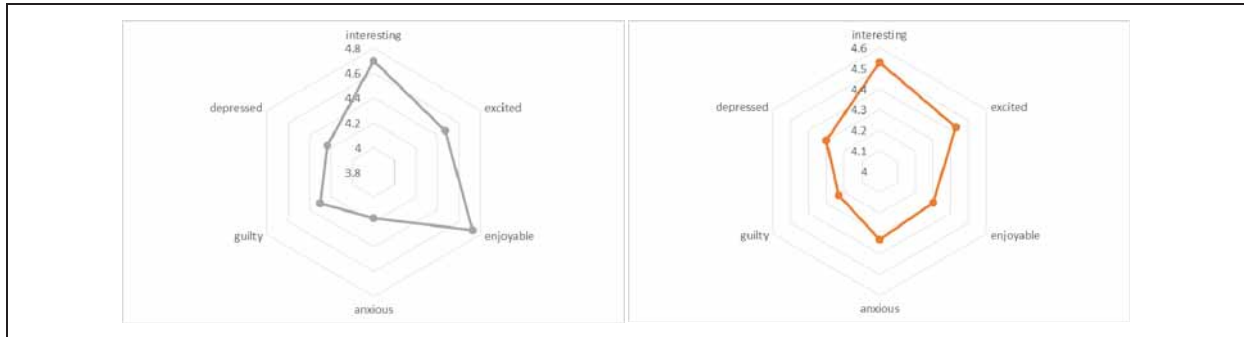


Figure 12. Emotional dimensions on Metaphor using living creatures style





(e) (f)  
 Figure 13. Emotional dimensions on the design styles (continuous)  
 (a)Text and Graph style (b)Realistic style (c)Iconic Style  
 (d)Indexical Style (e)Symbolic Style (f)Abstract style

3.4 Content communication

The design styles highest evaluated for clarity in meaningful communication were text and graph style ( $\bar{x}$  5.40 S.D. 1.20), metaphor using living creatures style ( $\bar{x}$  5.23 S.D. 1.04) and indexical style ( $\bar{x}$  5.10 S.D. 0.96) respectively whereas the design style lowest evaluated for clarity in meaningful communication was realistic style ( $\bar{x}$  4.46 S.D. 1.74).

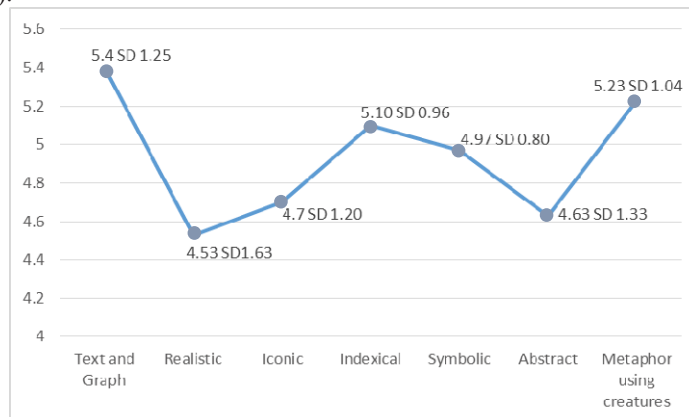


Figure 14. Clarity in meaningful communication on the design styles

3.5 Overall preference

The design styles highest evaluated for clarity in meaningful communication were metaphor using living creatures ( $\bar{x}$  5.40 S.D. 1.20), text and graph style ( $\bar{x}$  5.23 S.D. 1.04) and indexical style ( $\bar{x}$  4.80 S.D. 1.19) respectively whereas the design style lowest evaluated for clarity in meaningful communication was iconic style ( $\bar{x}$  4.20 S.D. 1.03).

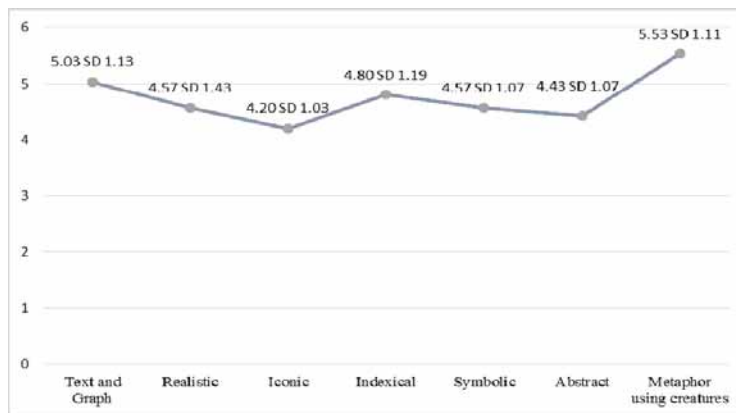


Figure 15. Overall preference level on the design styles



### 3.6 Effectiveness in promoting behavioural change

The design styles highest evaluated for effectiveness in promoting behavioural change were metaphor using living creatures style ( $\bar{x}$  5.17 S.D. 0.95), text and graph style ( $\bar{x}$  4.93 S.D. 1.11) and indexical style ( $\bar{x}$  4.87 S.D. 0.90) whereas the design style lowest evaluated for effectiveness in promoting behavioural change was iconic style ( $\bar{x}$  4.37 S.D. 1.00).

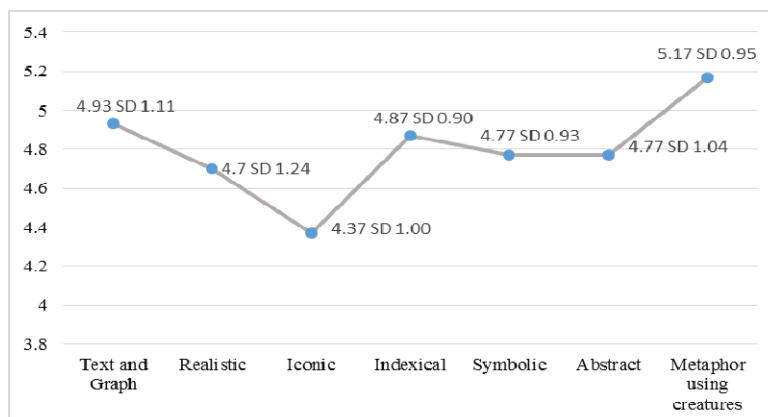


Figure 16. Effectiveness level in promoting behavioural change on the design styles

### 3.7 The relationship of emotion, clarity of meaningful communication, preference and effectiveness of design styles

Since the design style which was highest evaluated and which had highest effectiveness of meaningful communication was metaphor using living creatures style, the variables of this style was investigated. It was found that it had high correlation among several variables as follows.

Pleasantness: Interesting was highly correlated to excitement (r.859) and excitement was highly correlated to enjoyment (r.846). Unpleasantness: Anxiety was highly correlated to guilt (r.913) and depress (r.944). Clarity of meaningful communication was highly correlated to excitement (r.805). Effectiveness was highly correlated to interest (r.803) and excitement (r.835). Preference was highly correlated to effectiveness (r.832).

Table 3. Correlation level of emotion, clarity of meaningful communication, preference and effectiveness factors

	Clarity	Interest	Excitement	Enjoyment	Anxiety	Guilt	Depress	Effectiveness	Preference
Clarity	1.000	0.781**	0.805**	0.661**	0.420*	0.439*	0.437*	0.766**	.667**
Interest		1.000	0.859**	0.693**	0.297	0.332	0.253	0.803**	0.760**
Excitement			1.000	0.846**	0.395	0.472*	0.430*	0.835**	0.700**
Enjoyment				1.000	0.244	0.320	0.268	0.641**	0.591**
Anxiety					1.000	0.913**	0.913**	0.455*	0.219
Guilt						1.000	0.944**	0.449*	0.137
Depress							1.000	0.473*	0.133
Effectiveness								1.000	0.832**
Preference									1.000

\*Sig .05 \*\*Sig .01 (2-tailed)

## 4. Conclusion and discussion

According to data analysis, design styles were at neutral level and tended to slightly positive level. The design styles that created impact on emotions, interest, excitement, enjoyment, anxiety, guilt and depress at the highest level were metaphor using living creatures style, which is consistent with the findings in a study of Bao et.al (2016), and text and graph style respectively. However, several design styles did not demonstrate clarity of directions in the sample's emotions. These design styles included iconic style, realistic style, indexical style, symbolic style and abstract style. Interest was highest evaluated whereas anxiety was lowest evaluated.

Design styles that could encourage user's interest, excitement and overall preference could create impact on effectiveness of promoting behavioural change of energy and natural resource consumption.

#### 4.1 Suggestions

It could be summarised that the most effective design styles could create impact on emotions well. In this research, living creatures were used to arouse emotions. In addition, detailed information given such as text and graph was effective. Consequently, design of information that affects interest, excitement or preference should be taken into account.

This research will collect data from the sample to compare attitude, awareness, behaviour and knowledge about environment that affect effectiveness of data presentation and analyse differences in order to explore and develop product design enhancing environmental perception in the future.

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#### References

- Bao, Q., Shaukat, M. M., Elantary, A., & Yang, M. C. (2016). Eco-Feedback: A Balance Between the Quantitative and the Emotional. *ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*. 7, 1-12. <https://doi:10.1115/DETC2016-59376>
- Bhamra, T., Lilley, D., & Tang, T. (2008). Sustainable Use: Changing Consumer Behavior Through Product Design. In *Proceedings of Changing the Change: Design Vision, Proposal and Tools*, Turin, Italy.
- Daae, J. L. (2014). *Informing Design for Sustainable Behaviour*. Trondheim, Norway: Norwegian University of Science and Technology.
- Do, Y., Kim, D., & Oh, S. (2011). One Liter Limited. Yanko Desing. Retrieved from <http://www.yankodesign.com/2011/02/04/one-liter-limited/>
- Froehlich, J. E. (2011). *Sensing and Feedback of Everyday Activities to Promote Environmental Behaviors* (Doctoral dissertation). University of Washington, USA.
- Harlow, H. F., Stagner, R. (1933). Psychology of feelings and emotions. II. Theory of emotions. *Psychological Review*, 40(2), 184-195.
- Kim, J. W., Kim, Y. K., Nam, T. J. (2009). The Ténéré: Design for Supporting Energy Conservation Behaviors: *Conference on Human Factors in Computing Systems 2010*(pp.2643-2646). Boston, MA, USA.
- Kuznetsov, S. & Paulos, E. (2010). UpStream: Motivating Water Conservation with Low-Cost Water Flow Sensing and Persuasive Displays: *Conference on Human Factors in Computing Systems 2010* (pp. 1851-1860). Atlanta, Georgia, USA.
- Laschke, M., Hassenzahl, M., Diefenbach, S., & Tippkämper, M. (2011). With a Little Help from a Friend: A Shower Calendar to Save Water: *Conference on Human Factors in Computing Systems 2011* (pp.633-646). Vancouver, BC, Canada.
- Lilley, D. (2007). *Designing for Behavioural Change: Reducing the Social Impacts of Product Use Through Design*. Leicestershire, England: Loughborough University.
- Paay, J., Kjeldskov, J., Skov, M. B., Lund, D., Madsen, T., & Nielsen, M. (2014). Design of an Appliance Level Eco-Feedback Display for Domestic Electricity Consumption. *Conference on Human Factors in Computing Systems 2014* (pp. 332-341). Sydney, NSW, Australia.
- Petkov, P., Medland, R., Köbler, F., Krčmar, H. & Foth, M. (2011). Engaging Energy Saving through Motivation-Specific Social Comparison: *Conference on Human Factors in Computing Systems 2011* (pp. 1945-1950). Vancouver, BC, Canada.
- Schachter, S., & Singer, J. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review*, 69(5), 379-399. <http://dx.doi.org/10.1037/h004623>

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# The Feasibility and Methodology for Water and Land Paintings in the Study of the Ming Dynasty Costumes

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## Abstract

Chinese Water and Land painting contains lots of figure costume modeling, providing intuitive and vivid image data for the study of ancient costumes. It is a new medium for the study of Chinese ancient costumes. This paper analyzes the feasibility and methodology for Water and Land paintings in the study of the Ming Dynasty. With the Ming costumes in the Water and Land Paintings, this paper discusses the shape, color, texture and fabric patterns of the ancient dresses. The feasibility of using Water and Land Paintings to study ancient costumes is further analyzed in this paper. This paper emphasizes the importance of ancient dresses in Water and Land Painting for the study of its wearing effect, and the specific methods of research that are put forward.

**Keywords:** Water and Land Paintings; the Ming Dynasty costumes; feasibility; methodology; textual research

## 1. Introduction

The subject of the research of the costumes in China during the Ming Dynasty via Water and Land Paintings, until now, still is not drawing academic attention. There are only a few people who do this research both domestically and overseas. This research can be considered as the unknown side of fashion culture. There are two ways to improve. First, by looking up literature, data, and informational methods that no one has found yet through Water and Land Paintings to research of costumes in China during the Ming Dynasty. Second, by interviewing many acknowledged experts in the field, including Professors of costume history studies. These Professors include Professor Xiangyang Bian, Professor Feng Zhao, Professor Xiaoyun Dai and Professor Jincheng Su who are experts on the Water and Land Paintings. Additionally, I interviewed the University of California, Davis Professors Katharine P. Burnett and Susan B Kaiser.

Water and Land Painting is a kind of ancient traditional religious Chinese painting. Since appearing in the ancient books and paintings of the Tang Dynasty, and after several generations of development, the Ming Dynasty became the golden age, and more representative, normative and secularized (Dai, 2009, p.2). Water and Land Paintings contain lots of social customs. The shape, colour and pattern of the costumes by its detailed description, provides useful material for the study of ancient costume. (Su, 2009, p.103). Most of the existing Water and Land Paintings in 21st century are from the Ming dynasty (Huang, 2006, p.100). It is really meaningful to see these mural paintings of the Ming Dynasty. Craig Clunas raised the question in the book *Pictures and Visuality in Early Modern China: What is Chinese Painting? Water and Land Painting of Divinities of Nature makes sense* (Clunas, 2011, p.18). From the root causes of the identity of the characters in water and land paintings, to wearing clothes, to dressing up and the folklore, social culture, religious beliefs and the inherent characteristics of the civil to representation of the scene (Wang, 2011, p.118). The project focuses on costume research of the Ming Dynasty. According to the identity of the character divided into the Official Costume and Civilian Costume. The research of ancient costume focuses on several aspects, including the shape of the costume, cap crown/headwear, color of costume, design pattern, and finally the fabric texture. In the meanwhile, it also analyzes and summarizes the characteristics of the performance techniques of water and land paintings. This is without a doubt a subject worthy of study that the Professors recognize no one has researched before. Therefore, through this we will be able to make contributions to Chinese costume history.

## 2. The definition of the term

It is necessary to define some of Water and Land Paintings' basic terms, location and image materials in order to

research about Chinese ancient costume.

### 2.1 Water and Land Painting

Water and Land Painting is a kind of ancient traditional religious Chinese painting that mainly includes murals and scroll paintings. As a kind of painting used in the ancient Chinese traditional ceremony, Water and Land Painting dates back to the Three Kingdoms period and developed in the period of the Yuan, Ming and Qing dynasties. Widely distributed in the northern part of China, Water and Land Painting is the precious heritage of Chinese religion and traditional culture. Water and Land Painting contains lots of religious information, costume culture and social customs etc., providing useful material for the study of ancient costume. There are several manifestations of Water and Land Painting: murals, scroll painting, stone painting and etc.

#### 2.1.1 Water and Land Mural Paintings

The preserved Water and Land Mural Painting are mainly distributed in the northern part of China. The Water and Land Mural Paintings of the Yuan, Ming and Qing dynasties are distributed in Hebei and Shanxi Provinces (Huang, 2006, p. 107) (see figure 1 and 2). In Hebei, it is available in Zhaohua Temple of Huaian county of Zhangjiakou, Gucheng Temple and Zhongtai Temple of Wei County, Jueshan Temple of Guyue Town of Pingshan County and Pilu Temple of Shijiazhuang City. In Shanxi, Water and Land Mural Paintings are preserved in Qinglong Temple of Jishan County, Guangsheng Temple of Hongdong County, Zishou Temple of Lingshi County, Yunlin Temple of Yanggao County, Princess Temple of Fanzhi County, Yongan Temple of Hunyuan County, Wenshu Temple of Taihuai Town of Wutaishan City, Yuanzhi and Jingxin Temple of Taigu County, Jixiang Temple of Lingchuan County and the north Buer Temple of Taiyuan City. It also exists in other provinces, such as Xingfo Temple of Gongyi City of Henan province, Shengshou Temple of Dazu District of Chongqing City and etc.



Figure 1. Distribution of existing Water and Land Mural Painting of Yuan, Ming, Qing dynasty in Hebei province



Figure 2. Distribution of existing Water and Land Mural Painting of Yuan, Ming, Qing dynasty in Shanxi province

#### 2.1.2 Water and Land Scroll Paintings



Figure 3. Distribution of Existing Water and Land Scroll Painting in China



Figure 4. Distribution of Water and Land Scroll Painting in Shanxi Province

The preserved Water and Land Scroll Paintings are mainly come from the Ming dynasty and the Qing dynasty (Huang, 2006, p. 99) (see figure 3 and 4). From the north to the south and from the east to the west, the water-and-land scroll painting is distributed in Gansu, Qinghai, Beijing (Capital Museum and Palace Museum

keep lots of Water and Land scroll painting of the Ming dynasty and the Qing dynasty), Shanxi (from the north to the south, it distributes in Counties of Yanggao, Datong, Youyu, Shuozhou, Pianguan, Xinzhou, Taiyuan, Jiao City, Taigu, Qi County, Pingyao, Xi County, Huozhou, Changzhi, Hongdong, Gaoping, Jishan, Houma, Wenxi, Yuncheng), Shanxi, Henan and Fujian.

A great amount of Water and Land scroll paintings are preserved in foreign countries, such as Royal Ontario Museum of Toronto in Canada, Metropolitan Museum of Art in America, Museum of Pennsylvania University, Cincinnati Art Museum, Tokyo National Museum in Japan and Guimet Museum in France.

### *2.2 The research of the costume in Ming Dynasty*

The official and civilian costumes of the Ming Dynasty are taken as study objects. Most of the existing Water and Land Paintings in 21st century are from the Ming and Qing dynasties, and many Water and Land Scroll Paintings are kept in temples of Shanxi and Hebei provinces. In these scroll paintings, the painted figures and clothes are various, abundant, gorgeous, and vivid (Cammann, 1964, pp.38- 47). Most of the painting figures are in gorgeous Ming clothes, some are in Yuan or Tang style dress, which reflects the characteristics of figure painting in Ming Dynasty. The shape, color, embroidery pattern, ornament and wearing effect of the Ming dress are all presented in Water and Land Paintings. The clothes of modern Chinese drama are similar to the clothes that the figures of Water and Land Paintings wear. Therefore, Water and Land Paintings can provide data for the study of Chinese drama history.

### *2.3 Image data*

Image data refers to Water and Land Painting and other art works which provide information of the clothing. This paper uses the archeological materials, document literatures and image data of Water and Land Painting as the basis for studying the ancient costume history. These pictures and images provide affluent visual art and modeling creation for exploring Chinese ancient costume. The image data in this paper discusses the preserved Water and Land Paintings, and especially the Water and Land Paintings of the Ming dynasty, which are in the forms of mural painting and stone painting. Of all the aforementioned, the stone paintings are of the minority (Dai, 2009, p.4).

### *2.4 Realistic degree*

As the true portraiture of the objects, image data has certain consistency with the object. However, with the craftsman's technique, the use of creation, personal characteristics and understanding of painting vary. The Chinese Water and Land paintings are not the only methods that can be used to illustrate the Ming Dynasty costume style. This paper will use other forms of Chinese paintings to delineate this. Painters draw the social customs as a way to describe the details of the style and color of the figure clothes of that time. Besides drawing in accordance with the previous few dynasties methods of Water and Land paintings, most of the saints' clothes are drawn according to the costume system of the time of the Ming Dynasty. Doing this provides vivid and direct data for the study of Chinese ancient costume (Su, 2009, p.104). This paper proposes the concept of realistic degree to describe the true degree of the image data of Water and Land Paintings for the real relics.

## **3. The feasibility for Water and Land Paintings in the study of the Ming Dynasty costumes**

As for the methods for studying ancient costumes, this paper is mainly corroborated by cultural relics, cultural documents and image data. The study material of the costumes can be divided into text material and non-text material according to its' existing form. There are many literature works involving costumes, but the literature works are not completely consistent with the facts. The non-text material includes clothing, weaving, imaging, scroll painting, terracotta army and decorative ware relevant to clothes. Compared with text material, the non-text material is more real and direct. It has strong evidence of costume history (Bian, 2000, pp.23-24). As for the function of image in history study, image can present the history in a more direct and reliable way than literature data. French historian Hippolyte Taine declared confidently in a letter to his mother that he would throw historical documents away. He would write an Italian history taking painting as historical resources. He found that "instead of acting and writing, people tend to express themselves more clearly and earnestly in decoration, stigma and dome" (Cao, 2007, p.36). Craig Clunas raised the question in the book *Pictures and Visuality in Early Modern China: What is Chinese Painting?* Water and Land Painting of Divinities of Nature make sense (Craig, 2006, p.18).

Mr. Congwen Shen made a great contribution to the study of Chinese ancient costume. His Chinese costume culture monograph "Ancient Chinese Clothing Research" extensively makes use of images, literature, and ethnological materials or other handed down cultural relics as circumstantial research methods. It respects historical evidence and searches historical truth in multiple ways. He wrote the book in an objective light. With

the cap description of people from all walks of life during the Ming dynasty in stone paintings “Sancai Tuihui” and “Imperial Benevolence” mentioned in the book, with “Ming Huiyao”, “Seven Revision Draft” and other literatures. This book studies the symbolic meaning. The aesthetic idea and apparel culture’s connotation of the Ming dress. The book “Chinese ancient costume History” written by Zhou Xibao is a historical book of high academic level. Mainly based on historical documents to verify the recorded image data, his paper verified the validity of the contents recorded in literature according to the images collected in his investigations. It shows the importance of mutual verification of image and literature for the study of costume history. Direct access to archaeologically authenticated textiles has not been possible, and, as a result, one of the main sources of information has been summary reports published in Chinese from archaeological excavations and pictures (Zhong & Hann, 1991, pp.18-23). If one judges the image data of his subjective consciousness without the systemic discuss of its feasibility, and the establishment of rule-based coordinates, how much value does this image data have for a lot of the relics and literature of clothing? What is the unique artistic value of Water and Land Painting compared to that of cultural relics and literature?

The ancient costume is a touchable and observable object. As a practical item of the people of that time, it also can be researched in person by the modern scholars. While in contrast, the manifested patterns in the clothes in the image data of Water and Land Paintings match the description of the clothes during the real-life time of those days. We can see from the pictures that the painters are skillful and precise; the outline and rendering are very delicate. The lines are smooth and mild. The costumes’ weaving and its pattern details are presented vividly. With solid basic skills, rich experience and creativity, they record by pen what they saw and what they felt, making people feel as if they were there in the scene. In the investigation of temples of Shanxi, the figure image, clothes detail, weaving pattern and ornaments are drawn in colorful colors, depicting the gold and silver and other traditional techniques. The noble and glorious artistic characteristics embrace the decorative features, with strong folk art characteristics. The modern scholars, after seeing the arts expressing the painters’ feelings, will feel the painters’ feelings, so as to enrich the costume culture theory. This process can be described by pictures (see figure 5). Of course, for the different craftsmen of Water and Land Paintings, their purpose of creation and creative attitude is not the same, so is the artistic expression. Even if they are drawn by the same person, they vary in different subjects. Although there are such differences, the realistic exquisite murals exist in every age. Some authors present the true life of their times, which makes our research feasible (Bao, 2004, p.51).

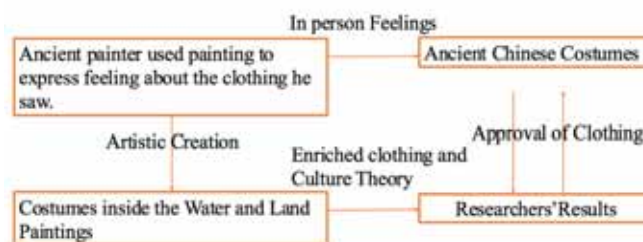


Figure 5. Feasibility and Method Flow Chart

#### 4. Some aspects of using Water and Land Painting to study ancient costumes

There are various studies on the history of ancient costume. Clothing textiles, fashion culture and aesthetics can be included in the scope of the study, but these are not the focus of research. The clothes reflected by murals, scroll painting and sculpture image data is not the focus of this study. This paper studies the aspects of dress form, crown jewelry, color, pattern etc.

##### 4.1. The shape of the costumes

The Portraits painting *Tian Fei Sheng Mu Bi Xia Yuan Jun Xiang* contains 8 persons (Editorial Committee of Beijing cultural relics appreciation, 2005, p.36) (see figure 6). The front right corner of it marks “Creating for Cisheng empress in Wanli Jiyou Year of the Ming dynasty”. It is drawn by professional painter Empress Cisheng which was commanded in Wanli year. There is the royal seal of Empress Cisheng on the painting, and the front right corner of it marks *Tian Fei Sheng Mu Bi Xia Yuan Jun Xiang*. The Empress and Bixia Yuanjun are in the front row, wearing a crown and a big sleeve cape. According to the retained literature and image data, the Mingfu’s cape, especially for the collocation of red sleeve shirt, generally makes use of deep blue embroidery. The pleating of Ru skirt was very popular in the Ming dynasty. The decoration was also very elegant. There are fine pleats and large pleats. The Mingfu is beautiful, elegant, accessible and trustworthy, with jade in both hands. Bixia Yuanjun turns back to communicate with the goddess, which is drawn vividly. The middle two goddesses,

with board in hands, are in gorgeous clothes and vivid expression. The back and left side of them have four female officers standing. They wear a black gauze folded napkin, decorated with flowers, beaded hair comb, hanging beads earrings. They are dressed in round collar gowns, narrow sleeves, and take the most distinctive robes of the Ming Dynasty, which has a patch on chest and back to distinguish between grades. Robes generally use lighter color, such as light pink, light green and light blue. Bow shoes are decorated with small golden flowers. The palace costume is the same as that of the Song dynasty. The characterization is exquisite, vivid and natural. They hold censer, Ruyi, fan and jade seal, following the four women. This Water and Land Painting vividly presents the lightness and elegance of women's clothes of the time. This image data reflects the beauty of the overall dynamic clothing.



