BUSINESS PROCESS REENGINEERING TO IMPROVE PROCESS ALIGNMENT & INFORMATION SYSTEM PLATFORM AT STAINLESS EQUIPMENT COMPANY

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ABSTRACT

Stainless Equipment Company (SEC) is a part of Processing Global Company (PGC) which the business process and the system were still local. Besides it had not been aligned with the global, SEC is also demanded by competitive market. Improvement project was raised and implemented to answer above situation and condition. The project was based on Business Process Reengineering (BPR) framework that involved three components (Process, People, Tools/ Technology) plus new component as the 'seat' of Project Management that represents in some teams: global process team, global information management team and site team. These three components result Performance. The project was called as Improvement of Process Alignment & Information System Platform (PrISP). This BPR is a huge project that needs full commitment from all stakeholders. By having full commitment assertively, big improvement would be happened. The improvement was reflected from the result of post go-live and data collection (questionnaire and interview) that is accepted by all the stakeholders with high self-development interest for most of the employees but less interest in the performance.

Keyword: *BPR, Alignment, Global, Local, Information System Platform*

1. INTRODUCTION

Due to continuous and abrupt changeability of conditions, enterprises that want to function effectively in today's conditions must create new features, behaviour and attitudes, which will represent their adequate response to the reality undergoing global transformation (14). Managers of enterprises should use their methodical potential to identify, diagnose and project emerging business models. Management of business processes represents a comprehensive approach to the implementation of an organisation's objectives, and the aim of managing business processes is to increase effectiveness of actions within an organisation.

In running the business, the company still uses process business from past 20 years with duplication flow steps from previous employees without proper and standard guidance. And in the information system is still autonomous without segregation of duty (SoD) applied and has not been aligned with the process globally. Those things cause many gaps between Stainless Equipment Company (SEC) and Processing Global Company (PGC).

Business Process Perspective uses the model of the World of Strategic Business Intelligence™, a key task is to understand who the stakeholders involved in creating value are and how to fulfil their respective expectations, and deal with conflict of interest between these groups (9).

SEC not only functions as a production centre, but also has its own business area, the Cosmetics category. In this category, the application of pre-project has wrong application with data issue in Understand Create Convey Deliver (UCCD) that caused many problems in customers. One of the problem caused from wrong application of UCCD was caused many mistakes and loss. The loss range is from -10% to -90%.

The IT perspective of the World of Strategic Business Intelligence™ therefore covers a set of three layers which help to understand how value can be created based on data, always keeping the information recipients in mind, along with their specific information needs. The three layers are: data, information models, and communication. Together these three layers allow to design an infrastructure which enables the desired analytical capability and add value (9).

SEC has a difference in the use of terms and master data in the business process of a company

which still uses the old terms. The information system platform owned by SEC is different from PGC. SEC that uses legacy system while PGC uses current system.

From above 2 cases raised within the company, problem statement is stated and caused disadvantages to the company that need to be improved to make company competitive in the market.

SEC was scheduled to conduct the improvement of Process Alignment and Information System Platform (PrISP) (16) with a span of 21 months. This is a big agenda where many things have to be adjusted and aligned. Therefore, this improvement will also be influencing in the preparation of strategy in a change management process (Change management process).

Based on this improvement project, the author would like to see more deeply about the process alignment from various perspectives in the face of business transformation. There will be much needed alignment so that there are changes that are very interesting to be appointed into a study. In fact, it is more about a change in the way we work, rather than a change in the system we use.

Having such description above, it is found out that problem statements area the old way of business process that cannot be longer accepted by internal and customers since it causes many problems in pre-project area (and continued to post-project up to site closing), such as:
- There's no system to manage the integration between pre-project and fix project management (post) and caused silo and miscommunication among functions because no solid collaboration.
- Overlapped job description among functions and or one man show.
- Many project losses.

And difficulties of searching and determining redundancy data in legacy system for Bill of Material (BoM) that causes the customer demands is left behind and functions blame each other, such as:
- No BoM master data.
- Materials don't have certain group and considered as material stock-able then every time engineers need a material with same specification (there's no valid information whether the material has been registered or not), the material would be re-registered. Because of this, engineers will take likely material to proceed.
- Takes time to find right BoM.
- Material compilers of products sold are not easy to group because they're not in a single same

material conFigureuration (MCON) and material stock able (MSTK).
- BoM in each function is not in one material conFigureuration with same structure, it makes mechanical, process and electrical engineers have their own structure (not standard).

Objectives are determined to fulfil the goals of the projects: 1) To improve business process and system based on the Business Process Reengineering (BPR) framework in the pre-project area and 2) To change current IT platform into a new one based on Information System Platform, especially for BoM from product structure.

With huge scope of the company that covers two combinations process alignment (Order Fulfilment Capital Equipment (OFCE), Finance (FI), Customer Management (CM), Product Creation (PC) and Product Life Cycle (PLC)) and information system platform, in this paper, the scope is limited to OFCE Pre-Project only which is talking about how to make the quotation from customer's request and how to coordinate it to other functions to improve the business process and the tool that is used under ISP is new system of Enterprise Resourcing Planning (ERP) that is focus to BoM only that is created from correct master data with correct product structure.

2. LITERATURE REVIEW

2.1 Business Process Reengineering

Business Process Reengineering (BPR) can be defined as a managerial approach to improving efficiency and effectiveness of business processes that exist within and across organizations (8). In fact, information systems (IS) have historically played an important role in BPR, and are considered by some as major enablers for new forms of working and collaborating within an organization and across organizational borders. This role can be represented as the link between technology and business.

2.2 Process Alignment

Process Alignment is developing a common understanding among the key stakeholders of the purpose and goals of the project and the means and methods of accomplishing those goals.