Figure 6. Water and Land Painting named as: Tian Fei Sheng Mu Bi Xia Yuan Jun Xiang. Reprinted with permission from (Editorial Committee of Beijing cultural relics appreciation, 2005)



Figure 7. Wang Gu Ceng Dao Ru Liu San Dai Shi Zhu Shi Nong Gong Shang. Reprinted with permission from (Editorial Committee of Beijing cultural relics appreciation, 2005)

#### 4.2. Cap Crown

*Wang Gu Ceng Dao Ru Liu San Dai Shi Zhu Shi Nong Gong Shang Image* (Editorial Committee of Beijing cultural relics appreciation, 2005, p.37) (see figure 7), at the left top of the picture was signed by “Empress Cao in Da Ming Wanli Ji You period”, it was also painted by Wanli Emperor’s mother. This painting covered a wide range of topics with rich content. It authentically revealed the current features of the general public lives. The picture has a fixed way of structuring all of the characters’ positions. With flexible combinations base on the character’s social status, there are 16 people in the picture and they are divided into four groups. At the top of level there depicts the workers, farmers, and businessmen. The first right person wears Mongolian hats and Yunjin, the hats and the scarf reflect distinctive local and ethnic features. Although the Yuan Dynasty was destroyed, Mongolian clothes were dispersed out in different forms. In Ming dynasty, civilians often in cyan, purple, blue and white. Portuguese called Gaspar da Cruz shaped the image in the Book of China with costume from Ming Dynasty; ordinary citizen usually wear black cotton robes, while poor people with white, simply because it is cheaper (Brook, 1998, pp.3-4). The top part of the picture has a young man with a cyan cross-over collar and narrow sleeves short gown. He is also wearing over-the-knee white pants while carrying rakes, hoes and spades which are simple farming tools. The image of the working people in the Ming dynasty are like painting *MoPu*. It is convenient for farmer in the short gown to work. On the left, the craft person wears the Pingjin Ze, cyan cross-over collar and narrow sleeves gown, with the hands in prayer position. The second group depicts the image of two women, with the graceful, beautiful and Gorgeous dress. One of the women has her hair pulled back into a peony updo. Women in Ming Dynasty liked to wear wigs with Huachai and Dianhua, and the ladies wore band collar narrow sleeves with a geometry flower pattern. The Beizi is a common clothing in the women’s civil society of Ming Dynasty. There are narrow sleeves and wide sleeves. The wide sleeves of Beizi is usually worn on important occasions, while in private life narrow sleeves are worn instead (Yuan, 2007, pp.181-212). The edge of Beizi is decorated with different patterns and colors, with a red coat embroidered with a blue-and-white flower. From the Wanli years we can see the how the dress design became more and more decorative, which is different from Tang and Song Dynasties. For fixing the edge of clothes and decoration, a button is used to connect the two sides fashionably. This way has been used instead of lines with knots to

connect garment sections for thousands of years.

From the picture we found that in order to conveniently work, farmers and craft persons tighten their belts, which is made of cotton. In the early part of the Ming Dynasty, the officials belt had two function: real belt and decoration belt. As this was the case in the early period, in the late period, the officials belt did not have the function of the traditional belt. It was a decoration that shows the wearer's status. The belts of Chinese modern drama are very similar to those in the water and land paintings (Ding, 2014, pp.1035-1039). When it mentioned officials in uniforms in the notes of historical data *Yueshibian*, which recorded the economic life in the late time of Ming Dynasty, the officials often held the leather gasket strap with hands to show a mighty and straight spirit state. In the book, it reads "the gasket strap is made of leather, wrapped in green silk, ornamented by jade, rhinoceros horn, cyanine, and untold amount of the gold and silver..., the belt is wide and round so it does not girdle the waist. The round collar and two flanks are with a towel on which a fine button suspends on either side, which can reflect majesty." In Ming Dynasty, the standard leather belt had a block of three square tablets in the front, with a symmetrical combination, attached to four small rectangular accessories and three peach-shaped rounds between the two accessories on the opposite sides, also with 2 fish tail and seven rows behind the leather belt (Ch'iu, 2014, pp.555-631). The patterns, jade ornaments and wat board materials of the waist leather belt are not the same because of the grade distinctions of officials. The specific shape is recorded in *Ming History Requirements for Wearing*. First-rank officials wore seven liangs. Their waist leather belt was decorated with jade, the ribbon was a four color Phoenix flower brocade which was compiled with yellow, green, red and purple brocade. The jade was tied to the ribbon, and the wat board was made of ivory. Second-rank officials wore six liangs and a leather belt around the waist with rhino jewelry which was tied to the ribbon, and the rest was the same as first-rank officials. Third-rank officials wore five liangs with a leather belt around the waist with was decorated with gold, and with jade which was used as an accessory. The ribbon was a four color cloud crane flower brocade, which was combined with yellow, green, red and purple brocade with gold tied to the ribbon. The wat board was made of ivory. Fourth-rank officials wore four liangs with their leather belt decorated with jade, and glaze was used as an accessory. The rest was the same as the third-rank officials. Fifth-rank officials wore three liangs with their leather decorated with silver, and glaze was used as an accessory. The ribbon was a carved brocade which was compiled with yellow, green, red and purple brocade. Silver-plating was tied to the ribbon, and the wat board was made of ivory. Sixth and seventh rank officials wore two liangs with a waist leather belt decorated with silver, and with glaze used as an accessory. The ribbon was a long-tailed flycatcher with a three color flower brocade which was compiled with yellow, green and red brocade. Silver was tied to the ribbon, and the wat board was made of wood of Chinese scholartree. Eighth and ninth rank officials wore one liang, and the waist leather belt was decorated with horn-like material. Glaze was used as an accessory. The ribbon was a Xi Chi two color flower brocade which was compiled with yellow and green brocade. Copper was tied to the ribbon, and the wat board was made of wood of Chinese scholartree (Zhang, 1974, pp.1634-1635).



Figure 8. Taiqing Moral God Image. Reprinted with permission from (Hu, Binbin & Wu, Can, 2013)



Figure 9. The God Images of Taoism. Reprinted with permission from (Hu, Binbin & Wu, Can, 2013)

Underneath the picture are officials and scholars. The left one is wearing an unfolded foot headwrap and Tuan gown with a round collar. The official robes place the gayer patch in the chest and back area to distinguish rank



order which is the characteristic in Ming dynasty. He also wears the belts and carries the wat board. There is a man in the middle of the picture who is wearing a right lapel cross collar gown, and a few belts. His two hands inserted in the sleeve of the opposite and has a peaceful look on his face. The man wears a headwrap, right lapel cross collar gown, and ties the big belt around his waist. The right hand holds the fan and looks straight ahead. The one on the right wears Ping style headwrap. The style of dress is slanting collar, and the sleeves are wide. The collar band is sewed broadside. He is happy and pleased with himself. There is a child below. The child shows the style of children's dress in the Ming Dynasty. The boy shaves off some of his hair, and leaves the rest of his hair to be fixed into a bun or braid. He wears a cross collar with trousers below, and ties the big belt round waist and wears boots. Having similarities to the image of children in the Lantern Festival picture in Ming Kenso years, these paintings share common elements such as children and toys (He, 2013, p.151). On the bottom is a monk. A mystical image. He wears wide sleeves, big gown, colorful auspicious cloud pattern shirt with a neckline. Cuffs and hem of the gown are designed with geometric patterns. All of these, can be used as one of the bases for the study of ancient costume.

#### 4.3. Color

Water and Land Paintings are colorful, brilliant, and strongly contrasted. They match ochre red with green. Strong colors create a strong decorative effect. The art of painting is inherited from Dunhuang frescoes. It can also be said to be the continuation of Dunhuang frescoes. Meticulous heavy color painting effect and rigorous style. It is neat and delicate, because the paint is selected from minerals. After a hundred years, the color is still bright and gorgeous, just like a new work. It is painted by thread filling technique. First the structure of the shape is outlined with dark color, and then colored is applied to the drawing. In the contrast of non-color and color in painting, like in *Taiqing Moral God Image* (Hu & Wu, 2013, p.114) (see figure 8), between black, green, red yellow, etc., visual contrast is bold. When the black area is large, a heavy sense of seriousness arises. When the colored area is relatively large the picture becomes bright and colorful. In *The God Images of Taoism* (Hu & Wu, 2013, p.128) (see figure 9), the whole painting is rich in color, brilliant and high in saturation. Although the visual contrast is strong, the whole effect of the picture is very harmonious, it is impressive. There are 12 people in the drawing. Seven people wear round collar gown. Four people wear cross collar gowns, and among them, 2 people are talking respectfully and politely. The picture is dominated by red and bluish-green, and these two colors match with green, pink, yellow and black. These secondary colors appear in the hat, collar, cuffs, etc. for modification. The dress itself is based on a large area of red. The edge of the blouse and sleeves are garnished with contrasting colors. The character's dress itself has a large area of red color. The edge of the blouse and sleeves are garnished with contrasting colors. All the colors aforementioned make the image stand out. Cyan gown cuffs are dotted with red which reflects the aesthetic features of folk painters. It is full of the rich flavor of life. The old man ahead wears a leather bian and cross collar big gown. The elder was very particular in his clothes. The edge of the cyan gown's collars, cuffs, and hem are black. Two large sleeves with red stickers inside match with a piece of green clothing to cover knees and yellow skirt. Appearing in a large shade of light cyan, it matches with black, red, yellow. These long tone colors form a contrast which can give people a bright and sonorous feeling with strong contrast. From the Water and Land Painting, we can get the color information intuitively, but these colors do not necessarily reflect the true colors of the clothes of the time. The creator is often subjective in using color and often uses color according to the needs of the picture. Even if color in the picture is the same as the color of the clothing of the wearer, as time changes, so does the color.

#### 4.4. Fabric pattern: Colorful auspicious cloud pattern, lotus pattern, cloud pattern

Many patterns of clothing appeared in the Water and Land Painting of Ming dynasty. The decorations are very complicated, themes are diverse, and the colors are gorgeous and strong but not very extravagant in effect. Compared with other image materials, costume patterns are influenced by secular culture. From the color, content and arrangement of the pattern, we can deduce that it has a certain realism and authenticity (Chueh, 2004, pp.1576-1582). In *Tiancao Six Gods Images* (Editorial Committee of Beijing cultural relics appreciation, 2005, p.38) (see figure 10), this painting technique is called Gongbizhongcai. In the painting the line drawing is rich, outline is fine, gown's pattern and decorations are very delicate and precise. The figures are graceful, composition is harmonious and complete, and the headgear and ornaments are outlined in gold and silver color. Using sparse lines in addition to outline the pleats, the patterns are intricate and exquisite. They reflect the material, fabric and texture of the dress. The ribbon of the clothing and the auspicious clouds in the background are outlined by lines like willow leaves. Lines change and are dynamic. Harmony appears in a picture with the figure's dress and charm.



Figure 10. Tiancao Six Gods Images. Reprinted with permission from (Editorial Committee of Beijing cultural relics appreciation, 2005)



Figure 11. Six Gods Images. Reprinted with permission from (Editorial Committee of Beijing cultural relics appreciation, 2005)

In *Six Gods Images* (Editorial Committee of Beijing cultural relics appreciation, 2005, p.40) (see figure 11), the lines are very smooth in the painting of the characters in the picture. The spaces are well placed, contrast is strong, proportions of the shape are very harmonious. The image is complete. The painter carefully designs the costumes and color collocation. Very particular about it, the costumes are gorgeous in color and there are specific patterns on the clothes. Decorative patterns are painted on the edge of the garment. There are four gods in the picture. The lower left god's clothing patterns show '卐', geometric flower patterns, lotus patterns on the cloak, and peony flower pattern on the cuffs. The design of this character is magnificent and extravagant. It is similar to the woman in the figure painting of "Lady Carrying a Pipa" by Wu Wei (Cahill, 1978, p.105). The first to the right is a goddess in a blue, water flowing pattern robe. It uses geometric patterns as the ornament for the edge of the garment. The image is dignified and elegant, fresh and refined. The robe of the man who is in the upper part of the picture, has two pieces, the cuffs and hem. Both the cuffs and hem have fish-scale patterns. This is in contrast with the physical patterns and statues of the same period, and is also in contrast with the figure painting of contemporaries. The classic patterns of armor worn by ancient Chinese warriors can be observed. These patterns include fish-scale patterns, tortoiseshell patterns, lock patterns and cloud patterns. These all appear in the Water and Land Painting (Wang, 2014, pp.177-180). The lotus patterns, auspicious cloud patterns, geometric patterns and other patterns will repeat, but sometimes, in order to avoid mental fatigue the painter will combine the work with their own creative imagination to paint. These basic elements will be re-arranged, such as flowing cloud patterns and auspicious cloud peony patterns, etc. It has become increasingly recognized by both anthropologists and archaeologists, that patterns of all kinds can be objectively classified according to their culture characteristics (Hann, 1992, pp.579-590). In a class society, the hierarchy is distinct. Different patterns are suitable for different levels of status. Colors, patterns and sizes determine the applicable range of this kind of pattern. These can be used as the basis for the study of the costume.

#### 4.5. Fabric texture

Clothing fabric has its own unique way of expression; however, the richness and shape of Chinese painting lines need to be conveyed by the brush. The beauty of the lines in the Water and Land Painting is also expressed by the change of the content of the dress. This is also a unique feature of painting. The first stroke of a character, then the pause and transition, the speed, and the virtuality and essence cause linear length, thickness, density and so on. All of these achieve the unique aesthetic taste and artistic beauty of the line. Pay attention to the combination of the technique of the brush and the content of clothing to be expressed. Plus, with the creative imagination and stylistic features of the creator, there are rich and varied lines used to express some features of ancient clothing materials. Clothing fabrics include Zhu cloth, cotton, silk and woolen goods, etc. These ancient fabric materials and textures, which are simple natural characteristics have a profound influence to and close relation with Chinese traditional painting style of costume. Focus on the details of the expression of the visual reality and the painter's style. It's not just rough grafting. It takes the specific image of the clothes as a model to paint the painting. There is a basis for communication between things. Such as in stain clothing. The texture is

soft, and the color is bright while natural. It is consistent with the artistic expression of the figures and costumes in the Water and Land Paintings.

In Water and Land Painting, the lines in the dress of the figures are flexible and rigid, while smooth and natural. The ribbons of the dress are well spaced. They accurately and vividly reflect the texture of different materials and fabrics. In *Brahman Gods Scholars, Peasants, Workers and Businessmen* (see figure 12), the picture shows religious figures and secular figures in one picture. Well proportioned, rich in content, and prominent in character, while harmonious and full of vitality. The upper half depicts the Buddhist figure Brahman, while the lower half of the drawing depicts scholars, peasants, workers and businessman. "Emphasizing agriculture but restraining commerce" in Ming dynasty the peasants are of a higher class than the merchants. They can wear silk, yarn cloth, linen, and cotton cloth. Businessmen can only wear cloth. As shown in the figure, the man in the upper part, the farmer, wears a round cap brim hat, purple cross collar narrow sleeves silk pattern blouse, green ribbon around waist, and carries a rake. The one on the left wears a flat hat and a cyan cross collar narrow sleeves blouse. The businessman carries a bag and looks behind himself. The far right person in the front row wears a square top, hard design headwrap, round collar wide sleeves silk gown with patterns longer than knees, and is holding a wat board. He is an image of humility and softness. Through the image analysis of the Water and Land Paintings, painting techniques, and characteristics, it is helpful to judge the texture of the fabrics of the clothes.



Figure13. Brahman Gods Scholars, Peasants, Workers and Businessmen. Reprinted with permission from (Shandan Museum, China)

## 5. Discussion on the method of Study of ancient costume performance with Water and Land Painting

### 5.1. Observation, qualitative judgment

Making regular judgement by observing the frescoes, scroll paintings, and image data of the Scare Pictures. First of all, in image data, the creative background, the author's identity, performance techniques, style of work, and others are included in the scope of judgment. Secondly, qualitative observation emphasizes the interpretation of patterns and meanings behind behavior and events in the study. There are four main ways of recording: description System, narrative system, map records, and process record. The main method of judgment is fieldwork, notes, a large number of original texts, pictures and recordings that are recorded in the survey and are integrated and analyzed (Chen, 2000, p.1). Thirdly, in the actual investigation, we need to strengthen the ability consciously or unconsciously. After the purpose of the investigation is made clear, through careful observation and expression of real feelings, and in addition with the aid of literature, images and interviews, we can judge the perceptual visual data qualitatively. Make the study of painting have more depth and breadth. Of course, in the investigation process, we should pay attention to the following points:

- 1) In the process of inspection, the environment of the site should be restored to the utmost similar version to what was observed in person. This means that before building a mock version we must prepare sufficient research conditions.
- 2) Use nouns and verbs to describe objective facts, and avoid adjectives with descriptive emotion and modifying nouns.
- 3) Do not omit any details. Sometimes this important evidence is the breakthrough point of the paper.

### 5.2 Research methods of image science

In the analysis of these image materials, we should pay attention to the stylization in the paintings. Stylization in Chinese folk art is an indispensable essential attribute. In other words, without stylization, there would be no folk art in Water and Land Paintings. It covers all kinds of art, drama, painting, literature, etc. In ancient times, the learning of stylization was the foundation of being a painter. It includes painting techniques, composition, material, etc. It is accumulated in the work of the painter painting experience, rules and tips, in order to draw some images, there are fixed procedures. When studying the graphic data of Water and Land Paintings, we should perform a comprehensive analysis of the sum of various images of social life in the Ming Dynasty. These images should be viewed from the time of the social life and the identity of the people of the dynasty. We should incorporate the visual culture into the costumes, social culture and life to make a deeper study.

### 5.3. Compare, analyze and perform on-the-spot investigation

Comparing and observing the documents and objects cannot be limited to one single material. We need to verify the comprehensive use of various materials in many ways and angles. This paper studies the history of Chinese costumes with Water and Land Painting as its carrier. We can make horizontal comparisons of the Water and Land Painting period's frescoes, scroll paintings and image data, and at the same time, we can refer to literature records and physical objects. In this way, we will have abundant research examples to analyze all these image data and make qualitative judgments, so it is valuable to the study of Chinese dress history.

In the Literature section, we can read the ancient and modern historical Chinese documents starting from the twenty-four history books, to a variety of historical biography, notes, novels. All kinds of painting, clay figurines, stone carvings, folk art, and unearthed cultural relics. A notebook and copy book should be brought along to record the relevant records of clothing and picture in the visible materials. In this way, every little bit of vast and rich first-hand information can be recorded.

Comparisons can be carried out from the form of clothing, color, pattern, wearing effect and fabric texture, etc. The shape and fabric texture of clothing are difficult to study. Clothing fabric can have a lot of performance techniques, such as the visual effects of silk and satin which are extremely similar in being smooth and delicate (Sun&Yuan,2014, p.59). Under the circumstances, visual image is similar to physical description and document description. We cannot completely bring out the actual expression of the fabric. Being only partially true, some have been transformed and be used at that time. Some have been completely integrated into the real world and are not recognizable. Therefore, the results reflected in the image cannot be completely true. Understanding the qualitative judgements of past relics helps to understand the past. It is believed that through this method, the historical knowledge of the true and possible objective clothing conclusions can be obtained.

## 6. Conclusions

Take Water and Land Paintings as a medium study costume in Ming Dynasty. Few studies have been conducted on this subject at home and abroad. Therefore, it is a challenge for me. The method of conducting ancient costume studies by using Water and Land Paintings is determined by the purpose of the study. Methods of verification should be done using several sources and multiple angles include images, literature, and relics. With the development of society, and the progress of science and technology, there will be newer and more scientific methods in the future practice.

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## References

- Bao, Mingxi. (2004). The Feasibility and Methodology in the research of the China's ancient silk in Dunhuang Frescoes and sculpture. *Journal of Dunhuang Research*. vol.1, 51.
- Bian, Xiangyang. (2000). Research methods of Chinese clothing history. *Journal of China textile university*, vol.4, 23-24.
- Brook, T. J. (1998). *The Confusions of Pleasure: Commerce and Culture in Ming China*, 3-4. California, Oakland: University of California Press.
- Cahill, J. F. (1978). Parting at the Shore: Chinese Painting of the Early and Middle Ming Dynasty, 1368-1580. *Weatherhill*, 2, 105.

- Cammann, Schuyler. (1964). A Ming Dynasty Pantheon Painting. *Archives of the Chinese Art Society of America*, vol. 18, 38-47.
- Cao, Yiqiang. (2007). *The Vision of Art History*, 36. Hangzhou: China Academy of Art Press.
- Chen, Yao (2000). *Study of Classroom Observation Methods*, 1. East China Normal University.
- Ch'iu, CL. (2014). Warmth, Ostentation, and Power: A Culture History of Valuable Furs in the Ming Dynasty. *Bulletin of the Institute of History and Philology Academia Sinica*, 80, 555-631.
- Chueh, BF. (2004). The Integration of Costume and Fabric Design Technology in Chinese Ming Dynasty (AD 1368-1644). *Quality Textiles for Quality Life*, vols.1-4, 1576-1582.
- Craig, Clunas. (2006). *Pictures and Visuality in Early Modern China*, 18. London: Reaktion Books.
- Dai, Xiaoyun. (2009). *Research of Buddhist Water and Land paintings*, 2, 4. Beijing: China Social Sciences Press.
- Ding, Y. (2014). On the Decoration and Symbolization of Chinese Ancient Official Uniform in Ming and Qing Dynasties. *Proceedings of the 2014 International Conference on Mechatronics, Electronic, Industrial and Control Engineering*, 5, 1035-1039.
- Editorial Committee of Beijing cultural relics appreciation. (2005). *Water and Land paintings in Ming and Qing Dynasty*, 36, 37,38,40, 41. Beijing: Beijing Art Photography Press.
- H. Zhong & M. A. Hann. (1991). Textile Production in China between the Han Dynasty and the Tang Dynasty. *The journal of textile institute*, vol.82, 18-23. DOI: 10.1080/00405009108658733
- He, Yuming (2013). Home and the world: editing the 'Glorious Ming' in woodblock-printed books of the sixteenth and seventeenth centuries, 151. Massachusetts, Boston: Harvard University Asian Center Press.
- Hu, Binbin and Wu, Can. (2013). *Dan Qing Jiao Hua*, 114, 128. Hunan: Hunan University Press.
- Huang, He. (2006). Water and Land paintings of Yuan Ming Qing II. *Journal of Buddhist Culture*, vol.3, 99.
- Huang, He. (2006). Water and Land paintings of Yuan Ming Qing. *Journal of Buddhist Culture*, vol.2, 100, 107.
- M. A. Hann. (1992). Symmetry in Regular Repeating Patterns: Case Studies from Various Cultural Settings. *The journal of textile institute*, vol.83, 579-590. DOI: 10.1080/00405009208631233
- Su, Jincheng. (2009). *Research of Water and Land painting images*, 103-104. Southeast University.
- Sun, Peiyan and Yuan, Xuanping. (2014). Research of Pattern Textiles in Water and Land paintings, 59. *Journal of Silk*.
- Wang, C. (2014). Conservation study of Ming dynasty silk costumes excavated in Jiangsu region, China. *Studies in Conservation*, vol.59, 177-180. DOI: 10.1179/204705814X13975704319154
- Wang, Jianguo. (2011). Research of Water and Land painting Cultural Anthropology,118. *Journal of Art and Architecture*.
- Yuan, Zujie. (2007). Dressing for power: Rite, costume, and state authority in Ming Dynasty China. *Frontiers of History in China*, 2(2), 181 – 212. DOI: 10.1007/s11462-007-0012-x
- Zhang, Tingyu. (1974). *History of Ming*, 1634-1635. Beijing: Zhonghua Press.

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# International Administration of Territories and the Dilemma of Accountability

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## Abstract

Two decades post the Cold-War; the World has witnessed a systematic revival of a practice long thought to be extinct-territory administration via an international body to act as a government for running the state/territory. The most prominent examples were the United Mission in Kosovo (UNMIK) and the United Nations Transitional Administration in East Timor (UNTAET).

Various criticisms were directed to the International Administrations of Territories; the most prominent was mandating this Administration Authority complete power in running the Legislative, Executive and Judiciary authorities where its decisions are not being subject to monitoring or accountability. Yet, such decisions were mostly in violation of the International law which undermined the core principles of democratic governments, the rule of law and human rights as being the corner stones of International peace and security.

This study aims at analyzing the legitimacy of forming international administrations as well as scrutinizing the legal restrictions and commitments thereof. The ramifications of any violations of such restrictions and commitments (The International Human Right Law and The International Humanitarian Law) should be holding these administrations and its members accountable internationally.

**Keywords:** International Law, International Administration, Territories, Responsibility, Accountability

## 1. Introduction

During the past two decades, an international phenomenon stated to spread called “the International Administration of Territories”. The United Nations was the body to run these territories as a local government where Administration members control the three authorities per se: Legislative, Executive, and Judiciary. The Administration, however, is not subject to any clear legal accountability leading to the violation of enshrined principles in the International Law- the Rule of Law, the Right to Self-determination, Human Rights...etc. - which are considered the core factors in protecting International Peace and Security.

This paper tries to highlight the deficiency in the attempt to hold the UN Administration accountable.

## 2. The Legality of the International Territorial Administrations

The UN Charter includes several provisions that are considered the legal basis of establishing Territorial International Administration as follows:

### 2.1 General Assembly

Under Article 11 of the Charter, the General Assembly can establish an international administration upon the approval of the concerned State. The General Assembly has the right to discuss any question relating to the maintenance of international peace and security brought to it by any member of the United Nations or the Security Council, as well as to make its recommendations on these matters to the members or the Security Council or to both. However, the General Assembly is not qualified to decide on military actions as per Article (11) paragraph (2) of the Charter, which states: "Any such question on which action is necessary shall be referred to the Security Council by the General Assembly either before or after discussion" (Ghanim, 1954), (Al Majdoub, 2006). The term "action" refers to actions related to the threat and breach of peace or act of aggression as detailed in Chapter VII (Brabandere, 2009).

### 2.2 Security Council

Article 6 of the Charter authorizes the Council to recommend procedures and methods for the peaceful settlement of international disputes with the consent of the State concerned (Al Majdoub, 2006). It should be noted that the Security

Council is prohibited from taking action that interferes with the internal jurisdiction of the State, except with the explicit consent of the State or when the Security Council acts under Chapter VII in accordance with Article 2, paragraph 7, of the Charter.

On the other hand, Chapter VII of the Charter authorizes the Security Council to enforce arrangements to settle international disputes without the consent of the State concerned and by coercive means, both military and non-military, whenever the situation constitutes any threat to the peace, breach of the peace, or act of aggression. Here, the Council can establish international administration based on three legal rules (Willner-Reid, 2005):

- Article 39 grants broad powers to the Security Council to take appropriate measures for the maintenance of international peace and security. The International Criminal Tribunal for the Former Yugoslavia (ICTY) notes that the Security Council enjoys a very wide margin of discretion in choosing the appropriate course of action for the exercise of its primary function of maintaining International peace and security.
- The International Court of Justice's decision on compensation for injury claims affirmed that the United Nations should be given powers other than those explicitly provided for in the Charter when it is deemed necessary for the performance of its duties. The establishment of international administration should be seen as an implicit consequence of the task of maintaining international peace and security.
- The consent of the UN member states regarding Kosovo and East Timor administrations is a sign of the emergence of a customary law with the international community accepting the legitimacy of Security Council actions in establishing international administrations, and this can be seen from the fact that General Assembly resolutions have endorsed all such actions (Ruffert, 2001).