Process alignment is come from Strategic Alignment, which is the process and the result of linking an organization's structure and resources with its strategy and business environment (regulatory, physical, etc.). Strategic alignment enables higher performance by optimizing the contributions of people, processes, and inputs to the

realization of measurable objectives and, thus, minimizing waste and misdirection of effort and resources to unintended or unspecified purposes. In the modern, global business environment, strategic alignment should be viewed broadly as encompassing not only the human and other resources within any particular organization but also across organizations with complementary objectives.

"The ability of a company in the perspective of business processes and information systems in achieving competition and ever-changing changes with new, more competitive strategies," (9).

"Each individual and team enforces strategic leadership when they face the challenge that is most relevant to their business and creates the direction, alignment, and commitment necessary to achieve the organization's performance potential." (6).

From above statements, it can be concluded that process alignment has 2 variables which they are being assessed to this paper for the improvement of Process Alignment and Information System Platform, namely:
1. Business Process
2. Information System/ Technology

This process alignment covers many subjects that support the scope. They are related to each other as the process is designed globally within the company. Process alignment can be failed if things were designed but not run as proper and communication doesn't run as expected. This combination of process alignment together with technology results ultimate goal of processing reengineering to achieve efficiency and effectiveness by radically thinking existing processes (15).

2.3 BPR Methodology

A company can get competitive advantage if it can improve its customer service or reduce its operating costs. Continuous improvement methodologies like time and motion studies, and the Japanese Kaizen, had done this for years. But reengineering is a methodology for rebuilding the way a company does things – its business processes – from scratch.

In particular, it emphasises removing whole processes that do not deliver value. The result of this radicalism was obvious in hindsight, though not what Hammer and Champy intended. Companies not only reduced the scope of processes and found significant shortcuts; they removed whole cadres of staff who had previously carried out the tasks that were no longer needed.

By the end of the 1990s, the reengineering bubble had burst, to be replaced by a second wave of technology enhanced cost-saving under the guise of another three letters acronym (TLA): Enterprise Resource Planning, or ERP.
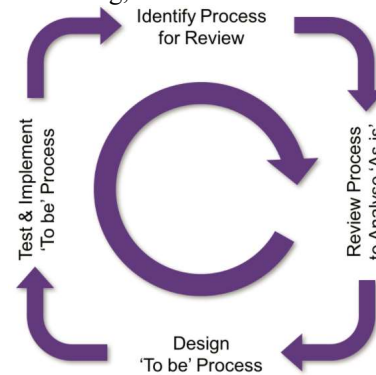

Figureure 1: BPR Methodology (Michaer Hammer & James Champy, 1993)

2.3.1 Initiate/ Identify

Organizations have utilized various techniques in the past to adjust to changing performance requirements. In many cases, these change initiatives have created push-pull conflicts between cost, the quality of service provided, product innovations, and employee involvement (17).

2.3.2 Analyse

The ability to analyse processes and show information flows between phases as well as rates of flows and resources usages, enhancing the clarity of the BPR team's vision, enabling the running of life simulations to discover bottlenecks and constraints, enforcing consistency in analysis and design, facilitating integration with tools that are widely used in designing BPR underlying information systems, permitting iterative and top-down refinement from the BPR project goals to solution and producing an acceptable return on investment (12).

2.3.3 Design

Change management, which involves all human- and social-related changes and cultural adjustment techniques needed by management to facilitate the insertion of newly-designed processes and structures into working practice and to deal effectively with resistance, is considered by many researchers to be a crucial component of any BPR efforts (5).

Organisational culture influences the organisation's ability to adapt to change. The existing culture contains beliefs and values that are often no longer appropriate or useful in the re-

engineered environment. Therefore, the organisation must understand and conform to the new values, management processes, and the communication styles that are created by the newly-redesigned processes so that a culture which upholds the change is established effectively (4).

2.3.4 Plan

Proper planning for the BPR project with adequate time frame are key factors in delivering a successful BPR project on time. Effective use of project management techniques and managing people-related issues (18) have also a crucial role in smoothing the flow of the process redesign stages.

Successful BPR implementation is highly dependent on an effective BPR programme management which includes adequate strategic alignment, effective planning and project management techniques, identification of performance measures, adequate resources, appropriate use of methodology, external orientation and learning, effective use of consultants, building process vision, effective process redesign, integrating BPR with other improvement techniques, and adequate identification of the BPR value (21).

2.3.5 Develop

The measurement process may start with a number of policies and goals which are then translated by the IS function into measures by exploiting other techniques such as monitoring, auditing, and benchmarking. A test of developed measures is conducted and a continuous refinement and review are performed continually as strategies change and as the IS function discovers new means for measurement (7).

2.3.6 Implement

Sound management processes ensure that BPR efforts will be implemented in the most effective manner (1). The most noticeable managerial practices that directly influence the success of BPR implementation are top management support and commitment, championship and sponsorship, and effective management of risks.

BPR implementation involves radical change to several systems in the organisation. Risks associated with acceptance of changes in the organisational structure, deploying emerging ITs with little familiarity, large investment in new resources needed for the new processes, loss of personnel, and loss of earnings (19) are some examples of the many risks that an organisation may take when implementing BPR.

2.4 Information Systems

Information Systems viewed from the point of view of the company with reference to the concept of how reliable a system created can run existing business processes. Reliability in the analysis of all information is a major indicator, both hardware and software used. Reliability in data analysis includes communication, competency, governance, partnership, and scope and architecture. The information system created must have a correspondence between the system and the procedures defined in the running of the company, supporting interaction between employees and one-way processes and avoiding repetition of processes (11).