### **3. Legal restrictions on International Territorial Administration**

There are a number of legal limitations to be observed by the international administration. The identification of these restrictions contributes to determining the legal framework for the accountability of international administration and the administering authority. This is discussed through the following:

#### *3.1 Obligations of the instrument establishing International Administration*

The instrument establishing the international administration determines the nature of its powers and jurisdiction. If established under a peace treaty, parties shall determine the powers and responsibility of the administration. If the administration is established by a Security Council resolution under Chapter VII, its purpose is to deal with a crisis involving a situation in which international peace and security are threatened in a territory or a State that lacks order (Irmscher, 2001). It is therefore the establishment document and its circumstances determine the nature of the authority of international administration, whether it is limited to specific areas or to exercise its authority in a particular manner.

It is noted that the establishment documents of international administrations are vague and often difficult to interpret, which has been demonstrated in practice in international administration missions in East Timor and Kosovo (UNSG, 1999). This has led to divergent interpretations of administrative functions that should be observed by the administration.

#### *3.2 Human Rights Obligations*

The United Nations and its subsidiary bodies are obliged to respect the international law, as stated by the International Court of Justice (Stavrinos, 1999; Brabandere, 2009), as long as they enjoy an independent international legal personality (Shihab, 1991). Therefore they are obliged to respect the internationally recognized human rights standards, such as the Universal Declaration of Human Rights. Moreover, many provisions of human rights law are considered peremptory norms per se, and it is recognized that peremptory norms in international law are binding to all International Organizations (Alwan & Mousa, 2014 ; Alfar, 1991).

This means that the United Nations and the International Administrations are obliged to respect human rights, especially if entrusted with the legislative, executive and judicial authorities. In practice, the International Administrations in Kosovo and East Timor has adopted regulations providing that human rights treaties are part of the law in force, particularly when they assume functions for which human rights can be applied such as detention facilities or police activities (Wilde, 2005).

#### *3.3 International Humanitarian Law Obligations*

International Humanitarian Law expresses a fundamental principle relating to the obligation on the occupier to maintain the status quo, while giving the occupier the right to take all possible measures to restore and ensure public order and security as far as possible (Alabbasy, 2009; Alwahiby, 2013). In other words, the powers stipulated in the Law of Occupation are aimed at limiting the actual powers of the occupying power, regulating the conflict between the military interests of the occupier and the humanitarian needs of the population, and prohibiting actions that would decide the final status of the region at the end of the conflict (Irmscher, 2001).

The international administration is obliged to respect the International Humanitarian Law when it comes to law

enforcement. The Secretary-General of the United Nations affirmed that "The present provisions do not constitute an exhaustive list of principles and rules of international humanitarian law binding upon military personnel, and do not prejudice the application thereof, nor do they replace the national laws by which military personnel remain bound throughout the operation" (ST/SGB/1999/13).

In accordance with United Nations human rights obligations, forces operating in a foreign territory must respect the laws of armed conflict (Roberts, 1984). The scope of application of human rights instruments is not limited only to those subject to the jurisdiction of State parties to these instruments, but include actions committed on the territory of another State (Cerone, 2001). Noting that the Commission on Human Rights had affirmed that the jurisdiction of States could extend beyond the territorial limits of the State party to the International Covenant on Civil and Political Rights (UNHRC 1979).

Furthermore, the 1994 Convention on the Safety of United Nations and Associated Personnel criminalizes attacks upon United Nations personnel while performing their duties established by the Security Council and is approved by the United Nations (UN 1994). The only exception relates to the duties of the United Nations missions approved by the Security Council under Chapter VII, as the participating United Nations force personnel are considered combatants against regular armed forces and this entails applying the international law of armed conflict (Greenwood, 1998).

#### **4. Accountability of the International Territorial Administration**

The responsibility of international organizations is an important starting point for examining the accountability of International Territorial Administration. The United Nations General Assembly resolution regarding the responsibility of international organizations for internationally wrongful acts stated that; "There is an internationally wrongful act of an international organization when conduct consisting of an action or omission: (a) Is attributable to that organization under international law; and (b) Constitutes a breach of an international obligation of that organization (UNGA, 2011).

Accountability is a broader concept of international responsibility, as it refers to standards and practices designed to hold public officials accountable for their actions and outcomes. The International Law Association (ILA) linked international authority to accountability when the international administration conflicts with the limits of authority granted or contravenes instructions, and linked administration and accountability in terms of reviewing the way in which the administration performs its duties; or in terms of liability that involves harming others and acts or omissions that are in breach of any rule of international law (Berlin Conference, 2004). This is discussed through the following:

##### *4.1 Responsibility of the international administration*

The United Nations bears the consequences of the actions of its bodies. This principle has been included in the articles on the responsibility of international organizations discussed by the International Law Commission. According to article 6, "The conduct of an organ or agent of an international organization in the performance of functions of that organ or agent shall be considered an act of that organization under international law, whatever position the organ or agent holds in respect of the organization". While Article 8 stated that, "The conduct of an organ or agent of an international organization shall be considered an act of that organization under international law if the organ or agent acts in an official capacity and within the overall functions of that organization, even if the conduct exceeds the authority of that organ or agent or contravenes instructions (UNGA, 2011).

As for the military forces placed at the disposal of the United Nations, the consequences of their conduct lie with the participating State if the conduct is attributable to that State. Article 7 of the International Liability Determination establishes that the conduct of an organ of a State or an organ or agent of an international organization that is placed at the disposal of another international organization shall be considered under international law an act of the latter organization if the organization exercises effective control over that conduct.

Usually, the agreement of military forces participation defines the attribution of responsibility for conduct which applies to the parties to the agreement (Brabandere, 2009).

The European Court of Human Rights concluded that the actions of the multinational peacekeeping force in Kosovo were attributable to the United Nations; the Court also noted that Security Council resolutions were the primary reference for analyzing the human rights obligations of the international administration (ECHR, 2007).

##### *4.2 International Territorial Administration Immunity*

The United Nations and its personnel enjoy judicial immunity under Article 105 of the Charter. The 1946 Convention on the Privileges and Immunities of the United Nations contains provisions concerning the immunity of United Nations and associated personnel (UNGA, 1946).

Immunities are often negotiated with the United Nations or with troop-contributing States and are incorporated into the Status of Forces Agreement or the Status of the Mission. For example, before the establishment of the United Nations Transitional Authority in East Timor (UNTAET), Australia signed a Status of Forces Agreement with Indonesia to regulate the participation of Australian troops in the mission of INTERFET and provided for the immunity of military



and civilian personnel, including those provided for in the Charter of the United Nations (Brabandere, 2009).

The immunity of the international administration and its personnel is critical to the success of the mission, but this should not mean immunity to accountability for acts that are breaching the law, including human rights violations.

#### *4.3 Mechanisms for accountability of International Territorial Administrations*

The International Administration of Kosovo and East Timor introduced the Ombudsman's Office to enable those affected to lawsuit the administration or its staff. The Ombudsman's Office was to investigate complaints of human rights violations and actions that constitute abuse of power and brought against any individual or other official institution (UNMIK, 2006).

Another mechanism used to ensure accountability was the judicial review of laws issued by the administration before national courts and tribunals. However, the continued application of United Nations immunity and immunities guaranteed by the legal status agreements of military forces precludes the effectiveness of this mechanism (Brabandere, 2009).

Judicial review of international administration's laws presupposes the existence of an effective judicial system and a competent judicial authority, but both of them cannot often be met due to the collapse or absence of the judicial system or the courts lacks the necessary powers to review legislation, at the time of establishing most international management missions, as in the cases of Kosovo and East Timor. Yet judicial review remains an important alternative to provide an effective legal procedure for cases involving violations of human rights standards.

In some cases, the International Mission itself developed a specific review mechanism. For example, UNTAET has issued two regulations allowing individuals to submit a written request to the Vice-President of the Authority to review decisions taken by a unit of the Authority (UNTAET, 2000). However, this mechanism is not neutral and not a judicial institution, which prevents the establishment of effective accountability mechanisms, especially in light of the situations in which these administrations operate and the post-conflict environment.

### **5. Conclusions**

Since the concept of accountability is broader than the concept of responsibility under international law, as it aims to hold the international body and those responsible for their actions and consequences for the damage resulting from the breach of international obligation and the acts that caused damage to individuals, the exercise of international authority and those responsible by the authority should be subject to accountability. This accountability is an international legal obligation, and it enhances the legitimacy of the administration and its success in achieving its goal.

The study concluded that there are legal obligations and restrictions on the international administration and its staff under the terms of the establishment document and the provisions of international human rights law and international humanitarian law.

On the other side, the study showed that the international legal framework is inadequate to oversee accountability of the international administrations and its associates under its immunity, as well as the weakness of accountability mechanisms created by the international administrations, which requires bridging these gaps by strengthening the accountability system for the international administrations to achieve its goal successfully.

It may be appropriate to apply international mechanisms that can make the administration more accountable, such as accepting complaints from individuals and communications of the administered states, in particular human rights violations. In this regard, the administration application of the first Optional Protocol to the International Covenant on Civil and Political Rights helps to bridge the accountability gap. Judicial review of international administration decisions remains the most important means of activating the system of international accountability and protection of human rights in such circumstances. When individuals in an internationally administered region lack access to judicial institutions, this violates the right to access justice.

### **References**

- Alabbasy, M. (2009). *Obligations of the occupying country toward the occupied country*. Alhabali legal publications.
- Alfar, A. (1991). *Human Rights Law in Positive thought and Islamic Law*. Cairo, CA: Dar Al-Nahda Alarabia.
- Almajdoub, M. (2006). *International Organization: Theory, International, Regional and specialized organizations*. Beirut: Alhabali legal publications.
- Alwan, M., & AlMoussa, M. (2014). *International Human Rights Law*. Amman: Dar Althakafa.
- Alwehebi, E. (2013). *Respecting International Human Rights Law in the context of military occupation: With a special reference to the situation in the Palestinian territories, Iraq and Afghanistan*. Cairo, CA: Dar Al-Nahda Alarabia.
- Brabandere, E. (2009) *Post-conflict Administrations in International Law: International Territorial Administration, Transitional Authority and Foreign Occupation in Theory and Practice*, The Netherlands, Leiden University,

Martinus Nijhoff Publishers.

- Cerone, J. (2001) Minding the Gap: Outlining KFOR Accountability in Post-Conflict Kosovo. *European Journal of International Law*, 12(3).
- Convention on the Privileges and Immunities of the United Nations (13 February 1946). Available at: <https://atsunhqny.files.wordpress.com/2015/11/d8a7d8aad981d8a7d982d98ad8a9.pdf>
- Convention on the Safety of United Nations and Associated Personnel adopted by resolution 49/59 of the General Assembly (9 December 1994). [http://hrlibrary.umn.edu/arabic/Convention\\_UN\\_Safety.html](http://hrlibrary.umn.edu/arabic/Convention_UN_Safety.html)
- European Court of Human Rights. (2 May 2007). Agim Behrami and Bekir Behrami against France' and 'Ruzhdi Saramati against France, Germany and Norway. Decision on the admissibility, Application No 71412/01 and 78166/06. Available at: [http://www.echr.coe.int/Documents/CLIN\\_2007\\_05\\_97\\_ENG\\_822346.pdf](http://www.echr.coe.int/Documents/CLIN_2007_05_97_ENG_822346.pdf)
- General Assembly Resolution on the Responsibility of International Organizations No. 100/66 (9 December 2011). Available at: [http://www.un.org/en/ga/search/view\\_doc.asp?symbol=%20A/RES/66/100&referer=http://www.un.org/en/ga/66/resolutions.shtml&Lang=A](http://www.un.org/en/ga/search/view_doc.asp?symbol=%20A/RES/66/100&referer=http://www.un.org/en/ga/66/resolutions.shtml&Lang=A)
- Ghanem, M. H. (1954). *New Assets of the Public International Law: A Study of its Current Formulation and Provisions of the International judiciary*. Cairo, CA: Nahdet Misr Press.
- Greenwood, C. (1998) International Humanitarian Law and United Nations Military Operations, *Yearbook of International Humanitarian Law*, 1.
- Human Rights Committee, 'Delia Salidas de Lopez v. Uruguay', Communication No. 52/1979.
- International Law Association, (2004). *Committee on Accountability of International Organizations*, Final Report Berlin Conference.
- Irscher, T. (2001). Legal Framework for the Activities of the UNMIK, *German YB Int'l Law*, Vol. 353.
- Irscher, T. (2001). The legal framework for the United Nations Administration in Kosovo, *German Yearbook of International Law*, Vol. 44.
- Report of the Secretary-General on the United Nations Interim Administration Mission in Kosovo, (12 July 1999), UN Doc. S/1999/779, para. 35. Available at: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N99/204/08/PDF/N9920408.pdf?OpenElement>
- Roberts, A. (1984). What Is a Military Occupation?, *British Yearbook of International Law*, Vol. 55, No. 1.
- Ruffert, M. (2001). The Administration of Kosovo and East Timor by the International Community, *International and Comparative Law Quarterly*, Vol. 50.
- Shehab, M. (1991). *Public International Law*. Cairo, CA: Dar Al-Nahda Alarabia.
- Stavrinides, J. (1999). Human Rights Obligations under the United Nations Charter, *The International Journal of Human Rights*, 3(2).
- UN Secretary-General (UNSG), Secretary-General's Bulletin: Observance by United Nations Forces of International Humanitarian Law, 6 August 1999, ST/SGB/1999/13. <http://undocs.org/ar/ST/SGB/1999/13>
- UNMIK Regulation 2006/6 on the Ombudsperson Institution in Kosovo, UN Doc. UNMIK/REG/2006/6 (16 February 2006). Bonn Agreement, Section 11,1,II and Section 111,c,6. Available at: [http://www.unmikonline.org/regulations/unmikgazette/02english/E2006regs/RE2006\\_06.pdf](http://www.unmikonline.org/regulations/unmikgazette/02english/E2006regs/RE2006_06.pdf)
- UNTAET Regulation 2000/17 on the prohibition of logging operations and the export of wood from East Timor, UN Doc. UNTAET/REG/2000/17 (8 June 2000), Section 6.1. <http://faolex.fao.org/docs/texts/tim53333.doc>
- UNTAET Regulation 200/19 on protected places, UN Doc. UNTAET/REG/2000/19 (30 June 2000), Section 8.4. Available at: <http://www.un.org/documents/ga/docs/55/a552.pdf>
- Wilde, R. (2005). The Applicability of International Human Rights Law to the Coalition Provisional Authority (CPA) and Foreign Military Presence in Iraq, *Journal of International and Comparative Law*, 11(2).
- Willner-Reid, M. (2005). *Post-Colonial Governments of Leading Strings: The Legitimacy and Accountability of International Transitional Administrations*. Second Semester University: Coimbra, Portugal.

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# Factors Affecting Decision on Environmental Modification according to Universal Design: A Case Study of a Private University

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## Abstract

The conventional belief of universal design objective is to benefits for few people with high cost of investment. It is, therefore, considered as unprofitable project, although Thai government has well developed laws according to the concept. A university is an organization which is affected by this concept, because it should be place where welcoming people of differences and opening opportunities for all to access education with equality. However, it is not easy for a private university to invest in building or modifying universal design environment due to surplus cost of implementation. The objectives of this research are to: 1) study factors in universal design implementation; and 2) analyze importance level of executives in deciding to invest in universal design implementation or modification. The research procedure and qualitative data collection was conducted with 59 informants by face-to-face semi-structured interview. The informants of this research comprised 56 physical users, and 3 executives and building managers. The research results show that factors affecting decision on environmental modification based on universal design principles in private universities are: 1) social structure, 2) understanding and recognition of human values; and 3) business image promotion. However, probable factors not facilitating universal design implementation in universities were: 1) investment budget, 2) architectural Aesthetic, and 3) utilization. Additionally, background of the interviewees is one of reinforcing factors for decision on universal design investment.

**Keywords:** Universal Design Implementation, Thai law, Decision Making, Education Provision for Persons with Disabilities Act, Executive's Perception, Private University, Social Value

## 1. Introduction

Universal design concept was firstly implemented in Thailand in public building such as hospital and public health centers, and then expanded to other public places such as educational institutions and government complex (Sawangjaroen, 2012). Thai government has well developed laws, ministerial regulations, standard criteria, and guidelines for building construction based on universal design principles. Because the government places importance to quality of life of all people in society, therefore, buildings and environments accessible for all must be considered. This is consistent with Sahachaisaeree (2011), that "when the environment does not facilitate participation in social activities of individuals with personal impairment, the state of handicap is impliedly discriminated by unfriendly environment." However, universal design implementations in public buildings, both newly constructed and modified, have been found in low rate. It is probably because of high cost in maintenance or construction, as well as perception of decision-making authorities on surplus cost. According to the research finding of Satio (2006), facility managers' understanding and recognition of advantages is the key to implement universal design; therefore, it is importance to increase understanding of the issues among authorities. Additionally, there is the conventional idea that projects under design for all or universal design concept support specific targets, for example disabled or handicapped people, which are few in numbers. The universal design, then, is considered unprofitable because benefits are low, investment cost is high (Odeck, Hagen & Fearnley, 2010). The above mentioned condition of universal design has affected many places. Educational institutions, for example, are places which play important roles in human capital development, leading to country development. They should be place accessible to all of any differences and provide opportunity to access education equally. In contrast, there are little numbers of educational institutions' facilities

built by universal design principles. According to statistical data of disabled people in Thailand in 2016, there are 48.37% of wheelchair occupants with ability to learn, but only 1.61% of them study in higher education system. This indicated that factors influencing education of persons with disabilities probably are individual economy or other related issues, i.e. physical environments that are not support or appropriate to living of person with disability (Tieammanee, 2009). As prescribed in Section 5 of the Education Provision for Persons with Disabilities Act, B.E. 2551 (2008) of Thailand, a person with disability shall have rights to access to education without cost, as well as to receive technology, facilities, media, services, and other educational assistances (Office of the Basic Education Commission, 2008). Consequently, the research has been conducted with 2 main objectives: to study factors affecting universal design implementation; and to analyze importance level of executives in decision to invest in construction or university's buildings modification based on universal design principles. This research is conducted by taking management characteristics of Dhurakij Pundit University as a case study. Dhurakij Pundit University is a private university in Thailand, where construct management system can be done comprehensively within the University, from the beginning to the end of the project. Data are collected by questioning and in-depth semi-structured interview. The questions are about factors important to consideration of universal design implementation in universities, including perception and investment decision of executives. This study indicates that decision on universal design implementation may be argued in terms of economic values. Additionally, the introduction of advantages and the study about social capital of universal design affect consideration and decision on implementing environment accessible to all. The researcher expects that the findings are able to motivate the application of regulations related to universal design in private universities.

## 2. Theoretical Framework

### 2.1 Thai Regulations on Universal Design

At present the national economic and social development plan of Thailand is stated that human is the center of development by promoting and enhancing citizen potential together with environment development. In other words, human capital is able to develop and add value. As in this conclusion, this research has been conducted by focusing on educational institutions as a component of human capital development. Educational institutions, therefore, should provide user-friendly facilities accessible to all people, so that they have equal opportunity in education. Education management should give importance on learners of all differences and provide services that can be reached by every learner. Thai government has developed laws focusing on importance of quality of life of all people in society, including those with impairment, i.e. the ministerial regulation prescribing the provision of facilities in buildings for persons with disabilities and the elderly B.E. 2548 (2005), the empowerment of persons with disabilities act B.E. 2550 (2007), the Education Provision for Persons with Disabilities Act, B.E. 2551 (2008), and the education act B.E. 2552 (2009). The ministerial regulation prescribing the provision of facilities in buildings for persons with disabilities and the elderly B.E. 2548 (2005) has been controlled and effective to buildings constructed after 2005. The cabinet has given approval to an urgent agenda in providing 5 facilities for the disabled, especially in government and public buildings, beginning from hospitals. However, the ministerial regulation is not enforced with buildings before 2005 and other types of public buildings, which is the gap in the law that has to be amended. The legislation serves as a recommendation and guides for professionals to practice according to their ethical value; however, many of them neglect moral responsibility in providing adequate facilities in order to cut cost or get faster profit. They lack awareness that a user-friendly environment can generate higher profit than an inaccessible one (Kadir, Jamaludin & Rahim, 2012). Even though, the benefits of universal design are high, but they are not adequate to motivate practice guidelines and implementation. To enhance the potential of universal design, law enforcement, standards, and practice guidelines according to the laws should be established.

### 2.2 Contributions of Universal Design

There is good development in knowledge and understanding of universal design principles and concepts in Thai society. Furthermore, the government has awareness and recognizes importance of impact of inaccessible social environment which hinders individuals from living and participating in mainstream activities, i.e. employment, education etc. This obstacle directly affects human resource which is the key in developing a country. Universal design is widely implemented in developing infrastructures, services and products that provide equal access to all people (Bangkok Department of Public Work). This concept is simplified and widely expanded by Center for Universal Design, North Carolina State University (1997). Universal design has been applied with amenities to upraise quality of life of social members. Therefore, universal design should be considered and implemented in modification and construction of buildings, environments, and facilities to the greatest extent possible and the widest range of situations as follows (National Disability Authority, 2012): 1) Benefits for persons with

disabilities and the elderly. Universal design is help persons with disabilities and the elderly to live independently, so that they are proud of themselves, strong minded, ready to face obstacles. It also develops quality of life of person with disabilities and the elderly to be productive manpower (Bangkok Department of Public Work). 2) Benefits for individuals. Universal Design is user-friendly and convenient, but is also respectful of users’ dignity, rights and privacy. It responds to different degree of difficulty that people experience when using products, services or environments. Every people are able to access and use products, services, or environments that are not specialized design. 3) Benefits for social. Universal Design promotes accessibility and usability, allowing people with all levels of ability to live independently and approaching services and environments individually. Universal Design assumes that the range of human ability varies according to the type of activity in which a person is participating or the environment in which that person is carrying out the activity (Ostroff, 2001). This research has applied overall benefits of universal design implementation as a key concept to develop the reduction of social environment impact which is barrier in well-being and social participation by emphasizing implementation of universal design principles in public buildings of educational institutions.

**3. Research Methodology**

This research aims to study perception and attitudes of physical users and university executives towards universal design. According to research framework, it shows that universal design principles enable the enforcement of governmental registration, i.e. laws, ministerial regulations, acts, and code of standards in universal design. These two factors indicate social benefits and values, and affect perception and attitudes of physical users and university executives in decision on investment in construction and modification of environment accessible to all, as shown in Figure 1.

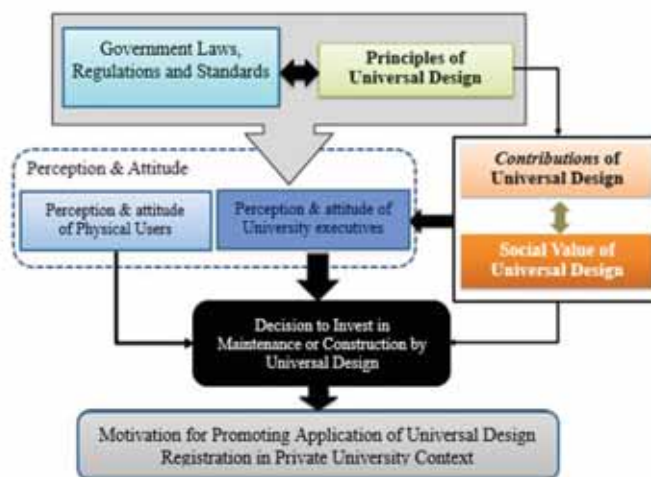


Figure 1. Conceptual Framework

This articles was concluded from the interview of physical users consisted of 53 participants, staff and students, 3 representatives of disabled students, and 3 executives of a private university, Dhurakij Pundit University. The qualitative method with semi-structured interview helps the study to focus on interviewees’ point of view (Bryman, 2008 cited in Kadir, Jamaludin & Rahim, 2012).

- 53 physical users of university’s facilities gave information and confirmed about current situation of universal design implementation in the university. 3 representatives of disabled students were informants about obstacles and real needs in using university area through semi-structured interview.
- The selective informants are a building manager, an executive who takes care of physical facilities, and a high level of executive, totaling 3 persons from Dhurakij Pundit University. The understanding of high executives is important to promote or push universal design into practices (Saito, 2006). Purposive sampling is used in this research, so that the researchers can intentionally select those related to the research questions.
- The informants are interviewed face-to-face by using open-ended questions. The interviews were recorded by digital recorders after the informant gives permission.

The questions can be divided into 2 main parts. First, it is about understanding and perception of universal design of both groups. The second part is the executive interview about aspects of advantages and value of universal design. The interviews have 2 objectives as follows:

- What factors are promoting universal design implementation?
- Why university executives place importance on universal design implementation?

Before conducting the interview, the current physical environment and facilities in the university under the universal design were studied, together with related effective registrations, by using a survey form as the research instrument.

- Overall survey of the university’s physical environment

1) According to the survey of outdoor environment, it can be concluded that the university has practice guidelines that highlight more on building entrances than others. The amenities such as benches along pathways or walkway are not efficiently designed for all accessibility. It is difficult for persons with mobility impairment or the elderly to step up 10 cm. to rest on the benches. Furthermore, 1-2 reserved parking spaces are provided but there is no sign to show the position. They have to ask for assistance from caretakers (Tipian & Sawadsri, 2017).

2) Regarding the survey of inside the building that constructed prior the building control law (before 2005), it is found that those in charge lacked of practice guideline and universal design implementation. The university only provided some components but still not meet standards prescribed by law. There were no toilets for persons with disabilities in buildings before 2005, which are considered the most priority according to the government resolution on 19 May 2009. As for the building constructed after the effective of building control law (after year 2005), the law enforced a building to have necessary facilities under universal design principles. The main components found give priority to building entrances, namely, practical entrance ramps, doorways with appropriate width, sufficient large-size lifts available but no mirrors and rails, and width indoor pathways. Only one building provides restroom for persons with disabilities. Therefore, it can be concluded that the buildings taking into studies, both before and after the effective of building control law, in Dhurakij Pundit University are unable to benefit for all users, but emphasize on building entrances more than other parts (Tipian & Sawadsri, 2017).

#### 4. Results

##### 4.1 Understanding and Perception of Universal Design Principles

Table 1. Perception of universal design principles from the interview of physical users in the case study university

Participants	Perception Issues	Perception and Attitude towards Universal Design
1) Physical users - Faculty members - Supporting Staff - Students	Knowledge and understanding of universal design principles  Experiences in using facilities for all and inclusive area usability	- Design for persons with disabilities that also benefits users of all groups, essential to public and beneficial to society as a whole  - The most common experiences are ramps, priority seats in public transportation, and signs in lifts.  - Very low numbers of the disabled share public areas.  - If there are amenities that cater needs of all users, it may enhance good relationship in society.
	Needs of facilities for all	The outside building facilities in order of priority are: 1) Parking lots and signage 2) Outdoor Benches 3) Pedestrian Walkways and Crossways 4) Lights 5) Curb Ramps  The indoor facilities are: 1) Toilets 2) Lifts 3) Service Areas 4) Signage and Symbols 5) Clear Entrances.
	Applicability of universal design in Dhurakij Pundit University	Universal design implementation is for persons with disabilities. It may be interesting and gives equal access to education, as well as benefits for general users with physical injury or disease.