3. RESEARCH METHODOLOGY

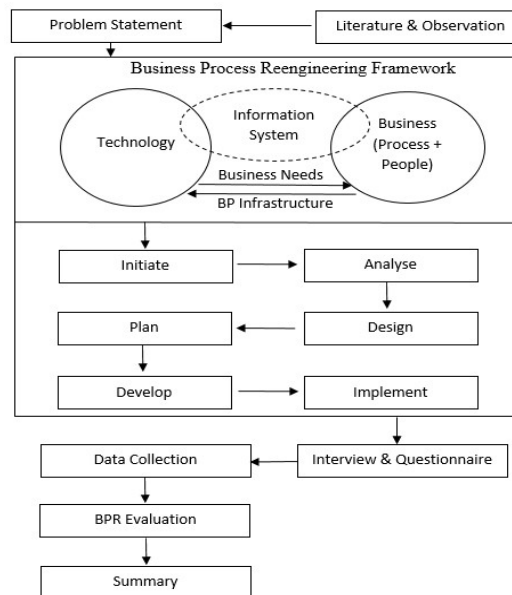To start the research, the author determined the methodology as follow:

Figure 2: Research Framework (PrISP, 2015)

Hammer and Champy (1993) are credited in the literature as defining reengineering as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical temporary measures of performance such as cost, service, quality, and speed" (p. 46). And defined reengineering as "using the power of modern information technology to radically redesign administrative business processes to achieve dramatic improvements in their performance".

From these two definitions, we understand that the ultimate goal of process reengineering is to achieve efficiency and effectiveness by radically rethinking existing processes; whereas the goal of

total quality management is to undertake process change gradually by working in incremental steps (15).

Early 2000, PGC started the transformation to processes. A decade ago it was continued after Dr. Michael Hammer's philosophy that his management theory of BPR and organizing work as series of tasks leading to an overall goal instead of organizing the work by specific functions like Sales and R&D. Today, after much effort and commitment, PGC understands the power of processes and their benefits to the business.

Initiate phase is clearly state what you want to achieve. Initiate's define the objective and scope are to start by defining the business objective (not the solution), get a first definition of scope in place to ensure right project and steering group set-up and also to get right Steering Group (SG) and right Project Manager.

Analyze considers different approaches: ensure learnings from past efforts are captured – what has/ hasn't worked in the past? What existing solutions could we use? Consider more than one approach to delivering value – balancing ambition level against resource requirements, discuss and agree on the best approach in the SG – with clear financial business case as basis for discussion.

Design phase is detail how the solution will work. This phase specifies the solution that achieves the objectives. Detail out each element required, as agreed in the analysis phase. Elements can include process design, new tools, people/ skill development, roles and responsibilities. Identify areas that need strong change management. It summarizes the costs and resources. Start detailing the costs and resources required to fully implement the To-Be solution. Include the effort needed by receiving organizations.

Plan creation delivers the value. Plan addresses all elements needed to deliver the value. The plan must cover when and how business results are realized. Define the end-point, when the receiving organization can sustain the performance. All elements required to realize results must be included, e.g. technical development, people development/ changes, communication plan, realization of financial benefits. Define who needs to do what and when. Actions and deliverables need to be assigned to individuals. All deliverables need to have a deadline – "critical path" activities should be highlighted. Identify and quantify major risks.

Plan makes it specific and implementable. All activities and deliverables should be clearly understood – both by the SG and by the assigned project group members. The timing of the overall plan should balance accelerated results delivery with good risk and change management. For activities that carry high implementation risk, a contingency is normally needed.

Develop phase gets everything ready to implement and test the solution. Develop the full solution: process, people, tools & structure to specifications, on time, at the agreed cost. Validate the solution is ready for full-scale implementation; often a pilot is required. It reconfirms commitments to deliver results. Ensure receiving organization is ready. Reconfirm the plan and the targets with the Steering Group. Set up required tracking mechanisms for results delivery.

Implement ensures deliver and track results and the plan is executed. It drives strong project management discipline. Follow up on deadlines and deliverables. Maintain status updates and required support from Steering Group. Implement manages and supports the change.

Data collection carried out either in a self-administered or interviewer-assisted way. When surveys are conducted using multiple modes of data collection, all questionnaire versions should be tested.

Survey of employees and organization is designed to see the stakeholders' readiness in accepting business transformation program at SEC to 214 end users of 450 employees.

Research population in the company is heterogeneous with a wide range of differences, in terms of working unit, age and years of services. With the heterogeneous population, research sample is composed by the element selection with restricted sampling to the company leader; management team (directors, managers) and staff by restricted sampling.

Table 1: Leaders position for Interview Sampling

Position	Population	Sample	%
Director	5	1	25
Manager	30	8	25
Total	35	9	25

As the change of system implementation, end users are the staff who do the daily operation (169 employees). For that, the size of sample that is taken from staff level position is classified to be questioned by the questionnaire is 30% which means 50 respondents.

The total sampling research is 59 respondents or around 28% from total of population. This total has reached minimum sample of 10% from total of population. From this sample, it is hoped that it will returned intact and valid to 90%. Return rate is assumed high due to the researcher is one of the

employees from the company that makes easy to get the data.

To get ordinal data (questionnaire) from respondent's perceptions on questionnaire, Likert scale is used from 1 to 5 so that respondent's perceptions is received on the answer of survey statement/ questions as follows:

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree

All data that is gathered will be analyzed to answer the questions that is submitted on issues in a research.

Below current business process is what show the scope of OFCE pre-project and BoM in the legacy system.

By having current process business below, it is shown that sales support functions in pre-sales is no more than as engineering quotation maker instead of managing and controlling a project (no full integration with post-project).
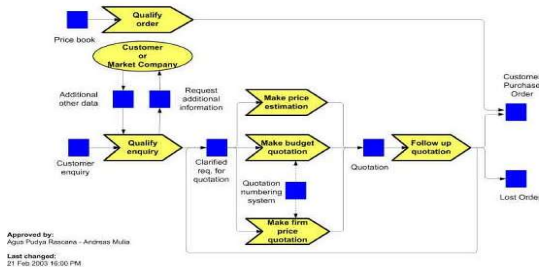

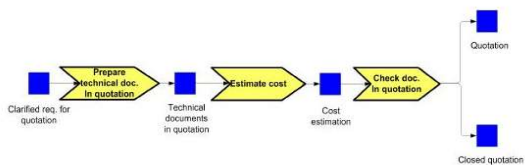*Figure 3: Current Process Business for Pre-Project in Making Quotation*

Figure 4: Current Process Business for Making Firm Price Quotation

Semi-finished (SF) goods material number as master data in legacy system has no proper structure that caused BoM is overlapped.

Figure 5: BoM Structure in Legacy System

Figure 6: BoM SF Product from Legacy System

4. RESULT AND DISCUSSION

PrISP is a project to change current IT platform into a new one based on ERP. The project is wider than changing from one IT system to another. It is in fact more about a change in the way employee work (business process), rather than a change in the system employee use.

4.1 Initiate

This very first stage to do is defining the objective for the project as the business strategy concurrently as the application of IT/ IS strategy. The project business is determined to achieve global data integration, provide the basis for better decision-making, improve key business processes and the supporting integrated system, and make the information systems more user-friendly. As a result, company will be able to continuously improve the value to provide to the customers.

After the project business is determined, it goes next to determine the project scope (as mentioned, in this paper the scope is only covers OFCE pre-project & BoM).

Budget is determined in high level according to global budget allocation. It consists of business and technical budget. The budget calculation is based on the scope and benchmark from other sites that are similar. Business budget covers backfills, user training, external consultant,

management & admin, travel, portfolio and contingency. Technical budget consists of travel, licence, abaper and analyst working hour.

The governance is to determine the accountability for achieving the objective of the project and the accountability of Project Management. SG committee is formed. It is chosen by the sponsorship (the owner of the bucket of budget). The SG is led by a chairman that coming from Business Transformation Division. Its members are coming from each process in the scope, including the top management leader from the site and Finance Director for budget advisor.

Project chartered is made. The analytical approach is where the analysis is kicked off. It's time to release the strategy into operational activity driven by next stage to the implementation. The sponsorship will only be monitored based on the steering committee reports.

4.2 Analyze

Analyse phase is executed after tollgate initiate has green light to GO from Steering Committee. In this stage, all preparations including scope should be well arranged from beginning to implementation.

Since it should prove the business value, define the required changes, it puts a fact-base in place to challenge/ validate the objective. It also quantifies the potential business value – and use this to refine the scope.

Entity scope confirmed is the step that company need to define the scope for the whole work that cover process from the beginning to the end. Scope matrix (entities & processes) signed off by PGC.

Entity scope that is confirmed under SEC covers IT Solution and Global Process Scope with 3 Business Units. The company's scope covers OFCE which consists of 80% of the company supply chain of production, engineering, project sales, warehouse and hybrid.

At the end entities out of scope are confirmed and communicated to the stakeholder for the starting awarness due to the company still runs service business and totally having bonded zone regulation.

To begin the understanding of business, trade flows should be made and described for discussion between global process team and technical team. It is one of the requirement to pass the stage since it is verified with Central Legal & Tax in headquarter.

Business case (BC) validated starts with the Finance & Business with some issues and impact as follows:
- ✓ Global production strategy implemented with impact business case form production strategy is loss of saving potential.
- ✓ Local efficiency gains in Jakarta with impact system support and lack of insight in the daily operation, efficiency losses.
- ✓ Burning platform, support package with impact cost of going up to next version of legacy sytem and local support is not good enough.
- ✓ Lack of adequate tools for business control with local impact corporate governance risk is still open.

All business cases issues above cause high risk with high cost almost 3 millions dollar.

Above issues should be resolved within the proposal of business case in order to support good business strategy as well as IT strategy according to BtripleE framework:
- ✓ SEC is the home for one of global categories as well as production centre site for sheet metal in the Processing Global Production (PGP) Strategy:
  - ○ A major investment (12M€) is carried out at SC during 2015/ 2016 for a new factory.
  - ○ A growing part of PGC business and a part of the Business Case for PGP Strategy.
- ✓ The Processing Global Production Strategy is built on the assumption that all Production facilities are on one common future system platform 2017:
  - ○ Same Master Data in future system is key for success.
  - ○ The BC for PGP Strategy at risk:
    - - SEC is a cornerstone for production center.
    - - Commonality in processes and ERP system is a pre-requisite.
- ✓ Processing business models are dependent on transparency and margin visibility:
  - ○ A pre-requisite for the BC is the PrISP implementation as in the Processing IT road map.
  - ○ Future system to be implemented in all entities.
  - ○ ERP implementation in SEC has been part of the overall roadmap for several years (2008). Legacy system was an interim decision already in 2009 and now is out of date.
- ✓ Realisation of synergies in business case dependent on installation according to plan.

Some intangible benefits in applying future system according to business case analysis that have been made: 1) Strong basis for indirect productivity improvements: a. Improved master data quality (Less errors, Shorter lead times, Lower cost), b. Standardized product structure, c. Deep process understanding and ownership, 2) Alignment with rest of PGC, eg: common tools, processes, reporting, support, Master data and KPIs, 3) Financial reporting benefits: project follow-up, monthly reporting cycle, cost monitoring by CC owners, 4) IT strategic fit: One ERP platform, 5) Improved production flexibility.