Table 2. Perception of universal design from the interview of representatives of disabled students

Participants	Perception Issues	Perception and Attitude towards Universal Design
2) Representatives of disabled students	Knowledge and understanding of universal design principles	- Universal design is mainly for persons with disabilities, and provide more comfortable in living.
	Experiences in using facilities for all and inclusive area usability	- The common facilities are ramps and guiding blocks. - If facilities are available, the disabled will participate more in society, and realize their places in society.
	Needs of facilities for all	In order of priority, the outside building facilities are: 1) Ramps 2) Curb Ramps 3) Crossways 4) Pedestrian Walkways 5) Road Components The indoor facilities are: 1) Entrance Ramps 2) Toilets 3) rails 4) Lifts 5) Service Area
	Applicability of universal design in Dhurakij Pundit University	The ability to travel and participate in university activities easier, live independently with less assistance from others

In conclusion of understanding and perception of both groups of interviewees, the answers vary in physical dimensions. The understanding about universal design principles incline to persons with disabilities, followed by serving all people. The second group of interviewees is representatives of disabled students with direct effect, the need for facilities are rather clear and show the real need. However, the interviewees in the first group answered the need of facilities overall in some components at the same points. Regarding the use of shared area, it is found in little number, maybe because the interviewees do not know why the disabled are inaccessible of the area. Additionally, the representatives of disabled students view that if the social environment is ready, they can have more space to live outside their houses. The physical users in the first group agree that universal design implementation opens the chance to attract disabled students to study at Dhurakij Pundit University. The interviewees from the second group claim that they can live independently without assistance of others.

As shown in Table 3, the executives' understanding of universal design highlights the persons with disabilities. They open up and give more acceptance of universal design implementation. It is best for the private university to implement universal design in compliance to related laws. Although the university has not pronounced official policy to accept disabled students, the issues did not raise up clearly. The practice guidelines first follow up the rule of laws, and then occurring budgeting, development and modification of environment accessible to all will be considered gradually.

Table 3. Perception of universal design from the interview of university executives

Participants	Perception Issues	Perception and Attitude towards Universal Design
University executives - high level executives - executive responsible for physical environment - building manager	Knowledge and understanding of universal design principles	- understand principles and concepts for design with benefits for disabled persons and the elderly - accept advantages of universal design implementation in universities
	Needs for facilities for all	- consider and prioritize necessary facilities, implement first in necessary area i.e. ramps, entrance way, and lifts.
	Advantages and disadvantages of universal design implementation	Advantages: - make all people live more comfortably - overall benefit to social - be in accordance with social mainstream - create modern image for better acceptance in business Disadvantages: - maybe need high cost to modify all environments at the same time

Level of universal design implementation	- Although the university has no official policy in accepting disabled students, it welcomes those who can accept and live in the university facilities. - The existing universal design implementation focuses on related law compliance in the current urgent issues and standards, as well as needs of physical users.
Possibly implemented facilities	The university gives importance first to accessibility of buildings, i.e. ramps, entrances, and lifts, and plans modification to meet the standards.
Trend in full implementation of universal design	- Old buildings (before 2005) are modified. - New buildings (after 2005) are built according to the effective laws and social mainstream to create good organization image better to business acceptance.

#### 4.2 Benefits and Values of Universal Design in Universities

##### 1) Factors Facilitating Universal Design in Universities

The university executives views that universal design investment is probably not cost-effective for private universities, which have to invest in facilities and building by their own funding. But in social aspect, the number of persons with disabilities has increased. To give opportunity for disabled students to access higher education, universities should pay attention and give importance to need of the disabled as of general people. In other aspects, the universities should prepare physical environment according to education trend in Thailand, which opens equal opportunity in education for all. The examples are preparation for future changes, aging society and roles of aging people in education, and preparation for aging of university faculty members and supporting staff. To implement universal design in universities, it should be start from following related laws. For buildings after 2005, facilities are built according to building control laws; while old buildings are amended as necessity. The university executives accept advantages of universal design by focusing on accessibility of most buildings. They agree that universal design management by new built or modifying the existing one is the best practice or trend of modern design. Universal design is an issue under sustainable design concept which the case study university has aimed to develop. Universal design is viewed as promotion of good university image

##### 2) Factors barring universal design in universities

It is difficult for the private university to decide on investment in facilities and physical environment. The cost-effective issue should be carefully considered. However, regarding investment worthiness, the interviewees said the return is unpredictable because the university plans environment modification into phases. The development project has started by priority or facilities in need. For example, if wheelchair students are accepted, the university will plan to modify accessible to buildings for them first. The considering issues in investing in facilities according to priority of necessity base on 4 factors: 1) low construction cost, 2) construction material available in Thailand, 3) practical facilities beneficial for all, and 4) aesthetic surroundings after construction or modification for good university image.

## 5. Discussion

The finding of this research about understanding of universal design principles among physical users shows that, faculty members and third- and fourth-year students have more understanding and are able to explain about universal design than first- and second-year students. It may be because universal design is related to variety of subjects. In the years of study, the subjects combine this concept in the content. Experiences in encountering facilities and sharing area in society partly affect acceptance and awareness of individual differences as normal issue, and create good relationship in society. For the representatives of disabled students, they views that if there are facilities for persons with disabilities, they will play more role in society and less introvert. It makes their places in society and reduces need of assistance from others, which they try to avoid. Outdoor facilities, in order of priority, are building entrances, toilets, lifts, and service areas which are in accordance with facilities the university executive has decided on possibility to invest and implement.

The executive in high level well accepts the advantages of universal design. Universal design is agreed to serve the following situations: 1) The change of social structure and benefits of changing society. Thailand is now passing to aging society. The governmental and private organizations jointly work to protect, promote and support status, role and activities of elderly people (Foundation for older person's development, 2015). The university is a part of this supporting, for example, preparing for the return of retired persons to study. 2) Recognition of human being. The number of persons with disabilities continuously increases. To give



opportunity for equal access to education and care for aging personnel who have to live their lives in universities context, the university has to prepare physical environment. However, as a private university, it has to consider 4 main issues: low cost, material available in the country, facilities beneficial for all not only specific people, and Aesthetic that supports university's good image. In the point of view of the executive responsible for physical environment, the advantages of universal design have been accepted in 3 aspects. 1) University image aspect. Universal design is considered as modern issue under sustainable design concept. It is a part of the university's environmental development, leading to good image of the university. 2) Marketing aspect. Universal design makes the university well-known in education field which leads to marketing or business advantages. The physical manager also considers the users' need response. In case there are users in need of special facilities, it will be provided urgently. However, the investment in construction or modification of environment should benefits in all aspects. The worthiness of facility utilization is also focused, for example, use of ramp. The construction standards should be studied before building practical ramp with appropriate width size. The disabled students can use ramps by themselves without assistance of others. University housekeepers can also use trolleys on the ramps, as well as those with problem in using the stairs.

## 6. Conclusions and recommendations

Factors affecting decisions to modify environment according to universal design principles in the private university are: 1) Social structure aspect. While Thailand is now passing to aging society, universities play a part in developing quality of life of the elderly people together with governmental policy, for example offering curricular for retired people. The universities that adjust environment accessible to all will be a good choice for the elderly to study. 2) The aspects of understanding and recognition of human value comprises 2 parts. First, current situations of persons with disabilities, whether from birth or accident, should be studied and acknowledge. Currently, Thai government has provided monthly allowance, 800 baht per month, for the disabled who has registered and held identification card for persons with disabilities (Ministry of Social Development and Human Security, 2015). The promotion of equal opportunity to access education is part of sustainable development in quality of life of persons with disabilities. Additionally, it can reduce governmental burden in paying disability allowance, in case they graduate and earn enough living for themselves and their family. The second part is about recognition of human value and care of aging university personnel. At present in Thailand the retirement age is 60 years, but for faculty members or staff with that age may have potential to work, but with physical difficulty. If facilitated physical environment are built, these group of personnel can live and work in the universities with no difficulties. These also may motivate efficient personnel to work longer with universities and promote self-esteem of the elderly. 3) Business image promotion. Universal design is a modern issue for design subject. It can enhance good image and make universities well-known, leading to marketing advantages. This means the universities can reduce promotional budget for high advertising cost. Universal design can also partly help developing university ranking in environment development. As for factors not supporting universal design implementation in universities are: 1) As investment budget factor, to adjust barrier-free environment all over universities under universal design principle is difficult in case the university has to invest comprehensively. 2) As for aesthetic factor, there is a strong belief that to build environment for all it reduces the building aesthetic. 3) For utilization, it is about understanding of high advantages of universal design which is not only benefits special groups. It is difficult to improve perception of universal design of all people and familiarity of universal design environment. It is also found that backgrounds of the interviewees are supportive factors for decision to invest in building universal design environment.

The suggestion of research discussion is the way to create awareness by instilling universal design principles in basic education level. Especially, in the design schools for future designers, they must learn about universal design principles and apply it in their designed works (Kadir, Jamaludin & Rahim, 2012). These will reduce modification problems after the buildings are built. Another factor in mobilizing universal design implementation in Thai context is the cooperation of government. It should support, promote or jointly organize development projects with private sectors. The government also should offer rewards or privileges to private organizations in return of universal design modification or implementation which is according to the laws, for example.

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## References

- Abdul Kadir, S., M. J. (2012). Building Managers' Perception in Regards to Accessibility and Universal Design Implementation in Public Buildings: Putrajaya case studies. Asia Pacific International Conference on Environment-Behaviour Studies (pp. 129-136). Famagusta, North Cyprus: Elsevier B.V. Selection. [https://doi: 10.1016/j.sbspro.2012.02.071](https://doi.org/10.1016/j.sbspro.2012.02.071)
- Abdul Kadir, S., M. J. (2012). *Applicability of Malaysian Standards and Universal Design in Public Buildings in Putrajaya*. ASEAN Conference on Environment-Behaviour Studies (pp. 659-669). Indonesia: Elsevier B.V. Selection. [https://doi: 10.1016/j.sbspro.2012.03.072](https://doi.org/10.1016/j.sbspro.2012.03.072)
- Afacan, Y., C. (2009). *An interdisciplinary heuristic evaluation method for universal building design*. *Applied Ergonomics*, 40, (pp.731-744) [https://doi:10.1016/j.apergo.2008.07.002](https://doi.org/10.1016/j.apergo.2008.07.002)
- Department of empowerment of persons with disabilities, (2008). *Ministerial Regulation: Education for Persons with Disabilities Act 2008, Section 5* [Online]. Available at <http://dep.go.th/th/node/432.PDF> (Accessed: January 2015).
- Holley Atkinson, D. D. (2013, April 24). <http://online.tarleton.edu/>. Retrieved from <http://online.tarleton.edu/ACEF/UDIL42413/.PDF>. (Accessed: June 2015)
- James Odeck, T. H. (2010). *Economic appraisal of universal design in transport: Experiences from Norway*. *Research in transportation economics*, 29 (1), 304-311. <https://doi.org/10.1016/j.retrec.2010.07.038>
- Jarutach, T. (2015) Universal design guide book [in Thai: คู่มือการออกแบบเพื่อทุกคน] In Jarutach, T. *Operations Unit: Research environment for the elderly and disabled people, the Thailand Research Fund (TRF)*
- Komolkiti, P. (2008). Life and the restrictions on the path of the disabled in Thailand [in Thai: ชีวิตและข้อจำกัดด้านการเดินทางของผู้พิการไทย]. In Komolkiti, P. [Online]. Available at <http://www.arch.chula.ac.th/ejournal/files/article/mlzppF86k8Sun103403.pdf> (Accessed: January 2015)
- North Carolina State University, College of Design (1997). *The Center for Universal Design*, [Online]. Available at <http://www.design.ncsu.edu/cud/>. (Accessed: June 2015)
- Oliver, M. (1990) *The Politics of disablement*. London: Macmillan Press.
- Ostroff, (2001). *The Centre for Excellence in Universal Design*. Retrieved from <http://universaldesign.ie/http://universaldesign.ie/What-is-Universal-Design/Benefits-and-drivers/.PDF> (Accessed: August 2015).
- Saito, Y. (2006). Awareness of universal design among facility managers in Japan and the United States. *Automation in construction*, 462-478. Elsevier B.V. Selection. [https://doi:10.1016/j.autcon.2005.06.013](https://doi.org/10.1016/j.autcon.2005.06.013)
- Sawadsri, A. (2012). *'Do I Look Like an Object?' A Quest of Exploring Person – Place Relationship of Disabling*. ASEAN Conference on Environment-Behaviour Studies (pp. 418-428). Bangkok, Thailand: Elsevier B.V. Selection. [https://doi: 10.1016/j.sbspro.2012.08.046](https://doi.org/10.1016/j.sbspro.2012.08.046)
- Sawangjaroen, C., Sirisali, P., & Sahavacharin, A. (2012). Assessment of the Physical Environment for Students with Disabilities Thammasat University Rungsit Campus. Bangkok: Faculty of Architecture and Urban
- Tieammanee, S. (2009). *'Methods of Improving the Providing of Educational Welfare for Disabled Students of Thammasat University at Rangsit Campus'* A Thesis for the degree of Master of Social Work in Education of Faculty of Social Administration Thammasat University. Pathumthani Thailand.
- Tipian, S. & Sawadsri, A (2017). The Role of Universal Design on Campus and Practical Mobilisation. AMER International Conference on Quality of life (pp.193-199). Bangkok, Thailand: E-B Environment-Behavior Proceeding Journal. <https://doi.org/10.21834/e-bpj.v2i5.665>

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# A Study of a Venture Company's Control Rights Allocation Model

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## Abstract

This paper proposes an allocation model of control rights between entrepreneurs and investors to properly manage venture companies. The basic concept of this model involves reflecting the company's future market value in its control rights to entrepreneurs as an incentive, while securing investors' minimum monetary requirements. Previous studies reveal that entrepreneurs' control rights gradually dilute as the monetary requirement increases in multi-staged financing; therefore, it is necessary to establish a fundamental rule for control rights allocations in initial contracts. This model also has the capability to allocate cash flow rights, and the potential capability to justify its premium.

**Keywords:** Venture company, control rights, allocation model, entrepreneur, investor, multi-stage financing

## 1. Introduction

One key element for a venture corporation's success includes the appropriate involvement of both entrepreneurs and investors in management. Entrepreneurs must develop and operate the business, as well as report its progress to investors; such investors as venture capitalists may monitor, supervise and instruct the company based on their knowledge. Each should understand their roles, and will be expected to become appropriately involved in the company's management. The optimisation of governance, such as control rights, is necessary to facilitate the appropriate involvement of entrepreneurs and investors. However, as negotiations are made between entrepreneurs and investors at every milestone in staged financing, cash-rich investors receive more negotiation power than cash-constrained entrepreneurs in later rounds due to the larger monetary requirements.

This paper proposes an allocation model for control rights by using the company's future target value, both anticipated and agreed upon by entrepreneurs and investors (the target value). This is intended to mitigate the unfairness of the negotiation power caused by monetary capability. Further discussed is the necessity to determine the allocation rule at the project's initial stage, consisting of multi-staged financing. Based on this model, entrepreneurs may have more control rights by enlarging the company's future value as a result of a better development status. The concept of allocating control rights by target value is especially attractive for cash-constrained entrepreneurs; the model can consequently provide new entrepreneurs with incentives to encourage innovation. Alternatively, investors can become more involved in management if the development status worsens; in other words, they can secure or even protect their profitability by introducing a model dependent upon the progress of development. Additionally, increased independent cooperation between entrepreneurs and investors is anticipated in attaining the company's clear, agreed-upon target value.

This paper defines control rights and/or management rights as the directors' voting rights in the board meeting, which represents the shareholders, except in the prior study referenced in Chapter 2.

## 2. Previous Studies

### 2.1 Management's rights in staged financing

Venture companies typically use staged financing with multiple rounds in the company's development, as Figure 1 illustrates.

A comprehensive study was made by Kaplan and Stronberg (2003) on the components of contracts between entrepreneurs and investors involved 213 financial rounds, with 119 venture companies supported by 14 investors. The authors' study reveals that re-negotiation is made in staged financing between the entrepreneurs and investors in a new financing round from previous contracts, and the entrepreneurs' voting rights decrease in

later rounds due to an increase in monetary requirements. This result is consistent with the research by Hellmann (1998), in that cash-constrained entrepreneurs may tend to release the company’s management rights, as Table 1 illustrates.

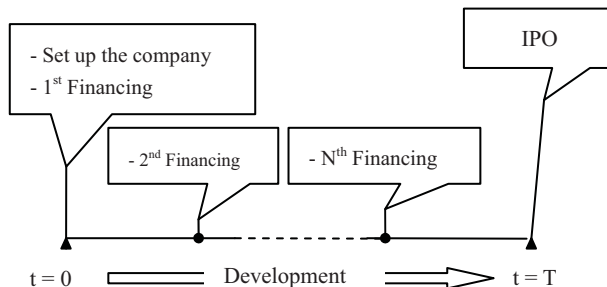


Figure 1. Staged Financing

Table 1. Allocation of voting rights (Kapan & Stromberg, 2003)

Holder	Initial Financing Round	All Financing Rounds
Entrepreneurs	29.8% – 42.9%	24.5% – 33.7%
Investors	46.3% – 58.9%	53.6% – 62.3%
Others	10.9% – 11.3%	12.6% – 13.1%

2.2 Management rights and financing rounds

Aghion and Bolton (1992) incorporated the incomplete contract approach in a study of the optimisation of management rights, with the assumption that overall, information cannot be observed at the timing of initial contracts. This concept is demonstrated in Figure 2.

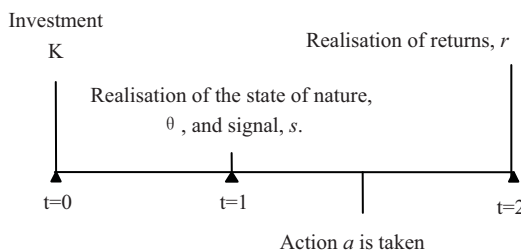


Figure 2. Incomplete Contract Approach (Aghion & Bolton, 1992)

This concept notes that an imbalance of information always exists between entrepreneurs’ ( $\theta$ ) and investors’ information. Further, entrepreneurs’ interests are not always the same as the company’s. An analysis regarding the optimisation of action, which the company takes if management rights belong to entrepreneurs or investors, reveals that entrepreneurs typically have more management rights. However, these rights are shifted to investors if the entrepreneurs cannot satisfy the investors’ requirements. From a financing perspective, these shifts are consistent with entrepreneurs’ behaviour, in that the entrepreneurs attempt to provide funds by the dead deals without voting rights, and attempt to fund through equity with voting rights if the finance is insufficient for development. Remarks are made to retain control rights, and entrepreneurs are to fulfil their payment duties towards this debt.

2.3 Control and cash flow rights

Li and Zhou (2012) established the financing contract model to provide a theoretical explanation for Kapan and Stromberg’s empirical research regarding the disproportionality between cash flow and control rights. They conclude that the entrepreneurs’ and investors’ judgment of a firm’s probability of success will affect the allocation of both control and cash flow rights. Moreover, the higher the investor assesses the entrepreneur’s creativity and ability, then the less cash flow and control rights the investor requires. The paper also notes that the investor gains are complementary in the cash flow and control rights at the venture company’s onset. In other words, the more cash flow rights the investor requires, the less control rights they will gain. Finally, the paper concluded with a renegotiation regarding the allocation of cash flow and control rights in multi-staged financing.

Based on this new information, it can be posited that venture companies' dynamic allocation of cash flow and control rights requires more detailed research.

Sakakibara, Ishida, Genba, and Tao (2012) propose the concept that control rights between entrepreneurs and investors should be allocated by future company value independently of the financial structure of the company in order to protect and encourage cash-constrained entrepreneurs.

Van der Burg and Prints (2010) discuss a new system of firm governance of which the voting rights is to be delegated to proxy voting institutions.

Galai and Wiener (2008) proposed a model that allocates voting rights in board meetings by stakeholders' incremental value, at an exchange of one dollar per stake. This study also explained the merit in saving internal costs to monitor the company's operations status. This concept can be applied to companies in which voting rights can be allocated, regardless of the financing structure, such as LLCs and LLPs.

He and Sommer (2010) investigate the separation of ownership and control for board composition with the hypothesis that agency costs associated with manager-owner conflicts increase with the degree of separation of ownership and control.

#### 2.4 Finance method

Marx (1998) notes that the best financing methodology between cash-constrained entrepreneurs and investors involves a combination of debt and capital, as this structure provides investors with the opportunity to manage the company, while providing entrepreneurs with an incentive.

Gebhard and Schmidt (2006) show a combination of convertible securities and contingent control rights can be used to resolve the conflict of interests between entrepreneurs and investors.

#### 2.5 Research question

Previous studies reveal the qualifying characteristics of contracts between entrepreneurs and investors, which differ in their timing due to the entrepreneurs' monetary restrictions. Regarding multi-stage financing, entrepreneurs especially have stronger negotiation power in the initial round than in subsequent rounds. Therefore, if a clear contract rule on control rights allocations is established in the initial round, entrepreneurs do not experience the problems imposed by investors in a later round. Therefore, the research questions are as follows:

- Does an allocation model of control rights correctly represent previous studies?
- Is the model trustworthy and acceptable to both entrepreneurs and investors in its theoretical aspect?

This paper posits that a venture company's value is considered and measured by an expected value at a certain time in the future—for example, an initial public offering price—and proposes a control rights allocation model based on the expected (target) value. Thus, a zero coupon bond model is applied to calculate the allocation of control rights. The fundamental behaviour is numerically studied with the model's application to multi-staged financing by analysing scenario studies.

### 3. Methodology

#### 3.1 The company's structure

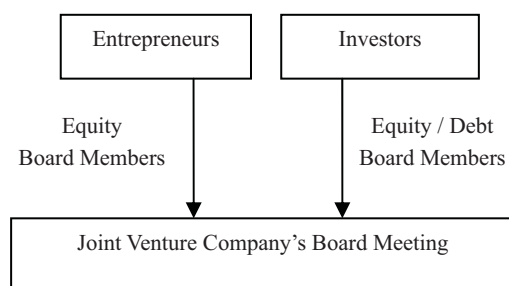


Figure 3. Joint Venture Company's Structure

This paper studies the allocation of voting rights as control rights in a joint venture company, in which an entrepreneur and an investor choose to invest. Figure 3 illustrates the structure; while typically voting rights are allocated based on the share of equity, this study uses the company's target value regardless of actual equity and/or debt investment.

This study assumes a development project in which the target value is  $V_T$  in  $T$  years, with the estimated development cost for  $T$  year period as  $V_0$ , the relationship among  $V_T$  is  $V_0$ , and the overall project profitability  $r$  (%) is simply calculated as the following equation:

$$V_0 = V_T \exp(-rT) \tag{1}$$

An entrepreneur and investor then agree on the project’s profitability and commit to investing the necessary funds in the project at the present value of  $S_0$  and  $B_0$ :

$$V_0 = S_0 + B_0 \tag{2}$$

Voting rights in common business practice are simply calculated as

$$V_{Re} = S_0 / V_0 \text{ (entrepreneur)} \tag{3}$$

$$V_{Ri} = B_0 / V_0 \text{ (investor)} \tag{4}$$

In this paper,  $S_0$  and  $B_0$  are calculated from the target value  $V_T$ , which is expected and agreed upon as the target price at a certain future time, such as the initial public offering (IPO). This paper calculates  $S_0$  and  $V_0$  by assuming the investor’s investment has a similar characteristic as the zero coupon bond or the convertible debt of the face value  $F$ , with maturity at the IPO (the zero coupon bond model). Figure 4 indicates the relationship between  $V_T$ ,  $F$ ,  $V_0$ ,  $B_0$  and  $S_0$  based on this assumption.

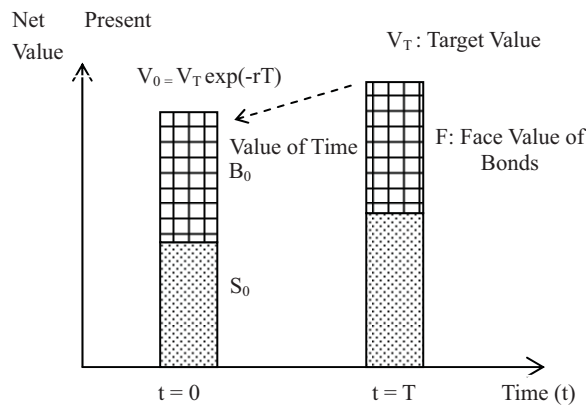


Figure 4. Relationship between  $V_T$ ,  $F$ ,  $V_0$ ,  $B_0$  and  $S_0$

As  $V_0$  indicates the necessary development costs,  $B_0$  can be the net present value of the investor’s commitment to invest in the company, and  $S_0$  is the net present value of the entrepreneur’s commitment. This absorbs the difference between  $V_0$  and  $B_0$ . The entrepreneur, in other words, is responsible for the variance in future target value, and bears both the incentive and the penalty.

Applying the zero coupon bond model proposed by Merton, R. (1973) allows  $V_T$ ,  $F$ ,  $V_0$ ,  $B_0$  and  $S_0$  to be calculated by Equations (5) and (6):

$$S_0 = V_T e^{-rT} \Phi(d'_1) - F e^{-rT} \Phi(d'_2) \tag{5}$$

$$B_0 = V_T e^{-rT} \Phi(-d'_1) + F e^{-rT} \Phi(d'_2) \tag{6}$$

Here:  $d'_1 = [\ln(V_T/F) + (\frac{1}{2} \sigma^2) T] / \sigma \sqrt{T}$

$$d'_2 = [\ln(V_T/F) - (\frac{1}{2} \sigma^2) T] / \sigma \sqrt{T}$$

$\Phi$  = Normal Distribution CDF

$\sigma$  = Volatility (Uncertainty)

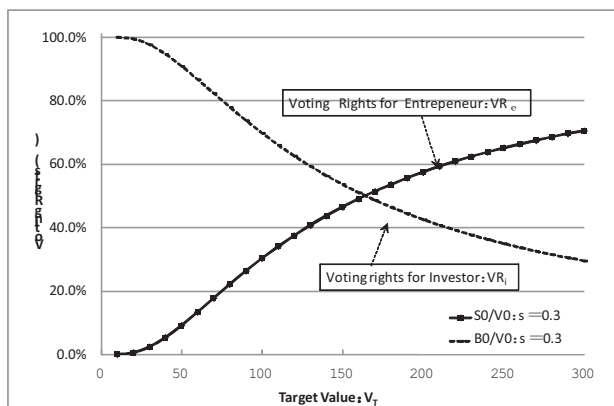
The profitability of entrepreneur  $r_e$  and investor  $r_i$  can then be calculated by the following equations:

$$r_e = \ln(S_0 / (V_T - F)) / T \tag{7}$$

$$r_i = \ln(B_0 / F) / T \tag{8}$$

### 3.2 Fundamental characteristics

Figure 5 displays the model’s fundamental characteristic. Under certain conditions, the target value  $V_T$  and the voting rights of the entrepreneur  $V_{Re}$  and investors  $V_{Ri}$  are calculated. As the  $V_T$  increases,  $V_{Re}$  increases, while  $V_{Ri}$  decreases. Thus, the investor has more voting rights as an incentive when development progresses well. In contrast, as the target value  $V_T$  decreases, the entrepreneur’s voting rights decrease  $V_{Re}$ , while the investor’s voting rights  $V_{Ri}$  increase. Thus, the investors can be involved in the company’s operations, which indicates more strongly to the entrepreneur when the development does not progress well or as anticipated.