The activities to prepare the readiness of data cleansing covers allocating the resources that should have 1 leader with team that consist of minimum 1 person as the admin and 1 backfill, secure GMD team's capacity and making activities timeline.

Prioritized data object sope agreed and confirmed for doing high level data cleansing plan in initial volume and target agreed.

The confirm product portfolio and tool, it has been confirmed to all level 0 products (Portfolio contains number of concepts without drawings and without BOMs) and material numbers. It also confirmed product modelling tool out of future system which is Vault (collaboration data and management software that helps designers and engineers organize design data, manage documentation and track revision and other development processes).

The global process team should be secured from 6 – 12 months before to avoid job overlapping due to high load allocation from accross nations. The first thing to apply with their leading is Global Process Workshop (GPW). This should be communicated to their own respected line manager to discuss the allocation for the project with one of the way is by making the line managers as the steering group committees.

This readiness for implementation entities on site are allocation for all position in site activities including their job description that show their responsibilities and site readiness with good IT infrastructure but has challenging on Activity Base Working (ABW) seating system.

Next step is to build High Level Activities Plan (HLAP) for whole project from first activities to hyper care. It also to decide places where those activities will be held. It is important to know every place taken for budget preparation.

4.3 Design

Detail solution specified conducted in GPW. During a series of GPW, a team of global colleagues took on a two-fold mission: introduce site to the global processes and understand legal and business-critical requirements at SEC.

GPW marks the beginning of the journey to go-live. More than a hundred "issues" were raised – topics where SC team and the global teams work together to reach a common understanding. The Local Process Drivers (LPDs) and the GP Team have the lead in closing these issues, and this activity is in full swing. LPDs are advised to be pro-active with the GP & Global Information Management (GIM) team and are encouraged to have active discussions – all to arrive at a solution.

GPW covers OFCE for creating a better, faster and cheaper supply chain. The OFCE process describes the activities from the time a request for proposals is received to when an order is placed and the products and services have been specified, produced, delivered and installed with performance validated at the customer site. In Project terms, this covers activities in the project phases of P (Pre-project), I (Implementation) and W (Warranty).

In OFCE Pre-Project, UCC stands for Understand, Create and Convey with elaboration of understand and confirm requirements, defining scope & setting performance target, creating the solution, creating the solution and manage & control the expectation. While D in UCCD is for confirming scope & detailed the solution, manage & control the expectation and validation of agreed performance.

UCC phase starts with verifying readiness to submit budget estimate and value proposition and verifying readiness to submit quotation & business proposal. It continues to submit firm quotation.

The Value Selling methodology helps to gain efficiency and effectiveness in sales by having a simple, logical and standardised approach. We focus on the solutions that create the most value while meeting customer needs, which in turn allows our customers to meet their objectives.

The purpose of project control process is to organise, plan, control our customer projects in both pre-project and implementation phases. It ensures that we successfully deliver the project by applying knowledge, skills and techniques to execute & control effectively and efficiently. It is designed to maximise the potential for our projects to succeed by helping to address each element of the project at the right time and to the right level of detail for the size and complexity of the project.

The purpose of support CE-quotation with production solution design in sales phase processes

is to indicate order of magnitude and prepare budget estimates and firm quotes requested by sales team. To do that technical solutions and associated cost estimates that meet the customer needs and requirements are created in the sales phase of the Production Solution Design process.

Then, how the company define and sell? Value selling – Understand customer needs has objective that is understand customer needs. It is about identifying opportunities to work with. Once an opportunity is approved we continue to proactively drive it and identify customer requirements. The reason to buy should be identified and analysed. Finally, customer needs are confirmed.

Value Selling - Create Solution (including create budget estimate) has objective to develop a basic solution together with corresponding value arguments and then demonstrating the value - and its price level - to the customer. Once the conceptual solution is confirmed by the customer it is refined to form a basis for a budget estimate and a value proposition. The budget estimate and the value proposition should be presented and agreed with the customer.

Value Selling - Convey Proposal (including create firm quote) has objective to prepare a complete business proposal based on the agreed value proposition and a firm quote, including technical design and performance targets. If the opportunity is lost, the project is closed, documented and make lesson learn.

A BoM is a complete, formally structured list of the materials which make up a product. The list contains the description and item number of each material together with the quantity and unit of measure.

General BoM of material structure is divided into 2 levels:
1. Single-Level BoM: Describes one or more assemblies used to form a unit
2. Multi-Level BoM:
   a. Specifies all the materials in a product, level by level
   b. Same structure as the BoM being used today
   c. All multi-level BoM begin as single-level BoM. Linking them together forms a multi-level BoM.

Important fields of BoM are the usage allows user to create separate BoM´s for the various areas within the company: R&D, this BoM contains data from R&D point of view and is for general usage and production, is set up from the manufacturing points of view. In production "BoM usage = 1" is used. The BoM is identified by Material number, Plant and BoM Usage. And the validity period is the time during which the BoM is valid: the period is specified by the following entries in the BOM item (Valid-from date, Valid-to date), ERP assigns a default valid-to date 12-31-9999 and Engineering Change Management could be used to control and manage BoM changes.

Variant BoM will allocate object dependencies to BoM items. And it does selection condition and the procedure will change item quantity.
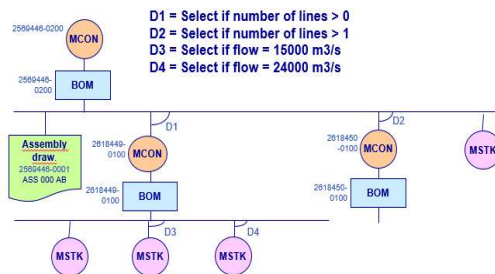

Figure 7: Variant BoM

Above Figureure describes MCON and MSTK as the materials that is created by BoM. MCON is a conFigureurable material. It is non-valuated sales order stock that contains of sales order specific stock that cannot mix individual between orders, moving average price specific per sales order, quantity follows the goods transaction and value-flow follows order settlement routes.