( $F = US \$90$  million,  $r = 10\%$ ,  $\sigma = 0.3$ ,  $T = 5$  years)

Figure 5. The Target Value and Voting Rights

### 3.3 Uncertainty and cash flow rights

Table 2 illustrates the impact of uncertainty on voting rights. When the uncertainty  $\sigma$  increases, the voting rights of entrepreneurs  $V_{Re}$  increase, while the voting rights of investors  $V_{Ri}$  decrease. This result represents the previous study, in that the investor requests higher profitability in the case of much uncertainty. The model allocates higher profitability to the investor in the case of higher uncertainty, while it provides more control right to the entrepreneur to handle such uncertainty. However, it seems reasonable that the entrepreneur assumes all monetary merit and risk from this uncertainty.

Regarding profitability, as uncertainty  $\sigma$  increases, the investor’s profitability  $r_i$  increases, while the entrepreneur’s profitability  $r_e$  decreases. This is a type of trade-off between control rights and cash flow rights from a risk-hedging perspective. This model represents the previous study, in that the control rights and cash flow rights are complementary.

Table 2. Impact of uncertainty

Uncertainty $\sigma$	V0	S0	B0	VRe	VRi	Profitability	
						re	ri
0.00	91.0	36.4	54.6	40.0%	60.0%	10.0%	10.0%
0.10	91.0	36.5	54.5	40.1%	59.9%	10.0%	10.0%
0.20	91.0	38.3	52.6	42.1%	57.9%	9.0%	10.7%
0.30	91.0	42.3	48.7	46.5%	53.5%	7.0%	12.3%
0.40	91.0	47.0	44.0	51.6%	48.4%	4.9%	14.3%

$V_T=US\$150$ million,  $F=US\$90$ million,  $T=5$ years,  $r=10\%$

### 3.4 Expansion to the premium calculation

The model has the potential capability to justify or calculate the premium as a function of uncertainty. Premium  $P$  is the initial payment, separately paid to the entrepreneur when the investor decides to invest in the venture company. This amount is decided through negotiations between the entrepreneur and the investor, and no clear guideline exists to calculate. The actual exposure of the entrepreneur  $S_{real}$  and the investor  $B_{real}$  can be calculated as a function of uncertainty:

$$S_{real} = S_0(\sigma) - P \tag{9}$$

$$B_{real} = B_0(\sigma) + P \tag{10}$$

Then, P can be calculated:

$$P = P(\sigma) = B_{real} - B_0(\sigma) = S_0(\sigma) - S_{real} \tag{11}$$

The above equation indicates that P is also the function of uncertainty  $\sigma$ . This is a critical characteristic to justify the relationship between the premium and uncertainty. For example, if the entrepreneur and the investor agreed that their profitability should be the same under risk-free conditions, then  $S_{real}$  and  $B_{real}$  can be considered as  $S_0(\sigma = 0)$  and  $B_0(\sigma = 0)$ , as in Table 2. Therefore, premium P can be calculated as a function of uncertainty  $\sigma$  through the following equation:

$$P = P(\sigma) = B_0(\sigma = 0) - B_0(\sigma) = S_0(\sigma) - S_0(\sigma = 0) \tag{12}$$

### 3.5 Validating the model

When entrepreneurs decide to invite investors to a venture company, investors will request appropriate returns on their investment to satisfy their internal criteria. Entrepreneurs may alternatively request a premium for their invitation, although investors consider this premium as a part of their investment.

An initial negotiation is typically made between entrepreneurs and investors by considering the venture company’s expected value through an independent valuation and estimation. If the company’s estimated value differs between entrepreneurs and investors and substantially deviates from an acceptable level, an initial contract cannot be concluded. In other words, when the initial contract concludes, a significant gap does not exist in the company’s expected values as calculated by both entrepreneurs and investors. Therefore, it can be observed that the model explains this implied initial agreement, and its application in the actual contract is realistic.

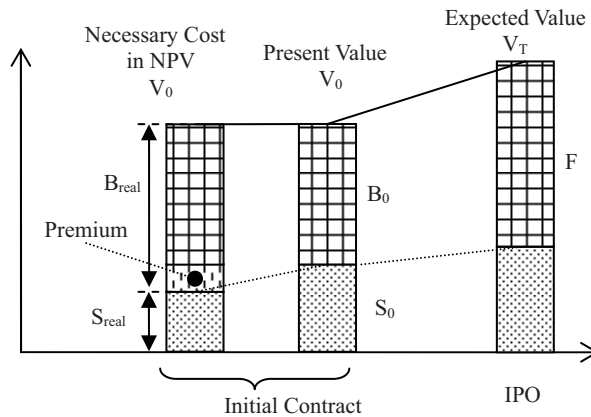


Figure 6. Shared Allocation at the Initial Contract

## 4. Application to Multi-Stage Financing

### 4.1 Period remaining in the target year

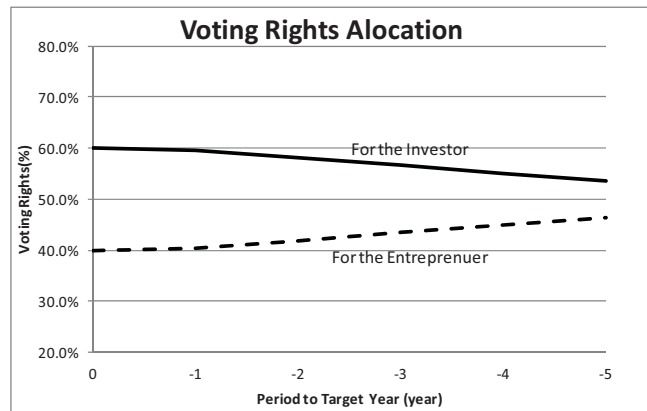
Figure 7 provides a numerical example of the model demonstrating the relationship between the remaining period  $t$  and voting rights. The entrepreneur’s voting rights  $V_{Re}$  are greater at the early stage to allow the entrepreneur to more easily control the company; as the period becomes closer to the target year, voting rights decrease to approximately 40%. Alternatively, investors’ voting rights  $V_{Ri}$  increase as the period is close to the target year to allow investors to become involved in the company’s operations and more easily request repayment. As  $V_T$  is set at \$150 million and  $F$  equals \$90 million, the following equation can calculate the monetary contribution at the target year:

$$(V_T - F) / V_T = 40\% \text{ (entrepreneur)} \tag{13}$$

$$F / V_T = 60\% \text{ (investor)} \tag{14}$$

Therefore, the model correctly reflects the entrepreneur’s and investor’s monetary contributions at the target year. This trend is enhanced if the volatility is greater.





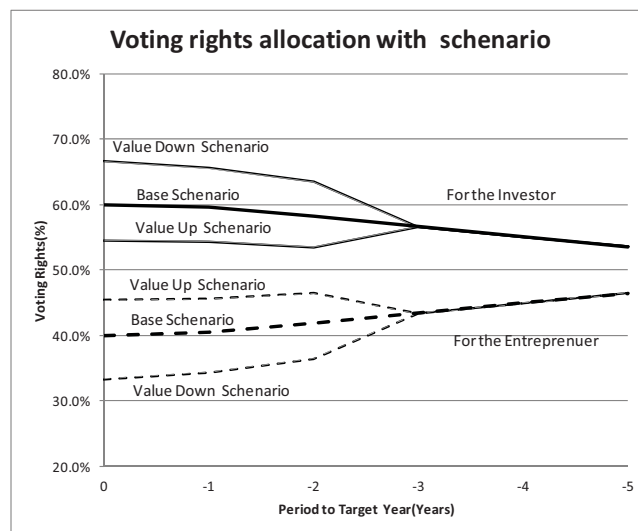
(VT = \$150 million, F = \$90 million, r = 10%, σ = 0.3)

Figure 7. Voting Rights—Period Remaining to Target Year

4.2 Change in target value

Figure 8 illustrates the change in voting rights allocations between the entrepreneur and investor in the scenario in which the target value changes. These scenarios include:

- ‘Value up’ scenario (+10%): A VT increase in the -2 year, from \$150 to \$165 million
- ‘Value down’ scenario (-10%): A VT decrease in the -2 year, from \$150 to \$135 million



(VT = \$150 million, F = \$90 million, r = 10%, σ = 0.3)

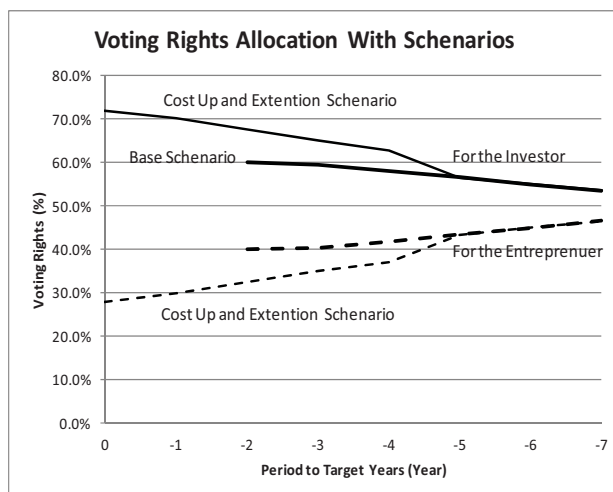
Figure 8. Study of Changes in Target Value Scenarios

Renegotiation in multi-stage financing will be made at every financial stage using the new obtained information. In this case, the entrepreneur’s voting rights VRe increase as an incentive as the VT increases, while the investor’s voting rights VRi decreases. In contrast, the entrepreneur’s voting rights VRe decrease as the VT decreases, while the investor’s voting rights VRi increase to strengthen indicating and monitoring rights.

4.3 Further downside scenario

Figure 9 illustrates the change in voting rights allocations between the entrepreneur and the investor with a ‘cost up’ scenario, as well as an extension of the development period as a ‘down side’ scenario. This scenario is described as follows:

- Three years after the investment decision (two years from the original target year and four years to the new target year), it was discovered that development costs would increase.
- Investors would compensate for this by investing additional funds, equal to 20% of the original F (or \$90 to \$108 million).
- The development period would be anticipated to extend by two years.
- The VT does not change, at VT = \$150 million.



(VT = \$150 million, F = \$90 million,  $r = 10\%$ ,  $\sigma = 0.3$ )

Figure 9. 'Down Side' Scenario—Increased Development Costs with a Period Extension

Figure 9 indicates that if the development status information is found to have worsened, then voting rights are significantly affected. Further, a cash-constrained entrepreneur typically cannot absorb incremental development costs, and investors might invest additional funds under severe monitoring. As a result of this new investment, the investor's voting rights  $VRI$  would increase to allow for the investor to have severe monitoring rights.

## 5. Conclusion

This study proposes an allocation model for the control rights between the entrepreneur and the investor. This model is based on the zero coupon bond model, and interprets the behaviour of entrepreneurs and investors that previous studies have revealed and explained. In other words, this model essentially illustrates the contract between entrepreneurs and investors.

Considering entrepreneurs' weaker negotiation power due to cash limitations, the model's application as a negotiation rule in multi-stage financing can protect entrepreneurs by providing a level playing field to negotiate with investors. Moreover, the allocation of greater control rights to entrepreneurs when the situation progresses well, and to investors when it does not, is essentially acceptable for both entrepreneurs and investors. The model has the capability not only to allocate cash flow rights as a complementary set of control rights, but also the potential to quantify and justify the premiums paid by the investor to the entrepreneur. Further study is anticipated in this area.

Finally, this model is the first to distribute control rights by the progress of development. Stock options from the initial public offering are used as a tool to motivate entrepreneurs; however, the model provides a new idea of incentives to allocate greater control rights to entrepreneurs based on target values in the future.

## References

- Aghion, P., & Bolton, P. (1992). An incomplete contracts approach to financial contracting. *The Review of Economic Studies*, 59(3), 473-494. <https://doi.org/10.2307/2297860>
- Galai, D., & Wiener, Z. (2008). Stakeholders and the composition of the voting rights of the board of directors. *Journal of Corporate Finance*, 14(2), 107-117. <https://doi.org/10.2139/ssrn.1087905>
- Gebhard, G., & Schmidt, K. M. (2006). *Conditional allocation of control rights in venture capital finance*. Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=911527](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=911527)
- He, E. & Sommer, D.W. (2010), Separation of ownership and control: Implications for board composition. *Journal of Risk and Insurance*, 77(2), 265-295. <https://doi.org/10.1111/j.1539-6975.2010.01351.x>
- Hellmann, H. T. (1998). The allocation of control rights in venture capital contracts. *The Rand Journal of Economics*, 29(1), 57-76. <https://doi.org/10.2307/2555816>
- Kaplan, S. N., & Stromberg, P. (2003). Financial contracting theory meets the real world: An empirical analysis of venture capital contracts. *The Review of Economic Studies*, 70(2), 281-315. <https://doi.org/10.1111/1467-937x.00245>

- Li, Y., & Zhou, Z. (2012). Research on the allocation of cash flow rights and control rights in venture capital financing contract. *Modern Economy*, 3(1), 54-60. <https://doi.org/10.4236/me.2012.31008>
- Marx, L.M. (1998). Efficient venture capital financing combining debt and equity. *Review of Economic Design*, 3(4), 371-387. <https://doi.org/10.1007/s100580050022>
- Merton, R. (1973). On the pricing of corporate debt: The risk structure of interest rates. *The Journal of Finance*, 29(2), 449-470. <https://doi.org/10.1111/j.1540-6261.1974.tb03058.x>
- Sakakibara, H., Ishida, S., Genba, K., & Tao, K. (2012). Study on the allocation model of control rights for an R&D-oriented venture company based on the future company value and its application to staging capital with financing rounds (in Japanese). *Journal of the Japan Association for Management Systems*, 29(2), 113-121.
- Van der Burg, T., & Prints, A. (2010). Empowering firm owners by separating voting from buying and selling shares. *Review of Social Economy*, 68(1), 69-91. <https://doi.org/10.1080/00346760902908708>

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# Sustainability and Competitiveness of Thailand's Natural Rubber Industry in Times of Global Economic Flux

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## Abstract

This study assesses economic, legal, and environmental conditions that Thai rubber farmers face, and evaluates actions they can take to increase incomes. Statistical analyses determine relationships between prices of oil, natural and synthetic rubber. Pearson correlation tests found a strong positive relationship ( $r = 0.887$ ) between the price of Brent crude and Thai ribbed smoked sheets, and a moderate positive relationship between price changes in Brent and synthetic rubber ( $r = 0.648$ ). Regression analysis showed Brent oil price is a good predictor of natural rubber prices. Moderate to strong positive relationships were also found between natural rubber price and gross domestic product of Japan, China, and the United States. Criminal antitrust behavior in rubber industries appeared to interfere with normal pricing in rubber markets. No significant bivariate correlation was found between rainfall in Thailand and natural rubber price, production, or export although flooding and other environmental issues clearly affected rubber farms. A survey of options showed Thai rubber farmers can improve livelihoods best through collective purchase and use of new technologies, and by integrating into downstream supply chain industries. At very least, farmers are urged to abandon monocrop methods and supplement incomes with fruit, fish, livestock, or pigs.

**Keywords:** Natural rubber; agronomics; southeast Asia; international trade

## 1. Introduction

“Rubber is an indispensable resource,” according to Thailand’s Board of Investment (2017). Rubber products, from auto parts to medical supplies, are vital to the world’s businesses and consumers. Regardless of the product or where it is manufactured, there is a good chance that the raw material came from Thailand – the world’s top natural rubber (NR) producer and exporter. Thailand, Indonesia, and Malaysia account for about 70 percent of the world’s NR, with Thailand contributing more than half of their combine 8.36 million tons in 2015 (Thailand Board of Investment, 2016). Synthetic rubber (SR) holds a slightly larger market share than NR, but NR is more resilient and longer lasting, making it irreplaceable for various products such as aircraft tires (Emspak, 2014).

Almost all NR comes from a single species of tree, *Hevea brasiliensis*, which is native to humid tropical climates like Thailand, especially the southern region. In 2015, Thailand exported \$6.6 billion worth of standard Thai rubber (STR) blocks, ribbed smoked sheets (RSS), and other rubber products (Thailand Board of Investment, 2016). Despite the gargantuan numbers, rubber farming is still a family business. More than 85 percent of the world’s and 90 percent of Thailand’s rubber plantations are operated by smallholders whose farms are as modest as 0.3ha (Yamamoto, 2016). Whereas Malaysia has transitioned from farming to higher value finished products, Thailand still largely specializes in raw materials, STR and RSS (Doner & Abonyi, 2013). Thailand is now seeking to create opportunity, value, and income for NR farmers, but challenges persist.

### 1.1 Background Research

Chawananon (2014) studied interrelationships between rubber production and price, rainfall, THB/USD exchange rate, rice price, rainfall, US vehicle sales, and GDP per capita in China, Japan, and the United States. The study found a positive relationship between rubber demand and US GDP per capita; when GDP per capita rises, automotive sales generally rise, creating greater demand for rubber. While rubber demand does not change significantly with price changes, rainfall can affect supply and, in turn, producer incomes.

Farmers’ decisions to monocrop rubber or intercrop are influenced by market prices of alternative crops just as natural rubber consumers’ decisions are affected by the price of its main competitor: synthetic rubber. As a

petroleum product, synthetic rubber prices are impacted by oil prices. High oil prices result in higher SR prices, making NR a more viable option for consumers. Alternatively, low oil prices make SR prices more competitive and NR demand suffers (Romprasert, 2009; Petchseechoung, 2016).

Synthetic rubber does not create an existential threat to NR production considering NR is a renewable resource whereas petroleum is nonrenewable and may likely fall into shortage within the 21st century (OPEC; Murray, 2016). Thus, NR is inherently sustainable and competitive to some extent in the long term, but how efficiently shareholders manage their industry in perpetuity will determine the direction and magnitude of impacts to surrounding economic and ecological spheres. The immediate problems that farmers face relate to income and price stability; in the medium and long term, environmental responsibility will probably gather more attention.

Financial survival is the instant issue for small farm owners, and thus for nearly every rubber farmer in Thailand. Average rubber farm sizes in Thailand are between four and five hectares, and nearly all of these smallholders monocrop, resulting in less than \$500 net income per year per ha (Jongrungrot et al., 2014; Pongchompu et al., 2015). Meager household incomes among rubber farmers help explain how roughly one-third of the Thai workforce is employed in agriculture, but agriculture contributes only 8-9 percent to GDP (World Bank, 2017a). While two to three thousand USD per year puts Thai rubber farmers well above the global poverty threshold, it does little to provide them and their families opportunity to develop themselves and their communities.

Viswanathan (2008) found rubber plantations in Songkhla, Thailand were significantly less profitable per hectare than plantations in Northeast India due primarily to Thai farmers shifting output from conventional RSS to lower-priced latex or STR. Farmers in Songkhla who had the highest incomes intercropped fruit and other foods, livestock and fisheries on their landholdings; their incomes were more than one-third higher than monocrop plantation owners. Studies consistently recommend addition of other crops alongside rubber trees to supplement income (Jalloh, et al, 2009; CIRAD, 2013; Wang, et al, 2014; Yu & Langenberger, 2016; Cadisch, 2016). However, smallholder farms like most in Thailand usually face significant difficulty diversifying their crops. Jongrungrot, Thungwa & Snoeck (2014) found small farm owners could mitigate rubber price volatility by adding other cash crops to lands, but they are consistently unable to undertake such changeovers due to lack of knowledge, skills, and labor.

Labor is ubiquitous in Asia, but knowledge and skills are often at a deficit in agricultural communities. In Thailand, only 65 percent of people aged 25 or older had completed primary school in 2016; those educational attainment rates fall to 45 percent, 32 percent, and 15 percent for lower secondary, upper secondary, and undergraduate university, respectively (World Bank, 2017a). A glut of laborers with low education has translated to short-sighted, inefficient, and inadvisable decisions in rubber industries throughout the region. Since 2000, for example, the area of land in southeast Asia under rubber farms has increased by more than 50 percent; much of the growth came from clearing natural forest. The preferred method for clearing throughout the region is slash-and-burn, which generates mammoth amounts of greenhouse gases (Ketterings, 1999; Palm et al, 2005).

Transition into NR farming entails massive-scale landscape alteration, which if done arbitrarily can seriously affect hydrology, soil quality, streams and other elements of once-thriving ecosystems (Giambelluca, Chen, & Ziegler, 2016). By 2050, rubber farming in mountainous regions is expected to increase fourfold and across the southeast Asian region, NR farming could double or triple in the same time frame (Ziegler, Fox, & Xu, 2009; Fox, et al, 2014a). Growth in NR plantations is fueled by increasing demand for rubber, generally for tires in China, Japan, the United States, and Europe. In the short term, farmers who convert other croplands to NR may earn a higher income, but due to poor selection of farmlands and inferior monoculture methods, their long term future may be jeopardized. Ahrends et al. (2015) found more than half of rubber plantations in southeast Asia are “unsustainable” due to marginal lands where low yields are likely. In addition to environmental degradation (i.e. surface erosion, loss of soil quality, risk of landslides, increased carbon emissions, etc.), the poorly-planned rubber boom could result in severe, negative economic repercussions (Fox, et al, 2014b; Van de Moortel, 2016).

As demonstrated by the number of smallholder plantations, subsistence farming is a longstanding tradition in Southeast Asia. However, the antiquated techniques that small agro-businesses often employ resemble what the Thai government has called “Thailand 1.0.” The current vision is to move into “Thailand 4.0” and thereby ensure sustainability, competitiveness, inclusive prosperity, and escape from the middle income trap (Royal Thai Embassy, 2017). Adaptation in the agriculture sector is fundamental to achieving national goals not only because one in three Thais work in the industry, but also because farming is central to the Thai identity – technological and scientific evolution of small farms would provide social and psychological boosts alongside economic gains.

### *1.2 Research Objectives*

This research is designed to understand factors currently limiting the sustainability and competitiveness of

Thailand's rubber farming industry, particularly smallholder operations. In this research, the term "sustainability" is defined as the ability to be maintained at a certain rate or level. Sustainability has both economic and environmental implications; it refers to continuing growth in economic terms, and avoidance of depletion of natural resources in order to maintain an ecological balance. "Competitiveness" is defined as the quality of being as good or better than others. In this research, competitiveness refers to price and quality of Thai rubber products, and efficiency of related industries.

Existing literature on the subject provides significant insight on environmental and economic factors, but prior research is generally compartmentalized and incomplete. Environmental research lacks detailed economic and business analysis. Likewise, studies that weigh in heavily on economics typically fail to consider social, environmental, legal or other factors. Literature commonly reviews, analyzes, and recommends policy relating to tax, subsidies, and land-use but fails to comment on antitrust in rubber industries which can severely distort markets. Researchers also routinely recommend government expenditures to upgrade agricultural operations while overlooking financial details.

This article aims to address multiple issues together, shedding light on interrelationships among factors. First, the author intends to independently confirm or disconfirm prior research on the price and production of natural rubber, and their relationships with other marketplace variables such as oil price, world consumption of synthetic rubber, exchange rate, rainfall, foreign GDP and GDP per capita. Next, the strength and direction of those relationships lead to discussion of interfering forces including natural disasters, antitrust, protests and government price intervention. Then, considering the complex matrix of factors influencing the price of NR and therefore incomes among Thai farmers, the researcher provides analysis and recommendation that promote sustainability and competitiveness in Thai NR industries. For example, growth and stability may require formation of farming cooperatives that function as juristic persons, and domestic forward integration into downstream supply chain businesses. Additionally, the research explores measures that farmers can take under the classic "sufficiency economy" model for cases where adoption of costly technologies is not an option. Conclusions implore all interested stakeholders to engage a long-term collective process of modernization in Thai rubber industries; research, revised policy, education and training, and investment are all fundamental to ensuring sustainability and competitiveness in Thai rubber industries.

## 2. Methodology

Data were retrieved electronically from various public databases. The Bank of Thailand (2015), Thai Rubber Association (2016), US Bureau of Labor Statistics (2017), US Federal Reserve Bank of St. Louis (2017), and Quandl (2017) provided statistics on NR and SR production, consumption, export, and price. The St. Louis Federal Reserve (2017) also provided exchange rate data. The US Energy Information Administration (2017) provided price data for Brent and WTI oil. Data were formatted into Excel and SPSS for graphical representation and statistical testing.

Data assumptions were tested prior to interpreting results. Data was normally distributed as assessed by normal Q-Q plots and Shapiro-Wilk tests. Scatterplots showed the data met assumptions of homogeneity of variance and linearity. Normal P-P plots confirmed the homoscedasticity assumption.

## 3. Results & Discussion

### 3.1 Oil & Rubber

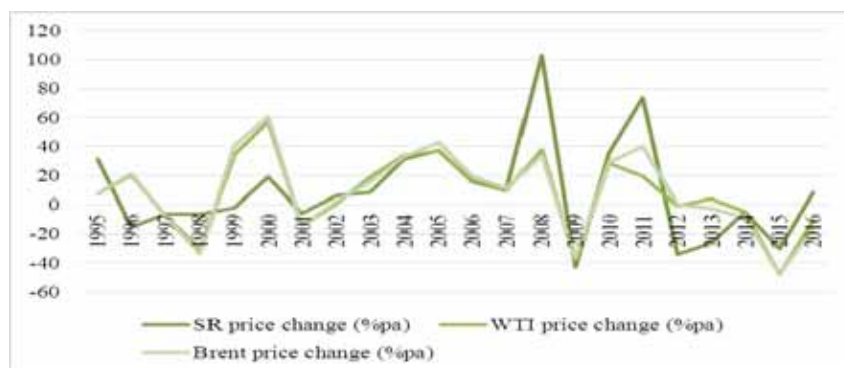


Figure 1. Oil price and SR price

Average price fluctuations for SR and oil appear to follow one another when represented graphically. For the period between 2001 and 2007, price changes are nearly identical. In other periods, the relationship is not as

strong, but peaks and troughs still correspond with one another.