The engineering is needed to fully specify the order. Engineering is planned and costed in a project connected to the sales and production orders. And unique BoM is used to store the engineering technical solution.

The main strategy of MCON is Engineering-To-Order (ETO) controlled via Material Resources Planning (MRP) for sales order driven and internal or external procurement.

Material type of MSTK is a stock able material that includes CDES – Converting Designs, CADD – Converting Additional Materials, CRAW – Converting Raw Materials when used in OFCE.

The anonymous stock from any individual can be used in any order for batch management for traceability – if needed, moving average price common for stock quantity in plant, quantity and value follows the goods transactions.

Main strategy of MSTK is Make-to-Stock (MTO) controlled via MRP for forecast driven and internal or external procurement. It also available MTO controlled via MRP for (sales) order driven and internal or external procurement.

Business issue log (BIL) is consolidated from GPW between GP and LPD. It has been gathered in 124 working hours with almost 100 people involved and 11 BILs. The BIL consist of important data to do: issue number, owning process, issue description, status, potential system impact, general comment, date raised, issue origin, classification, due date for resolution, agreed action, gap number, date closed, how issue was closed and teams that are responsible.

The BILs is done to reach common understanding. LPD and GP team have the lead in closing the issues. LPDs are advised to be pro-active with GP team and GIM and are encouraged to have active discussion, all to arrive at a solution.

All gaps estimated and documented, delivered to scope control should prerequisites with legal entity scope confirmed, trade flows confirmed, GPW conducted and KDS workshop with sites completed, standard KDS documented and presented, deviation from standard KDS should be taken through the gap process.

The objective of this scope control is GP team accountable to bring gaps to documented one gap-list file, prioritised (within process), estimated development days, do business severity (legal with business case and business clarity), delivery priority as mandatory for Go-live critical or Not go-live critical. All gaps brought to scope control management are accountable for the business case.

The procedure is there should be cross process gap meeting that held a week before scope control. All gaps should be presented for any involvement from all process need to be identified and documented. A week later, scope control is decided to be confirmed and published. To be able to manage scope and prepare possible rejections is an indication of scope assessed.

Gaps that are rejected will dependence to other gaps need to be clear before rejection. The consequences identified before scope are confirmed and published with any workaround, who owns procedures (local/ central) and training (who/ when). GP-team to bring back the information to site and set expectations.

For changes to be approved, GP-team to bring change request to PrISP management with estimate and business rational/ updated business case. It also valid for technical changes. Also, technical changes less than 3 days or less than 10% of can be added to scope control log by ERP Development Manager.

All requirements to be submitted to the PrISP management and communicated to ERP Development Manager. ERP Development Manager to review with Data Manager and Training Manager, eBusiness Manager. If Training-, Data-, or eBus-team cannot manage the change – it will not be approved or delivered through other channels. After approval, SCM records moved into Gap delivery file for complete transparency by the ERP Development Manager.

Determining backfill is a serious thing to do carefully because backfill is one of the biggest cost in the project. They will be hired and paid during the project that takes time for almost 2 years. The calculation is based on the salary itself, transportation, tax, bpjs and management fee. It is calculated with its 80% of utilization.

Choosing the right candidate to be Super User, replaced by backfill is also important thing. Within the project, qualified, performed and experience employees is a mandatory. If those qualification is not fulfilled, don't expect project will be succeeded.

SU recruitment took place by approaching the line manager to fully support to handover their best employee to project together with the coordination of Human Resource (HR). When agreed, HR will do backfill recruitment. These backfill cost will be borne by the project, while Super User is still being paid by the function.

MRP strategy communicated by business and validated. MRP workshop is divided into 2 sessions: introduction which has goal to understand general concept in global solution and understand as-is and identify scenario that has goal to identify constraints – dimension/ group and to do short list planning scenario.

MRP is a production planning, scheduling, and inventory control system used to manage manufacturing processes. An MRP system is intended to simultaneously meet three objectives: 1) Ensure materials are available for production and products are available for delivery to customers, 2) Maintain the lowest possible material and product levels in store, 3) Plan manufacturing activities, delivery schedules and purchasing activities.

To have KDS signed off, it has the approach to lead the closure. It starts with template preparation by Global Design Leader (GDL) and ISP Stream Leads. It continues to KDS introduction and input during individual GPW tracker that driven by GDL, ISP Stream Leads and GP team as well as site responsible for each track. At the end, finalize KDS to all processes.

KDS at SEC covers Buy and Sell, CM, OFCE and FICO. Overall the KDS for entity is 0282 as the company code, PJ02 for SEC Production and PJ01 for SEC MC as the plant/ valuation area

(production, procurement, maintenance and materials handling processes).

4.4 Plan

Project management team updated the project plan through HLAP and its detail then confirmed. It is including project organization chart to be updated and communicated to all stake holders. It is necessary to confirm each responsibility and clear timing as the project is in tight schedule.

As detail activity was confirmed, each function in the business and technical teams agreed to the deadline. This will lead to the commitment to finish the project on time. This also include for status reporting and communication plan approved.

The communication plan is about to plan how the communication works to all end users. The communication is not an easy task and cannot be afforded since it delivers end user to follow each activity for updated.