To examine the relationship between these variables more closely, a Pearson correlation test was conducted which showed moderate statistically significant positive linear relationships between year-on-year (YoY) price changes in SR and both WTI ( $r = 0.629, p = 0.002$ ) and Brent ( $r = 0.648, p = 0.001$ ). No significant relationship was found between SR price change and changes in production or consumption of SR, showing that SR is relatively price inelastic.

Table 1: Pearson bivariate correlations for oil, SR price, production, and consumption

Despite SR's relative price inelasticity, we assume that the law of demand holds true and that as price rises, consumers will attempt to substitute products when they are available in order to minimize costs and maximize their profits as rubber passes down the supply chain. Upon examining a graphical representation of YoY price change for RSS and SR, we see local minima and maxima do not align; rather, they are nearly opposite each other. Even though both prices may be rising over time, one rises faster than the other, which creates a perfect opportunity for consumers to switch based on price.



Figure 2. SR and RSS price change, percent per annum

Figure 2 supports prior research on the relationship between SR and NR, and when combine with correlations presented in Table 1, prior research on relationships between oil price, SR and NR price are supported. Further examination via Pearson bivariate correlations showed a strong significant positive linear relationship between WTI and RSS prices ( $r = 0.868, p < 0.0005$ ) and Brent and RSS prices ( $r = 0.887, p < 0.0005$ ). The correlation analysis found a moderate negative relationship between STR price and oil, which raised questions of an interfering factor given that STR is a NR product whose price should follow a similar curve as RSS.

Table 2. Pearson bivariate correlations for oil, STR, & RSS

	WTI Oil Price (\$/bbl)	Brent Oil Price (\$/bbl)	TH RSS Price (THB/kg)	STR Price (THB/kg)
WTI Oil Price (\$/bbl)	1	.991**	.868**	-.645**
		.000	.000	.001
	22	22	22	22
Brent Oil Price (\$/bbl)	.991**	1	.887**	-.660**
	.000	.000	.001	
	22	22	22	22
TH RSS Price (THB/kg)	.868**	.887**	1	-.686**
	.000	.000	.000	
	22	22	22	22
STR Price (THB/kg)	-.645**	-.660**	-.686**	1
	.001	.001	.000	
	22	22	22	22

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 3. Partial correlations oil, STR, & RSS

Control Variables	WTI Oil Price (\$/bbl)	Brent Oil Price (\$/bbl)	STR Price (THB/kg)	TH RSS Price (THB/kg)
WTI Oil Price (\$/bbl)	Correlation	1	0.965	-0.136
	Significance (2-tailed)	.	0	0.556
	df	0	19	19
Brent Oil Price (\$/bbl)	Correlation	0.965	1	-0.151
	Significance (2-tailed)	0	.	0.515
	df	19	0	19
STR Price (THB/kg)	Correlation	0.136	-0.151	1
	Significance (2-tailed)	0.556	0.515	.
	df	19	19	0

A partial correlation test confirmed presence of a confounding factor. Correlations between RSS, WTI and Brent prices almost completely explain bivariate correlations between STR, WTI and Brent. The partial correlation between both variables is very weak and not significant ( $r = 0.136, p = 0.556$ ). One possible explanation for this scenario is that STR is a lower-quality, lower-price product than RSS. When oil price rises, RSS price likewise rises and that may cause changes in production; producers may switch from STR to RSS when RSS prices are higher, or there may be a relative scarcity of NR products in the market as oil prices drive up SR prices and consumers choose NR as a substitute.

Brent and RSS shared a stronger correlation ( $r = 0.887$ ) than RSS and WTI ( $r = 0.868$ ). The strength of their correlation implies that, regardless of causative direction, the price of Brent has predictive value for the price of RSS. A linear regression analysis ( $r = 0.887, F = 74.154, p < 0.0005$ ) produced an R-squared value of 0.788, indicating the regression explains 77.8 percent of variance in the data. The regression equation is,

$$\text{RSS price in THB} = 14.051 + 0.873 * (\text{Brent price in USD})$$

Tables 4-6: Linear regression analysis for RSS & Brent oil price

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.887 <sup>a</sup>	.788	.777	15.92097

a. Predictors: (Constant), Brent Oil Price (\$/bbl)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18796.238	1	18796.238	74.154	.000 <sup>b</sup>
	Residual	5069.543	20	253.477		
	Total	23865.781	21			

a. Dependent Variable: TH RSS Price (THB/kg)  
b. Predictors: (Constant), Brent Oil Price (\$/bbl)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.051	6.448		2.179	.041
	Brent Oil Price (\$/bbl)	.873	.101	.887	8.611	.000

a. Dependent Variable: TH RSS Price (THB/kg)

Oil price affects SR price, which affects NR demand and price, but oil price is also a reflection of global economic conditions. During periods of growth, incomes rise and people buy more cars, more oil is consumed for electricity generation and transportation, and oil stocks cannot grow significantly, which maintains a higher price per barrel. In times of economic hardship, economies contract or grow slowly and oil surpluses accumulate, pushing prices down in periods of oversupply. When there is too much oil in the marketplace, SR producers can purchase raw materials cheaply, which leads to lower SR prices. Conversely, when oil is in higher demand than supply, SR prices rise and NR becomes a more precious commodity.

### 3.2 GDP, Exchange Rate, & Government Policy

NR is mainly produced in southeast Asia, but it is consumed in every country; thus, the livelihoods of family farms in rural Thailand are constrained by circumstances entirely out of their reach. When market prices for RSS fall to near or below production cost, Thai farmers have oft threatened or moved to protest, demanding the Thai government intervene (Campbell, 2013; Kaewjinda, Thepgumpanat, & Niyomyat, 2014; Peel, 2016). The government has on many occasions artificially propped up the price of rubber in order to support struggling farmers, but each time it is only a temporary fix which possibly causes more harm than good in the long term.

In 2001—02, Thailand’s then-Prime Minister Thaksin Shinawatra sought an “acceptable” price of 1 USD/kg for RSS, which amounted to 43—45 THB/kg (Moore, 2002). Thailand, Malaysia, and Indonesia formed the International Tripartite Rubber Organization (ITRO) around the same time in attempts to exert upward pressure



on the price of rubber, but less than one year into the agreement, the group was not adhering to its quotas (Economist, 2003), and so while prices overcame the one-dollar threshold, they failed to remain stable through years. The exchange rate also fluctuated, so the price paid to farmers in Thailand did not reflect the increasing USD-based global price. By 2010–2013, the once-fair price of 1 USD/kg only amounted to 30–31 THB/kg. Meanwhile, inflation increased the production costs for farmers who would demand 60 THB/kg by 2016 (Reuters, 2016). In 2017, the government had intervened again, hoping to push the price to 70 THB/kg, worth about 2 USD (Thaicharaoen, Hariraksapitak, & Thepgumpanat, 2017).

Table 7. Pearson bivariate correlations for RSS price, exchange rate, and GDP

		TH RSS Price (THB/kg)	THB/USD Ave Rate
TH RSS Price (THB/kg)	Pearson Correlation	1	-.408
	Sig. (2-tailed)		.059
	N	22	22
THB/USD Ave Rate	Pearson Correlation	-.408	1
	Sig. (2-tailed)	.059	
	N	22	22
CN GDP per capita	Pearson Correlation	.584**	-.323
	Sig. (2-tailed)	.004	.143
	N	22	22
US GDP per capita	Pearson Correlation	.654**	-.101
	Sig. (2-tailed)	.001	.656
	N	22	22
JP GDP per capita	Pearson Correlation	.755**	-.614**
	Sig. (2-tailed)	.000	.002
	N	22	22
CN GDP	Pearson Correlation	.576**	-.320
	Sig. (2-tailed)	.005	.147
	N	22	22
US GDP	Pearson Correlation	.652**	-.125
	Sig. (2-tailed)	.001	.580
	N	22	22
JP GDP	Pearson Correlation	.780**	-.592**
	Sig. (2-tailed)	.000	.004
	N	22	22
** . Correlation is significant at the 0.01 level (2-tailed).			
* . Correlation is significant at the 0.05 level (2-tailed).			

### 3.3 Anticompetitive Behavior

GDPs of the world’s largest economy and biggest auto parts market, and the world’s largest producer of rubber products were only moderately correlated to RSS price. At the macro-level, myriad mitigating factors could be present. One possible explanation is the influence of price fixing and anticompetitive behavior in rubber markets. As the Thai government and ITRO attempt to keep NR prices high through supply side measures, it is logical that similar attempts to keep NR prices low could occur on the demand side. And there is some evidence of such activity as billions of dollars in fines have been levied in recent years against major corporations whose actions severely distorted market prices of rubber products.

Automotive parts suppliers, and tire manufacturers in particular, have been caught fixing prices and rigging bids. Federal Courts in the United States fined Yamashita Rubber \$11 million (US v. Yamashita Rubber, 2013), Toyo Tire \$120 million (US v. Toyo Tire & Rubber, 2013), Bridgestone \$425 million (US v. Bridgestone, 2014), and Nishikawa \$130 million (US v. Nishikawa Rubber, 2016). Tire manufacturers continue to face prosecution for

Exchange rate fluctuations seriously impact import and export economies. Thailand, which relies on exports and tourism as macroeconomic staples, benefits from a high THB/USD ratio. Like the Chinese Yuan, the Thai Baht has been called “undervalued” (Danielsen, 2017). Cumperayot & Kouwenberg (2016) found developing nations sometimes use strategic policy to undervalue their currencies, resulting in limited domestic growth. In the case of rubber, undervaluation is the sort of magic that turns 50 Baht into 70 Baht, regardless of external consequences. Prior research on rubber pricing found significant correlations between exchange rate and NR price, but this research did not support those historical studies. A Pearson bivariate correlation test showed no relationships between RSS price and exchange rate significant to the 0.05 level.

Analysis confirmed moderate to strong positive correlations between RSS price and GDP indicators for China, the United States, and Japan. Whereas prior research focused on GDP per capita, the present study included both aggregate GDP and per capita statistics in analyses, finding only slight differences between the two measures. GDP per capita shared a slightly higher correlation with RSS price in the US ( $r = 0.654$ ) and China ( $r = 0.584$ ) than GDP (US,  $r = 0.652$ ; CN,  $r = 0.576$ ) whereas in Japan, RSS was more highly correlated with GDP ( $r = 0.780$ ) than GDP per capita ( $0.755$ ).

anticompetitive behavior in South Africa, India and elsewhere (Goodyear & Continental South Africa v. Competition Commission, 2016; Patel, 2016). Conspiracies to fix prices and control markets have also been found in synthetic rubber industries. In 2007, the European Union imposed nearly \$700 million in fines for price fixing and market sharing against an SR cartel consisting of Bayer, Dow, Eni, Shell, Unipetrol, and Trade-Stormil (De Luca & List, 2007). Just prior, US Courts fined DuPont Dow \$84 million for price fixing in SR markets (US v. DuPont Dow, 2005).

Companies stand to make hundreds of millions or billions of dollars from criminal activity, and in many cases their rewards are greater than the fines imposed, so there is no reason to suspect such anticompetitive behavior will cease. Precisely how much the price of NR or SR is affected by each individual case or the collection of cases together over time is unknowable, but the difference is certainly nonzero. There is also a less elegant way that prices are being distorted. Unlike oil, rubber is a perishable commodity, so producers cannot stockpile surpluses during down periods while they wait for prices to rise; farmers could be forced to sell at low prices out of desperation. In Thailand, millions of farmers and middlemen trade agricultural commodities (rubber, rice, sugar, etc.), but farmers lack significant power in the supply chain and are largely subject to the demands of export purchasing agents. Anticompetitive practices could be rife within the hoard of producers, wholesalers, distributors, and exporters but the Thai government has remained inactive in pursuit of antitrust claims. Instead, the government merely intervenes and artificially increases the price of rubber every year or so, which may be incentive for exporters and global purchasers to maintain artificially low bids.

Thailand's government intervention programs also have had a sordid history, drawing complaints of excessive government spending and presence of corruption (Economist, 2003). Former Prime Minister Yingluck Shinawatra was fined \$1.4 billion for criminal negligence in a costly, corruption-laden rice subsidy program that aimed to pay farmers 50 percent above market prices in order to raise production without concern for quality, leaving the government to pick up the enormous tab and deal with warehouses full of perishable rice (Chantanusornsiri & Yuthamanop, 2012; Yee, 2016). While the present research has no evidence supporting any claim against the integrity of the rubber subsidy scheme, it is clear that market dysfunction is intrinsic to the process. Kampan (2016) recommended integrated supply chain logistics throughout the ASEAN rubber farming regions in efforts to streamline efficiencies and help minimize price volatility. If the Thai government simply monitored potential collusion and bid rigging among middlemen in their domestic markets, and investigated and prosecuted cases involving price fixing and other anticompetitive behavior, a missing link could be unearthed between Thai exporters and global firms like those fined in the United States and Europe. While it is impossible to determine the degree to which corruption and other criminal business behavior jeopardizes fair pricing for farmers, there is reason to suspect impacts are significant.

### 3.4 Environment

Rubber farming has a natural advantage in that it requires planting of trees, which can help reverse the trend of deforestation and improve atmospheric quality. In Thailand, rubber production has increased alongside both the forest area and agricultural land area since the early 2000s (Bank of Thailand, 2015; World Bank, 2017a), suggesting the rubber industry may have had a net positive effect on forestry. On the other hand, when natural forests are cleared and replaced with NR plantations, as in the cases of China and Indonesia, carbon emissions can skyrocket and biodiversity can be decimated (Arifin, 2013; Source Intelligence, 2016).

Table 8. Agricultural and forest land growth 1995-2014, % of total land area

Agricultural land growth	4.24%
Forest area growth	5.55%

Carbon emissions, like those from Indonesian forest fires, have been linked to climate change. Climate change may increase or reduce rainfall, which logically affects the health of trees. News and industry reports suggest periods of severe rainfall negatively impact rubber production and lead to periods of increased prices (Farchy, 2010; Japan Ministry of Economy, Trade and Industry 2012, p. 317-384). This research tested correlations between rainfall and NR price, production, and exports to assess the association between rain and rubber that prior research has shown.

Correlational analysis did not find any statistically significant relationship between annual rainfall and rubber production, exports, or price. These results contradicted prior research. One possible explanation is that Pearson tests in the present study attempted to pair rainfall across all of Thailand whereas rubber production is largely localized in the southern region. Unfortunately, data was not available for rainfall data in Songkhla province alone. The nature and volume of reports demonstrating a relationship between rain and NR price or production

suggest the present correlation probably has unexplained variables, and may not be reliable.

Table 9. Pearson bivariate correlations for rainfall and NR data

		TH annual rainfall
TH annual rainfall	Pearson Correlation	1
	Sig. (2-tailed)	
	N	21
STR Prod (Met Ton)	Pearson Correlation	-.101
	Sig. (2-tailed)	.709
	N	16
TH RSS Price (THB/kg)	Pearson Correlation	.196
	Sig. (2-tailed)	.395
	N	21
STR Price (THB/kg)	Pearson Correlation	.156
	Sig. (2-tailed)	.500
	N	21
TH Tot NR Prod (Met Ton)	Pearson Correlation	-.293
	Sig. (2-tailed)	.270
	N	16
TH Tot NR Exports (Met Ton)	Pearson Correlation	-.325
	Sig. (2-tailed)	.220
	N	16
**. Correlation is significant at the 0.01 level (2-tailed).		
*. Correlation is significant at the 0.05 level (2-tailed).		

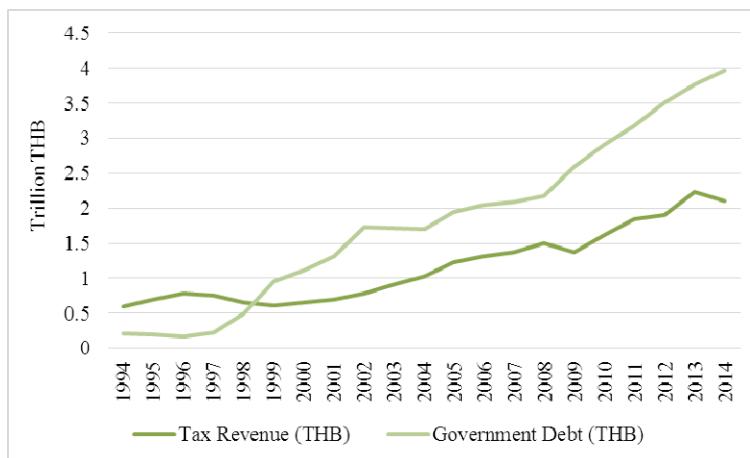


Figure 3. Thailand tax revenue and government debt

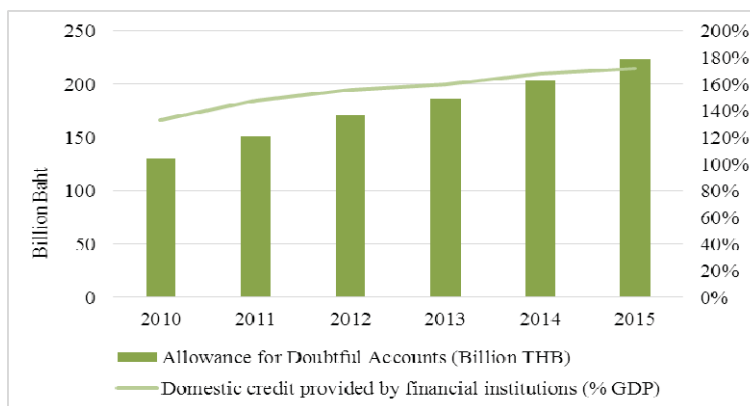


Figure 4. BAAC Allowance for Doubtful Accounts

Periods of high rubber prices like those between 2010 and 2012 can lead to a surge in new plantations, many of which are poorly planned and located. Prior research criticized suboptimal selection of rubber plantation lands for increasing environmental risks. Farms born out of desperation can also lead to lower NR prices when oversupply occurs following the 5 to 7-year gestation period for new trees. Meanwhile, farmers who fail to remove trees over age 30 reduce efficiency of their lands (Rubber Board, 2002). Thus, land management is an integral part of the science of farming that has been overlooked, which has detrimental environmental and economic effects.

### 3.5 Evolution of Sufficiency Economy

Thailand 4.0 aims to create “smart farmers” who use technology and manage efficiencies more precisely (Royal Thai Embassy Washington DC, 2017). Several authors on the subject recommended Thailand expand its rubber industry into downstream industries so the country can capitalize on what appears could be a natural comparative advantage in export-quality rubber products (Kampan, 2016; Yamamoto, 2016). Updated and upgraded farming methods would undoubtedly improve sustainability and competitiveness, however, it remains uncertain how farmers can fund any elaborate improvements.

#### 3.5.1 Financing Technology Acquisition

Saidur & Mekhilef (2010) discussed energy usage in the rubber industry in Malaysia, where about 90 percent of domestically-farmed NR is consumed and processed domestically. By comparison, roughly 90 percent of Thai

NR is exported (Doner & Abonyi, 2013), thus increasing energy consumption along the supply chain. Yamamoto (2016) recommended locally washing, processing, drying and packaging RSS rather than selling STR directly from farms. Forward integration via technology adoption would reduce transportation costs and emissions, provide farmers with greater income, and improve quality but at a cost that smallholders usually cannot afford.

Thailand's debt has exceeded its revenues for nearly two decades and the margin has only increased since the economy turned volatile following the global financial crisis. With budgets already stretched, farmers cannot rely on the government to foot the bill. The government already subsidizes interest rates for farmers at the state-sponsored Bank for Agriculture and Agricultural Cooperatives (BAAC), where the number of accounts in delinquency and default has steadily risen for years (BAAC 2014, 2015).

Domestic credit has also risen consistently for over a decade (World Bank, 2017a), but most of it appears to have gone toward car loans and consumer credit rather than small business expansion. Considering that small farmers can most often only qualify for a loan from the state-owned BAAC, personal loans and credit are not a feasible option for the mainstream smallholder. The World Bank (2017b, p. 55) found only one in ten SMEs in Thailand has a loan or line of credit, further showing that private lending is not an appropriate solution. Yamamoto (2016) suggested institutional support or cooperative purchasing for community use. While farmers usually lack the legal knowhow to construct corporations, the collective juristic person appears the most attractive option for raising capital. To accomplish any sort of scaled objectives on cooperatives, local government organization and oversight would be essential as subsistence farmers are not capable of such enterprise without guidance.

### 3.5.2 The Base Case: Better Agronomics

To take advantage of legal, financial, and technological options available in the marketplace, farmers or their agents need to be well-informed and able to make sound business decisions. Ideally, farmers themselves should have a bachelor's degree in a related field. In Thailand, however, they are more likely to have finished at most primary school. Currently, people of all ages in Thailand are undereducated, lacking the basic skills and knowledge required to function in a competitive economy whether agricultural, technological, financial or other. Maybe after several generations, something resembling universal secondary education can be achieved, but that goal is far from reality today.

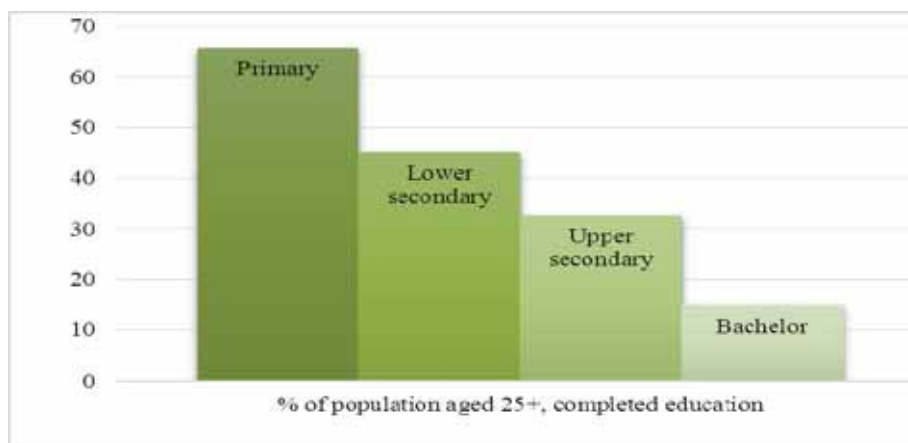


Figure 5. Thailand education deficit

Of course, in today's wired and connected world, everybody has access to knowledge for only the price of a mobile phone subscription. In Thailand, where there were an average 1.53 mobile phone connections per person in 2015, there is potential. However, while the percent of Thai people using the internet grew by more than 1100 percent between years 2000 and 2015, still less than half of the population uses it (World Bank, 2017a). In a global survey, Kemp (2015) found that although social media penetration in Thailand is roughly 50 percent, internet use rates are lower than global averages and growth is flat while e-commerce activity is low compared to other nations surveyed. Thais ranked fifth globally in time spent on social media, but one can safely assume that time spent sharing photos and liking posts on social network feeds will not translate to improved rubber farming techniques.

One of the key facts that farmers would find if they were using the internet for work-related research is that rubber has a long history of being a low-priced crop. In fact, the average price of NR was only over \$1/lb for 79 months between January 1980 and May 2017, and all of those months were since May 2006. There was a price spike in the aftermath of the 2008 financial crisis where NR price rose to a peak of nearly \$3/lb in early 2011 and

then steadily fell back down to 55 cents/lb by early 2016. Coincidentally, the area of land under rubber plantations grew significantly during the upswing in prices, and after about 5 years of gestation for new trees, oversupply helped bring the price of rubber down. Graphing NR price gives us a linear trendline equation where the slope is only  $0.0066x$ , meaning the average price of rubber increases a mere 0.66 cents per month, nowhere near enough to cover rises in costs.

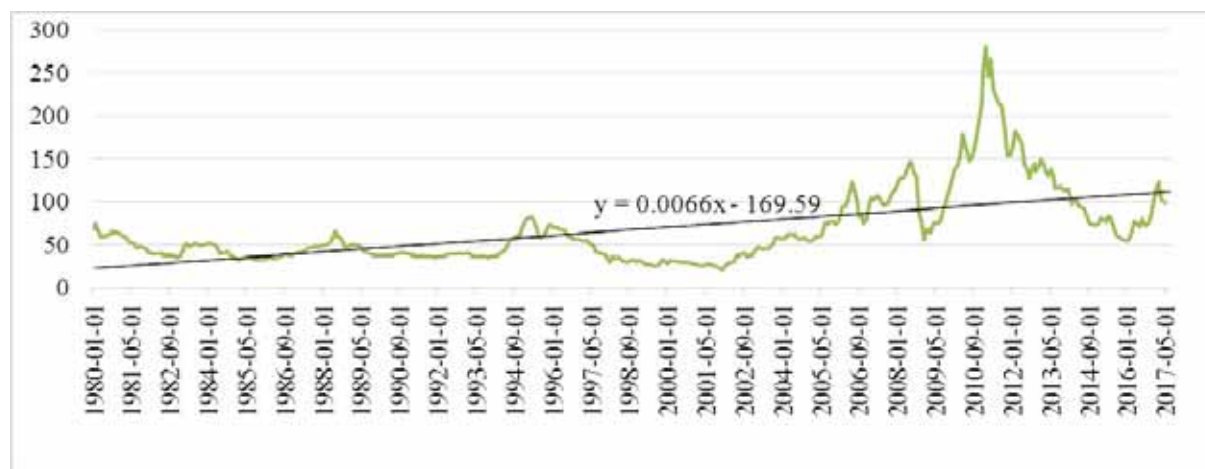


Figure 6. Price of rubber with linear trendline (\$0.01/lb)

Options for farmers to improve income and quality of life are few and far between without technical knowledge or pursuit of education, and lacking financial support. One thing is clear, though, the way forward is not to haphazardly plant more rubber trees in hopes of a nearly-miraculous surge in prices. Instead, smarter maintenance of existing farms is essential. Pragmatic analysis of the farming situation that takes into account the type of social and financial austerity of the people yields few alternatives other than government promotion of better farming practices under the sufficiency economy. Pongchompu & Chantanop (2015) recommended the Thai government, probably via the military and BAAC, make site visits to farms and demonstrate tapping and land management methods. Empirical studies have shown NR farmers who also tended fruit, fish, livestock, and pigs had incomes that were one-third or more greater than monocrop NR farmers (Cherdchom, Prommee & Somboonsuke, 2002; Jongrungrot, Thungwa & Snoeck, 2014). Monocropping offers farmers a sense of simplicity, but studies have shown there is no economic justification for limiting the number of income sources to only rubber; still, disseminating such information and making it understood in practice could present significant challenges.

#### 4. Conclusion

This research confirmed that the price of synthetic and natural rubber changes with the price of oil. Since SR can be a substitute for NR, and vice versa, their prices alternate with one higher while the other is lower. This study supported prior research and demonstrated when the price of oil rises, so does the price of SR, which drives increased demand for NR that in turn leads to higher NR prices. Statistical analyses showed the price of Brent crude oil is a very good predictor of the price of RSS. The research also showed that GDP and GDP per capita in China, Japan, and the United States share moderate to high significant positive correlations with RSS price. Considering the mass of data and commentary on the subject, one can deduce that oil price is a corollary to GDP, or conversely that GDP growth changes are responses to oil price changes, all of which affects rubber commodity prices.

Unlike prior research, this study did not find any significant relationship between exchange rate (THB/USD) and NR price. A multitude of interfering factors are considered present in the NR macro-environment, so it was impossible to isolate variables and pinpoint exactly what causes price fluctuations over time. One area of particular concern is antitrust in rubber industries as billions of dollars in fines have been levied against multinational corporations in recent years, which if viewed in the context of abnormal volatility in NR markets appears to suggest pervasive market manipulation. Whether or not Thai government subsidies and price intervention is helping or harming NR price stability and growth in the long term remains unknown. Also unknown is any extent to which domestic Thai middlemen, wholesalers and exporters have engaged in price fixing, but due to the relatively high likelihood of anticompétitive and predatory behavior in domestic Thai NR

trades, the Thai government should stay vigilant of suspicious activity and prosecute offenses when possible to deter such conduct.

Unlike prior research, this study did not find a significant relationship between annual rainfall and NR price, production, or export. Given the palpable manner in which heavy rainfall negatively impacts agriculture in general, the present findings regarding rainfall may be unreliable. Flooding in particular has become a threat to sustainable and competitive NR farming in parts of southern Thailand, so further research should be conducted on that subject focusing only on local plantations. Frequency of extreme weather events like flooding hinted at the potentially disastrous effects that climate change could manifest in the future. To help prevent climate change, farmers in the region should reduce or abandon carbon-intensive activities like slash-and-burn farming and clear-cutting natural forest. Literature found improper land management contributed to increased carbon emissions, soil degradation, erosion, and generally had negative impacts on waterways in the surrounding ecosystem.

Individual farmers were found to be poorly educated, which makes them unlikely to discover and implement improvement plans such as technology adoption or usage of optimal farming methods without government or other outside support. Ideally, smallholder farmers should form cooperatives which collectively borrow investment capital from BAAC to purchase drying, kneading, pressing and other processing technologies. Meanwhile, other industry shareholders with more access to funding should integrate forward into downstream rubber industries, ultimately making Thailand a one-stop shop for NR products from farmed raw materials to export quality finished goods. At the same time, farmers who are unable to engage in higher industrial pursuits should at very least stop monocropping; instead, they should incorporate fruits, fish, livestock, or pigs into their operations to increase and stabilize incomes.

Ensuring the sustainability and competitiveness of Thailand's NR industry is a multifaceted undertaking. While sustainability generally refers to environmental conditions, in Thailand there are human aspects to the term since a family simply cannot sustain a profession whose income does not exceed its costs. As inflation increases farm-related costs and NR prices fail to rise concurrently, farmers feel the pinch while downstream industries like tire manufacturers continue to improve their profit margins. Time and again, the burden has fallen on the Thai government to intervene and pay farmers a price for NR that at least covers their costs, but such an arrangement is inherently unsustainable. A true remedy to the problems Thai NR farmers have faced in the past couple decades includes an upgrade to their operations, whether by adopting advanced technologies or by simply applying more precise agronomics to their plots. More scientific methods at the farm and in the supply chain will improve quality, which in turn increases the competitiveness of Thailand's rubber industry, and a more competitive industry is a more profitable industry. With assistance from the Thai government, industry groups, academics, and other stakeholders, Thai farmers can undoubtedly overcome the obstacles in their way and secure the livelihoods of their families for generations to come.

## References

- Ahrends, A., Hollingsworth, P., Ziegler, A., Fox, J., Chen, H., Su, Y., & Xu, J. (2015). Current trends of rubber plantation expansion may threaten biodiversity and livelihoods. *Global Environmental Change*, 34, 48-58. DOI: 10.1016/j.gloenvcha.2015.06.002
- Arifin, B. (2013). On the competitiveness and sustainability of the Indonesian agricultural export commodities. *ASEAN Journal of Economics, Management and Accounting*, 1(1), 81—10.
- BAAC (2014). *Annual report: Fiscal year 2014*. Bangkok, Thailand: BAAC.
- BAAC (2015). *Annual report: Fiscal year 2015*. Bangkok, Thailand: BAAC.
- Bank of Thailand (2015). *Manufacturing production in the southern region*. Statistical tables retrieved July 22, 2017 from <http://www2.bot.or.th/statistics/ReportPage.aspx?reportID=590&language=eng>
- Cadisich, G. (2016). SURUMER – A framework for sustainable rubber cultivation. Sustainable Rubber Conference, Xishuangbanna, China, 16-19 October, 2016.
- Campbell, C. (2013). *Thailand's protesting rubber farmers reflect deeper social divisions*. Retrieved July 19, 2017 from <http://world.time.com/2013/09/04/thailands-protesting-rubber-farmers-reflect-deeper-social-divisions/>
- Chantanusornsiri, W. & Yuthamanop, P. (2012). *Rice scheme is 'pro-rich'*. Retrieved July 20, 2017 from <http://www.bangkokpost.com/learning/learning-news/306684/rice-policy-mainly-benefits-rich-people>
- Chawananon, C. (2014). Factors affecting the Thai natural rubber market equilibrium: Demand and supply

- response analysis using two-stage least squares approach (Unpublished doctoral dissertation). California Polytechnic State University, San Luis Obispo, CA, USA.
- Cherdchom, P., Prommee, P., & Somboonsuke, B. (2002). Economic performances of small holding rubber-based farms in southern region Thailand: Case study in Khao Phra, Phijit, and Khlong Phea communities Songkhla Province. *Kasetsart Journal of Social Science*, 23, 151—166.
- CIRAD (2013). *Rubber: Intercropping with coffee or cocoa is more profitable than monocropping*. Retrieved July 14, 2017 from <http://www.cirad.fr/en/our-research/research-results/2013/rubber-intercropping-with-coffee-or-cocoa-is-more-profitable-than-monocropping>
- Cumperayot, P. & Kouwenberg, R. (2016). Currency wars: Who gains from the battle? *Peuy Ungphakorn Institute for Economic Research Discussion Paper No. 18*. Retrieved July 19, 2017 from [https://www.pier.or.th/wp-content/uploads/2016/02/pier\\_dp\\_018.pdf](https://www.pier.or.th/wp-content/uploads/2016/02/pier_dp_018.pdf)
- Danielsen, R. (2017). *SEB merchant banking – country risk analysis: Thailand*. Retrieved July 19, 2017 from [https://sebgroupp.com/siteassets/large\\_corporates\\_and\\_institutions/prospectuses\\_and\\_downloads/country\\_an\\_alysis/asia/2017/2017-05-thailand-ar.pdf](https://sebgroupp.com/siteassets/large_corporates_and_institutions/prospectuses_and_downloads/country_an_alysis/asia/2017/2017-05-thailand-ar.pdf)
- DeLuca, M. & List, B. (2007). Commission fines producers and traders of synthetic rubber €519 for price fixing and market sharing cartel. *Competition Policy Newsletter*, no. 1, 68-70.
- Doner, R. & Abonyi, G. (2013). Upgrading Thailand's rubber industry: Opportunities and challenges. *Thammasat Economic Journal*, 31(4), 44-66.
- Economist (2003). *Rubber barons?* Retrieved July 19, 2017 from <http://www.economist.com/node/1820730>
- Empak, J. (2014). *Alternative source of tire rubber gains traction*. Retrieved July 23, 2017 from <https://www.scientificamerican.com/article/alternative-source-of-tire-rubber-gains-traction/>
- Farchy, J. (2010). *Thai floods send rubber to record high*. Retrieved July 18, 2017 from <https://www.ft.com/content/5f2c2b3c-eb6d-11df-b482-00144feab49a?mhq5j=e1>
- Fox, J., Castella, J., Ziegler, A., & Westley, S. (2014a). Expansion of rubber mono-cropping and its implications for the resilience of ecosystems in the face of climate change in montane mainland Southeast Asia. *Global Environmental Research*, 18, 145-150.
- Fox, J., Castella, J., Ziegler, A., & Westley, S. (2014b). Rubber plantations expand in mountainous Southeast Asia: What are the consequences for the environment? *Asia-Pacific Issues: Analysis from the East-West Center*, 114, 1-8.
- Giambelluca, T., Chen, Q., & Ziegler, A. (2016). *Economic development and land-use change: Expansion of cash crops in Southeast Asia*. Retrieved July 15, 2017 from <http://www.eastwestcenter.org/research/research-projects/economic-development-and-land-use-change-expansion-cash-crops-in-southeast>
- Goodyear South Africa (Pty) Ltd and Continental Tyres South Africa v Competition Commission (CR053Aug10/INS079Sep12, CR053Aug10/DSC073Aug12) [2016] ZACT 44 (25 May 2016).
- Jalloh, M., Harun, W., Talib, J., & Ahmed, O. (2009). A simulation model estimates of the the intercropping advantage of an immature-rubber, banana and pineapple system. *American Journal of Agricultural and Biological Sciences*, 4(3), 249-254.
- Japan Ministry of Economy, Trade and Industry (2012). *White paper on international economy and trade 2012*. Tokyo, JP: Ministry of Economy, Trade and Industry. Retrieved July 18, 2017 from <http://www.meti.go.jp/english/report/data/gWT2012fe.html>
- Jongrungrat, V., Thungwa, S., & Snoeck, D. (2014). Tree-crop diversification in rubber plantations to diversify sources of income for small-scale rubber farmers in Southern Thailand. *Bois et Forêts des Tropiques*, 321(3), 21-32.
- Kampan, P. (2016). *Supply chain and logistics of rubber exports from ASEAN to China*. Unpublished manuscript, National Institute of Development Administration, Bangkok, Thailand.
- Kaewjinda, K., Thepgumpanat, P. & Niyomyat, A. (2014). *Thai rubber farmers to protest over low prices*. Retrieved July 19, 2017 from <http://www.reuters.com/article/thailand-rubber-idUSL3N0TS29Y20141208>
- Kemp, S. (2015). *Digital, social & mobile 2015*. London, UK: We Are Social. Retrieved July 22, 2017 from <https://wearesocial.com/uk/special-reports/digital-social-mobile-worldwide-2015>
- Ketterings, Q., Wibowo, T., Noordwijk, M., & Penot, E. (1999). Farmers' perspectives on slash-and-burn as a

- land clearing method for small-scale rubber producers in Sepunggur, Jambi Province, Sumatra, Indonesia. *Forest Ecology and Management*, 120, 157—169.
- Langenberger, G. & Yu, X. (2016). Taxus mairei as potential intercropping plant in rubber plantations. Sustainable Rubber Conference, Xishuangbanna, China, 16—19 October, 2016.
- Moore, M. (2002). *3 major NR producers officially form cartel*. Retrieved July 19, 2017 from <http://www.rubbernews.com/article/20020812/NEWS/308129965/3-major-nr-producers-officially-form-cartel>
- Murray, J. (2016). Limitations of oil production to the IPCC scenarios: The new realities of US and global oil production. *Biophysical Economic Resources Quarterly*, 1-13. DOI 10.1007/s41247-016-0013-9
- OPEC (2016). *2016 world oil outlook*. Vienna, Austria: OPEC. Retrieved July 14, 2017 from [http://www.opec.org/opec\\_web/static\\_files\\_project/media/downloads/publications/WOO%202016.pdf](http://www.opec.org/opec_web/static_files_project/media/downloads/publications/WOO%202016.pdf)
- Palm, C., Vosti, S., Sanchez, P., & Ericksen, P. (eds) (2005). *Slash-and-burn agriculture: The search for alternatives*. New York, NY, USA: Columbia University Press.
- Patel, D. (2016). *Five tyre firms operated as cartel, finds CCI probe*. Retrieved July 20, 2017 from [http://www.business-standard.com/article/economy-policy/five-tyre-firms-operated-as-cartel-finds-cci-probe-116030500042\\_1.html](http://www.business-standard.com/article/economy-policy/five-tyre-firms-operated-as-cartel-finds-cci-probe-116030500042_1.html)
- Peel, M. (2016). *Thai junta pledges aid for rubber farmers hit by falling prices*. Retrieved July 19, 2017 from <https://www.ft.com/content/e163c61c-b90a-11e5-a7cc-280dfe875e28?mhq5j=e2>
- Petchseechoung, W. (2016). *Thailand industry outlook 2016-18: Rubber industry*. Bangkok, Thailand: Krungsiri Bank Research. Retrieved July 14, 2017 from [https://www.krungsiri.com/bank/getmedia/1d1b8758-8da1-44e3-af42-962b0b9f7506/IO\\_Rubber\\_2016\\_EN.aspx](https://www.krungsiri.com/bank/getmedia/1d1b8758-8da1-44e3-af42-962b0b9f7506/IO_Rubber_2016_EN.aspx)
- Poungchompu, S. & Chantanop, S. (2015). Factor affecting technical efficiency of smallholder rubber farming in northeast Thailand. *American Journal of Agricultural and Biological Sciences*, 10(2), 83—90. DOI: 10.3844/ajabssp.2015.83.90
- Quandl (2017). *Rubber price*. Data retrieved July 22, 2017 from [https://www.quandl.com/data/ODA/PRUBB\\_USD-Rubber-Price](https://www.quandl.com/data/ODA/PRUBB_USD-Rubber-Price)
- Reuters (2016). *Thai rubber farmers threaten protest, set to meet Tuesday*. Retrieved July 19, 2017 from <http://www.straitstimes.com/asia/se-asia/thai-rubber-farmers-threaten-protest-set-to-meet-tuesday>
- Royal Thai Embassy Washington DC (2017). *Thailand 4.0*. Retrieved July 15, 2017 from <http://thaiembdc.org/thailand-4-0-2/>
- Romprasert, S. (2009). Forecasting of natural rubber ribbed smoked sheets no. 3 (RSS3) price in the agricultural futures exchange of Thailand (Unpublished doctoral dissertation). School of Development Economics, National Institute of Development Administration, Bangkok, Thailand.
- Rubber Board (2002). *The rubber tree*. Retrieved July 22, 2017 from <http://rubberboard.org.in/ManageCultivation.asp?Id=3>
- Saidur, R. & Mekhilef, S. (2010). Energy use, energy savings and emission analysis in the Malaysian rubber producing industries. *Applied Energy*, 87, 2746—2758.
- Source Intelligence (2016). *Sustainable raw materials: Is rubber finally catching up?* Retrieved July 22, 2017 from <https://www.sourceintelligence.com/sustainable-raw-materials-rubber-finally-catching-up/>
- Thai Rubber Association (2016). *Rubber statistics*. Data retrieved July 22, 2017 from <http://www.thainr.com/en>
- Thaicharoen, K., Hariraksapitak, P. & Thepgumpanat, P. (2017). *Thailand takes steps to help rubber farmers cope with low prices*. Retrieved July 19, 2017 from <https://www.reuters.com/article/thailand-rubber-idUSL3N1JA3XT>
- Thailand Board of Investment (2017). *Thailand's rubber industry*. Retrieved July 23, 2017 from [http://www.boi.go.th/upload/content/BOI-brochure\\_2017-rubber-20170223\\_15111.pdf](http://www.boi.go.th/upload/content/BOI-brochure_2017-rubber-20170223_15111.pdf)
- Thailand Board of Investment (2016). Thailand: The world's leader in natural rubber production. *Thailand Investment Review*. Retrieved July 15, 2017 from [http://www.boi.go.th/index.php?page=thailand\\_investment\\_review](http://www.boi.go.th/index.php?page=thailand_investment_review)
- US v. Bridgestone Corporation, 14-cr-00068 (N. Dist. OH 2014).
- US v. DuPont Dow Elastomers L.L.C., 05-cr-0036 (N. Dist. CA 2005).



- US v. Nishikawa Rubber Co., Ltd., 16-cr-00030 (E. Dist. KY 2016).
- US v. Toyo Tire & Rubber Co., Ltd., 13-cr-00529 (N. Dist. OH 2013).
- US v. Yamashita Rubber Co., Ltd., 13-cr-00439 (N. Dist. OH 2013).
- US Bureau of Labor Statistics (2017). *Commodity data including "headline" FD-ID indexes*. Data retrieved July 22, 2017 from <https://www.bls.gov/data/#api>
- US Energy Information Administration (2017). *Spot prices*. Data retrieved July 22, 2017 from [https://www.eia.gov/dnav/pet/pet\\_pri\\_spt\\_s1\\_d.htm](https://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm)
- US Federal Reserve Bank of St. Louis (2017). *Economic data*. Data retrieved July 22, 2017 from <https://fred.stlouisfed.org/categories>
- Van de Moortel, S. (2016). *Sustainable rubber*. Retrieved July 15, 2017 from <http://sustainablelubber.org/conference-2016/#objective>
- Viswanathan, P. (2008). Emerging smallholder rubber farming systems in India and Thailand: A comparative economic analysis. *Asian Journal of Agriculture and Development*, 5(2), 1–20.
- Wang, Z., Jin, X., Bao, X., Li, X., Zhao, J., Sun, J., Christie, P., & Li, L. (2014). Intercropping enhances productivity and maintains the most soil fertility properties relative to sole cropping. *PLoS One*, 9(12). DOI: 10.1371/journal.pone.0113984
- World Bank (2017a). *World development indicators*. Washington, DC, USA: World Bank. Retrieved July 14, 2017 from <http://data.worldbank.org/data-catalog/world-development-indicators>
- World Bank (2017b). *Atlas of sustainable development goals 2017: From world development indicators*. Washington, DC, USA: World Bank.
- Yamamoto, H. (ed.) (2016). Research for consideration of a policy proposal to reform the natural rubber industry's structure and stabilize farmers' dealing conditions in Thailand. *ERIA Research Project FY2015, No. 12*.
- Yee, T. (2016). *Former Thai PM Yingluck faces \$1.4b fine over rice scheme*. Retrieved July 20, 2017 from <http://www.straitstimes.com/asia/se-asia/yingluck-faces-14b-fine-over-rice-scheme>
- Ziegler, A., Fox, J., & Xu, J. (2009). The rubber juggernaut. *Science*, 354(5930), 1024-1025.

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# Internationalization of Colombian Firms: Competitive and Productivity as a Problem to Enter the Asian Market

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## Abstract

The main objective of this research is to identify the influence of the productivity and competitiveness level of Colombian firms in the development of Asian market. The approach used was through descriptive and empirical analysis, with respect to measured variables, which helps the understanding of what firms require the skills of productivity. As a result of this article, a need was obtained at the corporate and governmental level, that production line should have a change to the know-how (macro), which is a necessity for international business success. The research allows to conclude aspects relevant to business activities, where the correlation of strengthening firms-government-university, is producing a negative effect, and through the psycho-entrepreneurial acquisition.

**Keywords:** Competitiveness, financial system, globalization, international markets, productivity

## 1. Introduction

Globalization created independence for the different cultures that in times past were always questioned by their conditions of customs; during the era of slavery it was considered that the African culture had no right to anything, they only had the obligation to be slaves, this was because the predominant culture was that of the Spaniards or as they were called the blue blood, a measure of time to the end of slavery and with the times of struggle; today it can be found a variety of cultures and ethnic groups, today have their rights and own conditions of command, to this we owe the communication through books, art, among others.

This research presents the results about the productivity and competitiveness in the development of business environment, observing that today there are no firms can avoid globalization environment, an issue in which all the countries are participants in this global aspect (Lindh, 2017); globalization or economic opening, it is fundamental for the development and transformation of the national economy, for this reason, today it is necessary to have a suitable information for members active in international trade. It is precisely, for this reason, the interest to be entrepreneurs in the present does not have intercultural ignorance, thus avoiding the communication breaks between negotiations that hinder commercial exchange in turn, in the same way, all professionals who are part of a work team where its objective it's to be internationalized (Ramón-Llorens, García-Meca, & Duréndez, 2017; Dominguez & Mayrhofer, 2015).

It must have the necessary knowledge, that will provide the organization with an optimal level of market expansion, obtaining opportunities to grow and acquire positioning. A successful market expansion increases the level of productivity, incomes, and potential consumers, hence the important role by production capacity and the state must fulfill in order to guarantee adequate tools in the financial resources support, and with greater importance directed towards medium and small businesses.

In this way, the objective of the research is to determine and observe the shortcomings that are found in the

productivity and competitiveness level on Colombian firms, at the time of developing competitive and productive firms, the purpose is to publicize the opportunities that the employer can have if properly trained and interested in know the government grants to access them, hence, the employer will develop strategies for the benefit of their organization and use of resources that will generate the goals with their favorable results.

For the development of the research there is a methodological proposal of an empirical type, carried out by a descriptive study, conducted by a deduction-hypothetical tool, which allows to analyze and identify the challenges of competitiveness and productiveness management in the internationalization activities of firms, without to fail to mention the need presented by firms to develop strategies that make them competent in relation to other firms already established and positioned in the Asian market, which increasingly competition increases due to globalization and lack of firm's information, that today are not productive to be competitive to enjoy the Asian consumers.

## **2. Problem Statement**

Competitiveness and productiveness are the issue that takes relevance in the environment of business areas, fundamental as covering political, economic and social aspects of a nation, which consequently means that today, firms and organizations should strive to implement strategies of internationalization and to know Asian business culture. (Chen, Ong, & Hsu, 2016), hat cover in a more specific and centralized way, all those determining and particular areas of each country; such as communication, clothing, cuisine, standards, and protocols characteristic of the Asian market, all this in order to obtain positive results in this internationalization, which in turn will allow to be competitive with other firms entering in the same market.

There are different problems, one of them is the weakness of productive capacity and the financial system (Tjaden & Hunkler, 2017; Laouris & Michaelides, 2017); since there is no link between the needs that are currently required in the international market and the way, in which the firms are organized with reference to this aspect; it should be taken into account that firms carry out specific activities of production and/or provision of services in different areas, and it requires that these be developed by highly qualified people in the position that corresponds to them; stimulation that exists on the part of the different institutions and organisms of the order both private and public, to give the solution to a problem that affects in a significant way, the commercial relations between the countries and therefore their economies (S Rick Fernandez, 2013), another worrisome aspect is the apathy that some entrepreneurs have for knowing and learning about other cultures; which sometimes falls to a decision more personal than entrepreneurial, where they see the interaction with other cultures, not so necessary to achieve and fulfill of business objectives.

## **3. Justification**

As the selected problem developed, there were major problems in the productivity and financial support of the Colombian government, towards future entrepreneurs (Edsand, 2017), even professionals who exercise their careers without the means and necessary knowledge to carry out their activity in a consistent manner.

A productivity mechanisms in the business world are a fundamental pillar in business transactions, whether goods or services, leading to a successful agreement between the parties involved.

The Colombian state as a developing country has a long way to go in investing, both technological and investigative-processes, as expressed (Giotopoulos, Kontolaimou, Korra, & Tsakanikas, 2017) around technological mechanisms, such as ICTs for the proper functioning of international negotiation processes, for an expansion of the population knowledge and greater preparation in each of the careers offered in the country, mainly those that touch on economic, social and administrative activities.

The main thing is to change the interests of the Colombian government to improve the institutional processes, providing the population with the necessary tools to grant a positioning of the country, both in the social environment for the suspicion and intelligence of its community, for the management of hostile environments as it can be generally the business agreements, as in the economic growth by exports and imports country' increase; increasing its capital and diminishing the deficit by the firms.

## **4. Literature Review**

### *4.1 Production Capacity and Financial System to be Competitiveness*

The globalization or commercial opening is a fundamental mechanism for the development and transformation of the economy of a country, therefore, the suitable form of the members that participate of the active way in the international trade; it is very important for the economic advancement of firms.

Hence the transcendental role of the financial institution and the State must fulfill (Monteiro, 2016); to guarantee

the adequate instruments in the firms productivity, especially those SMEs who manage the international markets, and have little financial resources, but have high experience in the establishment of successful international relations, and thus in this way be able to contribute to the overcoming of the different flaws that have been observed in the course of trade agreements (Buzard, 2017; S. Rick, 2014).

One of the problems that most concerns are the ignorance and training in the cultural, social, and all those essential aspects of productivity and competitiveness that firms must take into account when implementing each of their strategies, which will allow them to penetrate other markets, diversify and expand their products and services.

Hypothesis 1a. The increase in production capacity makes the firms to be competitive in other markets, reinforcing the relationship of entrepreneurs at an international level regarding the number of business transactions (see Figure 1).

As can be seeing for a long time the productivity level, in general, has shortcomings that in the light of today have been minimal or few, the efforts on the part of the competent entities to support suitable firms in the different important markets, which would allow Colombia through its businesspeople and firms to achieve international competitiveness (Xu, Xia, & Li, 2017; Carneiro, Rodrigues, & Craig, 2017), issues such as science and technology are essential to achieve such competitiveness, as well as other fundamental factors such as research.

The current production capacity does not comply with international standards and requirements in terms of being internationalized and competitive in the market (Carneiro et al., 2017), in Colombia there is no financial support system focused fully on the emphasis of international business development and promotion, which encompasses the intercultural competencies of entrepreneurs in a consistent and appropriate manner, which would undoubtedly be of great benefit to the country's economic growth, in which first must guarantee the quality of products, make a reduction of tax and other internal government barriers.

Colombia has not been able to take advantage of these different channels of information to significantly attenuate the deficiencies that exist in the enterprise' environment, one of the proposals would be to establish or reaffirm existing ties or look for options and alternatives which help to correct such deficiencies.

Hypothesis 1b. The increase in financial support to the firms; minimizes the government care reflected in the number of business transactions (see Figure 1).

Although it could be said that knowledge comes from experience and observation, to facilitate a behavior in the international market.

#### *4.2 Business support scenarios to join international market*

Currently, the most difficult thing to undertake in a market is the lack of projects knowledge in which the government has not made the management of making them known; the most suitable for entrepreneurs who have the initiative to undertake is to have clear and compelling information from their competitors, firms are part of our environment (Hsieh & Hyun, 2018; S Rick Fernandez, 2016), although all are different and to be able to undertake a study is necessary where it covers larger dimensions to be able to enter a market that day by day is globalized.

Globalization has been rapid during the last decades, one of the biggest affluent has been the technological revolution of information and telecommunications that are experienced worldwide. The rapid growth of the market means that firms have higher levels in a production line, in order to be able to compete and gain position in a market.

Hypothesis 2a. All the lack of constant resources will negatively affect the business profitability (see Figure 1).

The environment of economic opening and of the firms constitute a scenario in which the phases of business management must be examined in an unusual way, in light of the challenges that arise from this environment (Vidgen, Shaw, & Grant, 2017).

The government is concerned about achieving a greater economy where employment and productivity were generated in the country, Colombia has a strong economy but with many difficulties (Barjolle, Quiñones-Ruiz, Bagal, & Comoé, 2017), therefore, an attempt was made to reduce protectionism, integration into the world (Saul Rick Fernandez, 2014; Ritzel & Kohler, 2016) open markets and compete in search of a modern Colombia, thanks to that, today they face a world of big and small barriers that need to be overcome with a determination, if the same judgment with which started would have been maintained today, we would have a more refined country in its processes, agiler in its procedures and procedures, with fewer demands and better practices.