Allocation for all team activity was not an easy one since the involvement of GP team's time is challenging. Their allocation for participation is highly demanding as generic requirement in the project. They need to lead MCA, GPW, participate in KDS, lead/ participate in GAP process, includes soliciting requirements from site, signing off Analysis, as per detailed GAP process, lead process implementation, participate (coach) in Organization Alignment (OA), participate (coach) in ambition management process, lead conceptual knowledge build on production planning, lead Process Role Validation (PRV), participate in user mapping and SoD mitigation.

For data conversion readiness in sufficient progress and good quality in data cleansing, material mix of Own Design Material (ODM) & OEM (various types including raw material) created on client level and ERP numbers communicated to site to use for data sampling submission with minimum quantity: 100 materials ODM, OEM + good mix per OEM product type.

Site delivery of cleansed master data meeting quality and timeliness expectations of Global Master Data Management (GMDMt) covers: a) Scope for Master Data should maximize value for the business. It's 68,000 parts identified, down to approximately 18,000 after scope scrutiny, room created for parts for current and future portfolio and Product Modelling subproject launched for prioritized portfolio Pharma, b) Validate ERP master data created in past years, but only 'consumed' by MC for purchase – risk for obsolete data, scrutinize what local data can be made Global and prepare for new requirements such as Food Contact, FDA approval, etc, c) Evaluate completeness of installed base.

Resource need for continued data cleansing identified and allocation confirmed until deadline "all materials cleansed & created" for site & Global MDMt. The Objectives are to discuss Structures for High Level (HL) MDM Governance between Site/ Site + Cluster/ Site + owning BU/ Site + Regional cross-BU with site requirements understood and HR impact known, to align with global MDM Blueprint as the concept agreed to align to MDM Blueprint for SEC and challenge remaining is Central MDM Role(s), solutions emerging but not finished, for MDM Tools - quick wins as MDM Enterprise tool for client level Master Data management implemented and for Emerging Risk as MDMe Project, implementing SAP MDG tool staggered go live during the project, it is important impacts to MDM & DC track.

4.5 Develop

PRV had taken place successfully for each function. PRV is a collaboration of process and organization for agreed mapping of global role. The purpose was to secure the understanding of GBR and SoD and finally kick off end user mapping.

The key activities were to introduce Global Business Role (GBR) and SoD concept and walkthrough scenarios in OFCE process, validate position in organization to do the activity, hands over and SoD between position.

LPD and Line Managers shall map the GBR while LSA perform SoD conflict analysis on GBR mapping and present result to LPD and the Training Manager. After finishing LSA conflict analysis, LPD approved the SoD. Finally, Training Manager plan the End User training based on GBR assignment. It resulted the course mapping.

SoD that has been analysed shall be validated by Processing Process Driver (PPD) in headquarter. If there's conflict, PPD shall mitigate the action needed.

Course mapping was done completely with a lot of coordination with the SU for each process due to the order should be proper.

Data identification, collection, consolidation, cleansing shall be completed to plan. All scheduled data cleansing activities completed as scheduled and data quality signed off by data owner, yet it still had a data provisioning for production related master data unveils lack of quality and detail requiring product management, product modeling and engineering efforts to establish and a purchasing sub flow recognized only as exceptional during

analysis turns out to have been used extensively leading to missed materials during cleansing.

Early reviews of test load data & cutover simulation data show inconsistencies in business value of data provided, for example material marked as forecast driven but no data for forecasting available or maintained; unlikely MAP pricing for stock items.

Data test load completed according to plan were files delivered on time by site, but not in load-ready quality due to main issue area: BoMs, Routings; Vendors; Assets, issues with some technical load tools due to main issue area: Assets; production master data and cost centers & profit centers loaded are not in line with business unit expectations to enable "local reporting" requirements.

This brought up the assessment 4 months before go-live with the status of test load has caught up but actions needed before P-load (Production load), test load was able to complete with 1 week delay and impact to dependent activities was minimized and mitigated, cost center restructuring completed; profit center restructuring work in progress (WIP) due to deliver as soon as possible and mitigation plan for business value of data: investigating backing up data owners to validate data with experts in both business unit, SEC and ISP.

4.6 Implement

All plans that have been scheduled were on track and were ensured to be executed. All these plans are covered in milestones of Cutover Readiness:

1. MDM organization is in place and operational with 37 total scope definitions and MDM deliverable: MDM introduction workshop, MDM scope workshop, MDM training, Local MDM implementation plan, Dual maintenance plan, Local MDM web set-up, Dual maintenance complete to plan

2. Production data load is on track for 100% delivered before going live but it had delayed of 50% due to lack of interest on the person in charge to do the job and also changing product structure in the last minutes. This was a problem but can be catched up very hard with the support of all team.

3. All cut over preparation task are identified. Project to be cut over before go-live was identified for 17 projects with 101 units to be delivered to customers. Delivery was on track for 90%. Only minor action should be done in the area of validating the drawing and the purchase of material. The schedule was

committed with all respected function, yet the actual from Finance side, the data were still not updated due to source file not yet submitted. It also messed up for Supply Unit activities since the product structure was not in place.

Mile stones of Go-No-Go cover some items: all users set up in production, all printers set up, all hyper care preparation complete and all end user training delivered.

All users set up in production has been done according to the GBR agreed. 5 printers with global network have been installed in office building, utility building, warehouse and bar code PDT.

All hyper care activities were done on time with continuity transferred to delivery team in global. It starts from the end user raised the issue then closed by Super User as shown in below Figureure.

The last reporting date was done after 2 weeks passed as scheduled with total user 208 and number of login is 198, which means it is only 95% people do the login. To make it reach to 100%, personal approach was done to each person to do.

All status reported that overall status is green that means user has logged on to the system for the first time in the production mode.

High number of tickets during last 3 days of HC analysis shows 18/21 are UA; reason: slower start of full process testing due to CO order catch-up. PMs decided after analysis that this does not indicate lack of solution stability; with BPT 100% completed and documented, we are confident all areas covered by the system are functional.