Hypothesis 2b. All the constant cooperation at the governmental and financial level will positively affect the business profitability (see Figure 1).

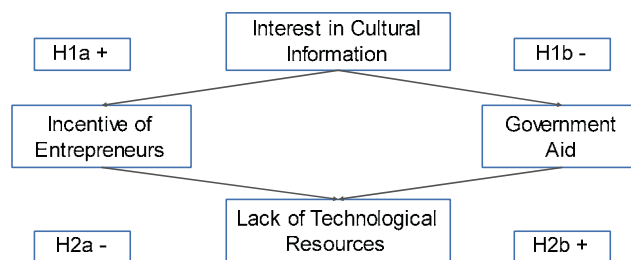


Figure 1. Research Model

The Colombian government has made many alliances where the free movement of goods and services is allowed, but for entrepreneurs who do not know the opportunities outside of borders, this means having psycho-business barriers (Guadix, Carrillo-Castrillo, Onieva, & Lucena, 2015), this happens because of the ignorance of government projects; there are few firms that acquire these education projects and monetary aid, that is why so many opportunities are lost from new and competitive markets, because the initiatives are, but SMEs, unfortunately, do not have enough information to be part of government projects (Knight, Deng, & Li, 2017; Felgueira & Rodrigues, 2015), the innovative activity on the growth and performance of small companies of the countries coordinated by the Pacific Alliance has obtained an innovation result of its production, in processes and management that positively impacts: growth, employment, sales and likewise Its utility. It is true that Colombia has many commercial agreements, where an economic contribution could be made generating more employment, and more market opportunities that are still lost, that is why it is necessary to know our agreements with the other countries and to train ourselves to reach the objectives that every entrepreneurial firm wishes.

#### 4.3 Business innovation in order to be competitive

As highlighted by Chan, Fong, Luk, & Ho (2017); Oliveira, Echeveste, Cortimiglia, & Gonçalves (2017), to be able to comply with this economic advance, organizations must identify a number of characteristics and requirements to become competent at a local level and, even more so, at the international level, among these characteristics we can highlight innovation as the main axis.

Cao, Navare, & Jin (2017); Oliveira et al (2017) refers to innovation from the perspective of commercial firms and business organizations are the successful commercialization of an invention, entering a market or creating a new one, or improving internal processes and generating efficiency.

This is a differentiating point between one firm and another in a market that is globalized and saturated with innovative products, services, and processes; it is must bear in mind that innovation goes beyond the incorporation of technology, but also focuses on anticipating the needs of the globalized world, where consumers are more demanding, and therefore what will allow it to remain in the market National and international.

Busom & Vélez-Ospina (2017), Giovannetti & Piga (2017); Feder (2016); S. Rick (2014) mentions that productivity increases induced by innovation not only make the firms of a territory competitive, but also contribute to raising the standard of living of the citizens of that territory.

Productivity is a key factor and is undoubtedly aimed at innovation, which is why firms and governments must guide their strategies, policies, and resources to improve this failure greatly; that in addition to generating productivity, it generates that the organizations get to be competitive in the Asian markets.

In relation to the above, it is required that the investment in scientific, technological and research development in the firms be significant and find a collaboration of the different government levels, which provide the adequate tools, so the firms could compete effectively in Asia as a target market, because to get an innovation it needs the infrastructure and resources (capital and human) suitable.

However, coherent policies that are in accordance with all the innovative processes are also needed, as well as a regulatory framework that fosters the same, new strategic approaches of the new firms; and qualified personnel; given the above, firms will have the ability to participate in Asian markets with greater dynamics business; the firm-university-government, the latter must act in a synchronized manner, since each of them feeds on the others.

It is observed that for a long time the topic of innovation has become a focus of vital importance for the most developed countries, likewise, it analyzed by Oliveira et al (2017); Marxt & Brunner (2013), that has allowed

them to bring the subject to the forefront.

Regrettably, this process of industrialization in Colombia has developed gradually; which does not allow it to keep pace with global economic developments. The international context shows that the highest levels of development are possessed by those countries that enjoy high rates of innovative entrepreneurship in their economies. Colombia must identify and make an exhaustive diagnosis at the business level on the critical points in which it is necessary to act and correct, which will allow reaching markets such as Asians Andonova & Ruiz-Pava (2016); Aggarwal, Berrill, Hutson, & Kearney (2011).

The position was taken by some entrepreneurs in relation to the international negotiations they carry out, in a certain way influence, not only economically but also affects the small entrepreneurs and entrepreneurs that are making their way in this business field (Yang & Gabrielsson, 2017), and it is because of this, that the ideal production line is emphasized.

## 5. Methodology

When carrying out the research, the descriptive methodology was used as well as empirical and it was taken out through a hypothetical-deductive study, which helped to identify the current state of firms' production and competitive level, since it is not what entrepreneurs expect.

### 5.1 Population sample

The population sample consisted of 100 observations, of different production sector (goods and services), for which surveys were conducted with 5 questions, where was asked about how the current state is considered at the production and competitive level to develop Asian markets, as well as government barriers and financial support.

### 5.2 Data collection and analysis of results

Through the sample, the necessary tabulation was performed in order to obtain real, measurable and achievable data, resulting in the following analyzes:

Table 1. Collection of the sample

Description	Quantity	Percentage
Questionnaires sent (1)	135	
Questionnaires not available	13	9,6%
Questionnaires received (1)	122	90,4%
Forwarded questionnaires (follow-up)	13	9,6%
Questionnaires received (2)	11	8,1%
Total Questionnaires sent (1) - (2)	148	
Not respond	15	10,1%
Responded	103	69,6%
Questionnaires declined to participate	1	1,4%
Questionnaires that didn't be available	0	0,0%
Complete questionnaires	100	68,2%

Based on the sample of the research, it can be observed that there is dissatisfaction with the lack of productivity (see Figure 2) provided by the Colombian state, where the right financial system is not provided to be competitive and generate economic growth strategies; without it, it is observed under the spatial analysis that the lack of qualified government regulations are in a negative position, manifesting the need to obtain greater attention to the improvement of internal support by government and financial institutions, at present in 21st century it is needed to implement firms-working team (not individualism).

At the moment of analyzing the results of the sample, it is concluded that today people with an aspiration to be entrepreneurs have great ignorance in cultural aspects, this demonstrating that on the part of the governmental support is not enough in order that the entrepreneurs have input in its business activities, as detailed in Figure 2, in the same way, there are no business incentives for their development and contributions to society, it can be seen that productivity is required and a higher level of technological resources is needed.

The following Table 2 Table 2 details the level of confidence of 95% with a margin of error 5% in the variables studied in the research.

Table 2 shows 95.0% confidence intervals for the means and standard deviations of each of the variables. These intervals delimit the sampling error in the estimates of the parameters of the populations from which the data come. It can be used to help to judge how accurately the population means and standard deviations have been

estimated. The intervals assume that the populations from which the samples come can be represented by normal distributions. While the confidence intervals for the means are quite robust and not very sensitive to violations of this assumption, the confidence intervals for the standard deviations are very sensitive. The assumption of normality can be verified in the procedure of analyzing a variable.

Table 2. Confidence Intervals 95,0%

	<i>Medium</i>	<i>Error Est.</i>	<i>Lower limit</i>	<i>Upper limit</i>
Incentive for entrepreneurs	0,32	0,0468826	0,226975	0,413025
Lack of qualified personnel	0,57	0,049757	0,471271	0,668729
Government regulations	0,35	0,0479372	0,254882	0,445118
Government aid	0,41	0,0494311	0,311918	0,508082
Lack of knowledge	0,23	0,0422953	0,146077	0,313923
Interest for cultural information	0,38	0,0487832	0,283203	0,476797
Lack of technological resources	0,78	0,0416333	0,69739	0,86261

Note: Error range of 5%

Table 3. Inertia and Chi-square Decomposition

<i>Dimension</i>	<i>Singular</i>		<i>Chi-</i>		<i>Cumulative</i>	
	<i>Value</i>	<i>Inertia</i>	<i>Square</i>	<i>Percentage</i>	<i>Percentage</i>	<i>Histogram</i>
1	0,5059	0,2560	1254,2977	80,3531	80,3531	*****
2	0,1728	0,0298	146,2357	9,3682	89,7213	***
3	0,1390	0,0193	94,7306	6,0687	95,7899	**
4	0,1027	0,0106	51,6997	3,3120	99,1019	*
5	0,0430	0,0019	9,0679	0,5809	99,6828	*
6	0,0314	0,0010	4,8203	0,3088	99,9916	*
7	0,0052	0,0000	0,1304	0,0084	100,0000	*
TOTAL		0,3186	1560,982			

Note: p-value < 0,05\*\* (confidence level 95%)

Table 3 details dimensions 1 and 2, which have a higher accumulated score, therefore the second dimension is the one with the highest accumulated percentage, shows the percentage of the total variability, in this research a variability was obtained in the first pair (the first 2 dimensions) with a percentage of 89.7213%, which shows that between the incentives for entrepreneurs and the lack of qualified personnel is concentrated as a central problem of research.

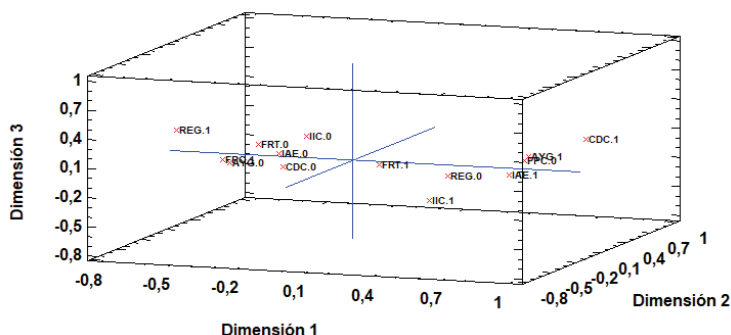
Table 4. Code of research variables

IAE	Incentive for entrepreneurs
FPC	Lack of qualified personnel
REG	Government regulations
AYG	Government aid
CDC	Lack of knowledge
IIC	Interest for cultural information
FRT	Lack of technological resources

According to Table 4, codes are observed for each of the variables.

It is noted that the contribution of the lack of qualified staff provides visibility given that as noted in Figure 2, is part of a necessary component for business development, without hesitation, this is due to the low levels of internationalization that would allow us an exchange not only of goods and services (Shearmur, Doloreux, & Laperrière, 2015; Meyer, Skaggs, Nair, & Cohen, 2015), but also of governmental support, which is another detailed contribution in Table 3 and in relation to 错误!未找到引用源。 which shows the correlation it has with little access to business incentives, which would promote technological resources necessary for business development; instead of seeing this as a disadvantage, it should be an open mouth for all those who are willing to be big business (Côte-Real, Oliveira, & Ruivo, 2017), since Colombia is a country with great biodiversity and infinite possibilities to take advantage of this quality to make us known internationally. According to the research sample, it is considered that there is a lack of knowledge both to carry out a business activity and in the same way to obtain the resources to increase economic prospects (Varum, Rocha, & Valente da Silva, 2014), therefore, incentives are lacking through the entities endorsed to have a support that does not mean higher business costs; on the other hand, we are aware that do not have the technology to compete with large multinationals, and for

this, SMEs require support. It is clear that the economic level in Colombia is taken advantage by strong firms economically and technologically, which complicates competing with this type of firms, since its have a wide recognition; financing, with qualified personnel and high innovative capacity.



Figures 2. Correspondences Map - Space

Table 5. Category Contributions

ID	Name	Quantity	Dough	Inertia	Coord	Dim #1			Dim #2		
						Corr	Contr	Coord	Corr	Contr	
1	IAE.0	0,807	0,097	0,040	-0,326	0,806	0,040	0,010	0,001	0,000	
2	IAE.1	0,807	0,046	0,086	0,693	0,806	0,086	-0,021	0,001	0,001	
3	FPC.0	0,979	0,061	0,116	0,767	0,977	0,141	-0,035	0,002	0,002	
4	FPC.1	0,979	0,081	0,088	-0,579	0,977	0,107	0,026	0,002	0,002	
5	REG.0	0,919	0,093	0,057	0,422	0,918	0,065	-0,015	0,001	0,001	
6	REG.1	0,919	0,050	0,105	-0,784	0,918	0,120	0,027	0,001	0,001	
7	AYG.0	0,966	0,084	0,081	-0,544	0,965	0,098	0,018	0,001	0,001	
8	AYG.1	0,966	0,059	0,117	0,783	0,965	0,140	-0,026	0,001	0,001	
9	CDC.0	0,910	0,110	0,031	-0,266	0,781	0,031	-0,108	0,129	0,043	
10	CDC.1	0,910	0,033	0,105	0,892	0,781	0,102	0,363	0,129	0,145	
11	IIC.0	0,751	0,089	0,038	-0,269	0,527	0,025	0,175	0,224	0,091	
12	IIC.1	0,751	0,054	0,062	0,439	0,527	0,041	-0,286	0,224	0,149	
13	FRT.0	0,768	0,031	0,058	-0,178	0,054	0,004	-0,646	0,714	0,439	
14	FRT.1	0,768	0,111	0,016	0,050	0,054	0,001	0,182	0,714	0,124	

It is necessary to find a strategy to reduce unemployment and increase qualified personnel, it is vital to carry out an evaluation to the financial system (Schworm et al., 2017; Faham, Rezvanfar, Movahed Mohammadi, & Rajabi Nohooji, 2016), so find the flaws and be able to develop and study business change solutions.

According to the results, there are several questions to study. The firms in the process of be productive are SME, to be qualified to enter into the internationalization markets, who can develop in the environment of their interest, but it find themselves with the wide ignorance of the governmental regulations adopted by the Colombian government; being thus, a great barrier in general is the ignorance of the extensions before the business activities to have access to the Asian markets. Of course, there are many firms with the desire to enter a market such as Asia, but do not have the necessary information, leaving the ideas and proposals on paper, since it does not know the processes duly parameterized to fix that idea. This is part of the integration firms, but also with great influence, in the scarce participation in the decision-making and the deficit of production, be it agreements, taxes, barriers, reforms, among others; making the citizen ignorant of the legal and regulatory issues of the country, giving him a great wall a long way to go, to be able to lower that curtain that the government has wanted to put to the corporate citizenship to make decisions without thinking about the welfare of society.

Therefore, most entrepreneurs today prefer to obtain a debt with a financial institution, because the incentives granted by the government are almost impossible (see Figure 2), a longer time in them, and in the end it is not known if the projects are suitable or simply the entities have an answer, does not meet the requirements. A large part of the sample does not know the aids and is not interested in looking for them or asking for information (see Table 5), the aid from government agencies is intended for firms that are already in business development. In relation to the above, it is clear that there is a flaw in the training system for employers, the lack of incentives for projects and the limited information provided by competent entities, therefore the contribution of the variable lack of qualified firms to enter an international markets. For the strengthening of firms, this variable (Table 5) as



the main component is required to have greater attention, therefore the hypotheses correspond to the results of Table 6.

Table 6. Hypotheses measured in the investigation

Hypotheses 1a	The increase in production capacity makes the firms to be competitive in other markets, reinforcing the relationship of entrepreneurs at an international level regarding the number of business transactions.	positive
Hypotheses 1b	The increase in financial support to the firms; minimizes the government care reflected in the number of business transactions.	negative
Hypotheses 2a	All the lack of constant resources will negatively affect the business profitability.	negative
Hypotheses 2b	All the constant cooperation at the governmental and financial level will positively affect the business profitability.	positive

## 6. Limitation of Research

Limitations were observed when obtaining information to support financial resources by financial entities, which it was not possible to obtain for the study, data that could adjust the result of chi-square, providing an analysis with greater attention on integration business-financial entities-government; the financial system's responsibility to companies allows it to increase its participation in international markets, such as the Asian market. In future studies, it is expected to obtain the participation of financial entities, and that the data will help to resolve the dynamics of business internationalization. In addition, a great limitation was that the Colombian state does not present adequate policies to have an incentive on companies creating, in favor of being productive and competitive in markets outside of Colombia's borders, this presented by high taxes, restrictions, high bank charges and bureaucratic procedures, that impede companies with the vision to develop highly competitive markets.

## 7. Conclusion and Implication

According to the objectives, the following conclusions were reached:

The main shortcoming of cultural ignorance when making a negotiation is primarily by the minimum government support, with which Colombia has education, turning future professionals into ambiguous and ignorant personnel. In addition, the regulatory bodies of these support projects must take initiatives and change the selection process, making possible the incursion of people who do not have a suitable percentage of resources, but who have the ideal and motivation to perform them.

According to the sample, it is possible to analyze the bewilderment of small companies in the process of having high levels of productivity, and the resources provided an implication to get financial resources from the responsible entities and more attention from government; that is why, according to the percentages thrown, it is possible to deduce the nonconformities and concerns that companies have to have an adequate competitiveness in international markets such as Asia; it is very clear, that the world is in a moment of globalization, that is why it is necessary for both companies and regulatory bodies to concentrate on phases of evolution, to visualize goals and objectives to boost the country.

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## References

- Aggarwal, R., Berrill, J., Hutson, E., & Kearney, C. (2011). What is a multinational corporation? Classifying the degree of firm-level multinationality. *International Business Review*, 20(5), 557–577. <http://doi.org/10.1016/j.ibusrev.2010.11.004>
- Andonova, V., & Ruíz-Pava, G. (2016). The role of industry factors and intangible assets in company performance in Colombia. *J. of Bus. Res.*, 69(10), 4377–4384. <http://doi.org/10.1016/j.jbusres.2016.03.060>
- Barjolle, D., Quiñones-Ruiz, X. F., Bagal, M., & Comoé, H. (2017). The Role of the State for Geographical Indications of Coffee: Case Studies from Colombia and Kenya. *World Development*, 98, 105–119. <http://doi.org/10.1016/j.worlddev.2016.12.006>
- Busom, I., & Vélez-Ospina, J. A. (2017). Innovation, Public Support, and Productivity in Colombia. A Cross-industry Comparison. *World Development*, 99, 75–94. <http://doi.org/10.1016/j.worlddev.2017.07.005>

- Buzard, K. (2017). Self-enforcing trade agreements and lobbying. *Journal of International Economics*, 108, 226–242. <http://doi.org/10.1016/j.jinteco.2017.07.001>
- Cao, L., Navare, J., & Jin, Z. (2017). Business model innovation: How the international retailers rebuild their core business logic in a new host country. *International Business Review*. <http://doi.org/10.1016/j.ibusrev.2017.10.005>
- Carneiro, J., Rodrigues, L. L., & Craig, R. (2017). Assessing international accounting harmonization in Latin America. *Accounting Forum*, 41(3), 172–184. <http://doi.org/10.1016/j.accfor.2017.06.001>
- Chan, C. K. Y., Fong, E. T. Y., Luk, L. Y. Y., & Ho, R. (2017). A review of literature on challenges in the development and implementation of generic competencies in higher education curriculum. *International Journal of Educational Development*, 57, 1–10. <http://doi.org/10.1016/j.ijedudev.2017.08.010>
- Chen, P. H., Ong, C. F., & Hsu, S. C. (2016). The linkages between internationalization and environmental strategies of multinational construction firms. *Journal of Cleaner Production*, 116, 207–216. <http://doi.org/10.1016/j.jclepro.2015.12.105>
- Côrte-Real, N., Oliveira, T., & Ruivo, P. (2017). Assessing business value of Big Data Analytics in European firms. *Journal of Business Research*, 70, 379–390. <http://doi.org/10.1016/j.jbusres.2016.08.011>
- Dominguez, N., & Mayrhofer, U. (2015, December 1). Internationalization stages of traditional SMEs: Increasing, decreasing and re-increasing commitment to foreign markets. *International Business Review*, pp. 1051–1063. Pergamon. <http://doi.org/10.1016/j.ibusrev.2017.03.010>
- Edsand, H. E. (2017). Identifying barriers to wind energy diffusion in Colombia: A function analysis of the technological innovation system and the wider context. *Technology in Society*, 49, 1–15. <http://doi.org/10.1016/j.techsoc.2017.01.002>
- Faham, E., Rezvanfar, A., Movahed Mohammadi, S. H., & Rajabi Nohooji, M. (2016). Using system dynamics to develop education for sustainable development in higher education with the emphasis on the sustainability competencies of students. *Technological Forecasting and Social Change*, 123, 307–326. <http://doi.org/10.1016/j.techfore.2016.03.023>
- Feder, C. (2016, May 19). The effects of disruptive innovations on productivity. *Technological Forecasting and Social Change*. North-Holland. <http://doi.org/10.1016/j.techfore.2017.05.009>
- Felgueira, T., & Rodrigues, R. G. (2015). Market Orientation of Teachers and Researchers in Higher Education Institutions: A New Approach. *Procedia - Social and Behavioral Sciences*, 174, 3017–3024. <http://doi.org/10.1016/j.sbspro.2015.01.1092>
- Fernandez, S. R. (2013). It Takes Two to Tango : Commercial Relation Beyond Of Bilateral Agreement , China and Colombia to Sign a Free Trade Agreement. *American Journal of Business and Management*, 2(4), 275–295. <http://doi.org/10.11634/216796061302426>
- Fernandez, S. R. (2014). 产业集群一体化挑战研究. *CNKI JOURNAL*. 上海大学. Retrieved from <http://cdmd.cnki.com.cn/Article/CDMD-10280-1014418924.htm>
- Fernandez, S. R. (2016). The Opportunities and Bottlenecks between China and Latin American Countries' Economic and Trade Development. *International Journal of Developing Societies*, 5(2), 23–26. <http://doi.org/10.11634/216817831605783>
- Giotopoulos, I., Kontolaimou, A., Korra, E., & Tsakanikas, A. (2017). What drives ICT adoption by SMEs? Evidence from a large-scale survey in Greece. *Journal of Business Research*, 81, 60–69. <http://doi.org/10.1016/j.jbusres.2017.08.007>
- Giovannetti, E., & Piga, C. A. (2017). The contrasting effects of active and passive cooperation on innovation and productivity: Evidence from British local innovation networks. *International Journal of Production Economics*, 187, 102–112. <http://doi.org/10.1016/j.ijpe.2017.02.013>
- Guadix, J., Carrillo-Castrillo, J., Onieva, L., & Lucena, D. (2015). Strategies for psychosocial risk management in manufacturing. *J. of Business Research*, 68(7), 1475–1480. <http://doi.org/10.1016/j.jbusres.2015.01.037>
- Hsieh, K.-Y., & Hyun, E. (2018). Matching response to competitors' moves under asymmetric market strength. *Journal of Business Research*, 82, 202–212. <http://doi.org/10.1016/j.jbusres.2017.09.038>
- Knight, J., Deng, Q., & Li, S. (2017). China's expansion of higher education: The labour market consequences of a supply shock. *China Economic Review*, 43, 127–141. <http://doi.org/10.1016/j.chieco.2017.01.008>

- Laouris, Y., & Michaelides, M. (2017). Structured Democratic Dialogue: An application of a mathematical problem structuring method to facilitate reforms with local authorities in Cyprus. *European Journal of Operational Research*. <http://doi.org/10.1016/j.ejor.2017.04.039>
- Lindh, I. (2017). Entrepreneurial development and the different aspects of reflection. *International Journal of Management Education*, 15(1), 26–38. <http://doi.org/10.1016/j.ijme.2016.12.001>
- Marxt, C., & Brunner, C. (2013). Analyzing and improving the national innovation system of highly developed countries - The case of Switzerland. *Technological Forecasting and Social Change*, 80(6), 1035–1049. <http://doi.org/10.1016/j.techfore.2012.07.008>
- Meyer, C. R., Skaggs, B. C., Nair, S., & Cohen, D. G. (2015). Customer Interaction Uncertainty, Knowledge, and Service Firm Internationalization. *Journal of International Management*, 21(3), 249–259. <http://doi.org/10.1016/j.intman.2015.04.003>
- Monteiro, L. H. A. (2016). Population dynamics in educational institutions considering the student satisfaction. *Communications in Nonlinear Science and Numerical Simulation*, 30(1–3), 236–242. <http://doi.org/10.1016/j.cnsns.2015.06.015>
- Oliveira, L. S. de, Echeveste, M. E. S., Cortimiglia, M. N., & Gonçalves, C. G. C. (2017). Analysis of determinants for Open Innovation implementation in Regional Innovation Systems. *RAI Revista de Administração E Inovação*, 14(2), 119–129. <http://doi.org/10.1016/j.rai.2017.03.006>
- Ramón-Llorens, M. C., García-Meca, E., & Duréndez, A. (2017). Influence of CEO characteristics in family firms internationalization. *I. Business Review*, 26(4), 786–799. <http://doi.org/10.1016/j.ibusrev.2017.01.007>
- Ritzel, C., & Kohler, A. (2016). Protectionism, how stupid is this? The causal effect of free trade for the world's poorest countries: Evidence from a quasi-experiment in Switzerland. *Journal of Policy Modeling*, pp. 1007–1018. <http://doi.org/10.1016/j.jpolmod.2017.05.002>
- S. Rick, F. (2014). Empirical Result on Firms' Cluster Integration: Should Firms Evolve beyond Their Region? *I. J. of Trade, Economics & Finance*, 5(3), 204–211. <http://doi.org/10.7763/IJTEF.2014.V5.372>
- Schworm, S. K., Cadin, L., Carbone, V., Festing, M., Leon, E., & Muratbekova-Touron, M. (2017). The impact of international business education on career success—Evidence from Europe. *European Management Journal*, 35(4), 493–504. <http://doi.org/10.1016/j.emj.2017.02.009>
- Shearmur, R., Doloreux, D., & Laperrière, A. (2015). Is the degree of internationalization associated with the use of knowledge intensive services or with innovation? *International Business Review*, 24(3), 457–465. <http://doi.org/10.1016/j.ibusrev.2014.10.004>
- Tjaden, J. D., & Hunkler, C. (2017, September 1). The optimism trap: Migrants' educational choices in stratified education systems. *Soc. Sci. Res.*, 213–228. <http://doi.org/10.1016/j.ssresearch.2017.04.004>
- Varum, C., Rocha, V. C., & Valente da Silva, H. (2014). Economic slowdowns, hazard rates and foreign ownership. *International Business Review*, 23(4), 761–773. <http://doi.org/10.1016/j.ibusrev.2013.11.008>
- Vidgen, R., Shaw, S., & Grant, D. B. (2017). Management challenges in creating value from business analytics. *European Journal of Operational Research*, 261(2), 626–639. <http://doi.org/10.1016/j.ejor.2017.02.023>
- Xu, X., Xia, Y., & Li, C. (2017). Influence of Chinese entrepreneurial companies' internationalization on independent innovation: Input incentive effect and efficiency improvement effect. *China Journal of Accounting Research*, 10(3), 247–280. <http://doi.org/10.1016/j.cjar.2017.05.001>
- Yang, M., & Gabrielsson, P. (2017). Entrepreneurial marketing of international high-tech business-to-business new ventures: A decision-making process perspective. *Industrial Marketing Management*, 64, 147–160. <http://doi.org/10.1016/j.indmarman.2017.01.007>

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