Site team continues to focus on recovering performance; good progress in WH operations; production performance still significantly impacted by the need to re-engineer cutover orders to SAP product models. Action plan in place and progress measured daily.

Other mile stones of Go-No-Go is book closing activities planned with resources confirmed (Site, Hub, GIM, GP) and all EUT delivered. Book closing run smoothly as all parties accepted based on the hyper care closure activity and report.

EUT deliver was successfully done based on the plan schedule but the attendance of 35% which was far away from the target of 90%. The main reason for having less attendance from the employees is due to business priority, even the communication has been delivered to the top management, while from project perspective it's due to tight schedule. It was catch up after official training schedule whenever necessary and Super Users were available.

In the Process Improvement, it has been done for OFCE Pre-Sales as results as follow:

1. Integrated communication between pre-project and fix project management (post), such as:
   a. Perform customer credit check (account receivable balance). If approved by Finance, pre-project can continue.
   b. Create project (using the quotation number) by the engineer but the quotation doesn't contain a project team. When project and network created, the quotation is linked.
   c. Engineering capacity can be checked and assigned.
   d. Technical documentation can be created (order BoM and or drawing) then the costing report can be run.
   e. Engineering and production capacity situation is checked and quotation can be updated with dates and risk assessment is found then quotation is reviewed, finally quotation is sent out.

2. No more overlapped job or one man show as GBR has been mapped and it is shown in the process flow.

3. Decreasing loss, eg: project in USA has margin -9% and in Vietnam is +6%.
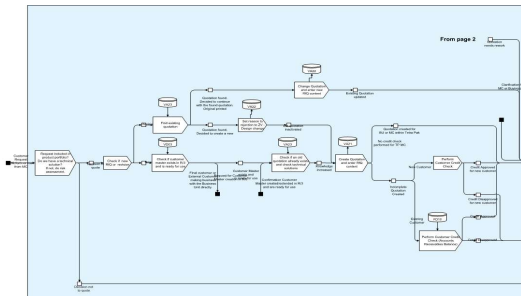
Figure 8: Pre-Project Process Improvement (1)
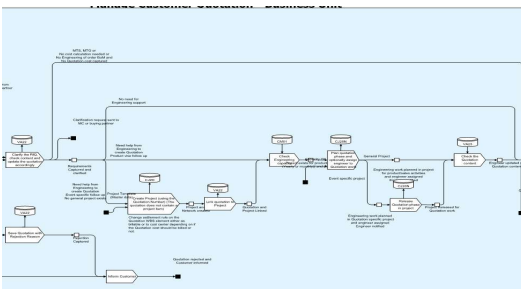
Figure 9: Pre-Project Process Improvement (2)
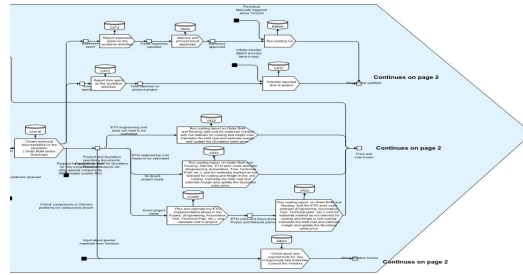
Figure 10: Pre-Project Process Improvement (3)
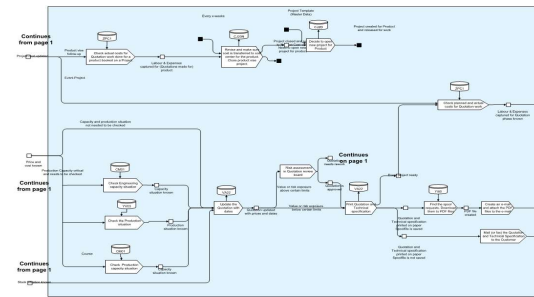
Figure 11: Pre-Project Process Improvement (4)
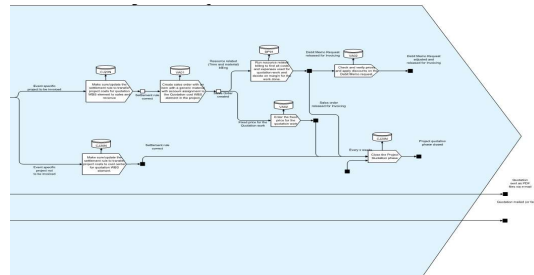
Figure 12: Pre-Project Process Improvement (5)

Process improvement has been done for BoM on process alignment. New BoM structure eliminates problems in old system such as:

1. There is BoM master data (data base) available that can be used in different project.
2. All items that compile product/ BoM is well arranged and recorded via MCON in every level.
3. Easy to identify and shorten time to find the material.
4. MCON can save a lot of material with the same description but different conFigureurations with reference to the drawing of which project is using the MCON. MSTK is already a clear standard material and initial specification and has only one number for one material specification (it can be raw material or assembling material).
5. All engineers will use a single BoM structure that composes a product to facilitate the

identification and collaboration between functions (standardize).

New BoM structure in new system is now more detail and identified, as shown in below picture.

Figure 13: Unique Name for Each Material That Easy to Find

Questionnaire has distributed to whole new system active user with feedback of 25% as planned which means total returned number is 50 people. Even it is anonymous questionnaire, but data introduction was provided to find out specific interest from each age, working years and functions.

Range of age is dominated by age of 31 - 40, which means it is productive age and the majority group in SEC. This age group has balance response for seeing new system as 1 is complain too much and the other feels great with the tool. It can be concluded as neutral as it equals as a bell curve is healthy. The absence of a bimodal curve shows there's no determining factor between "good" and "bad".
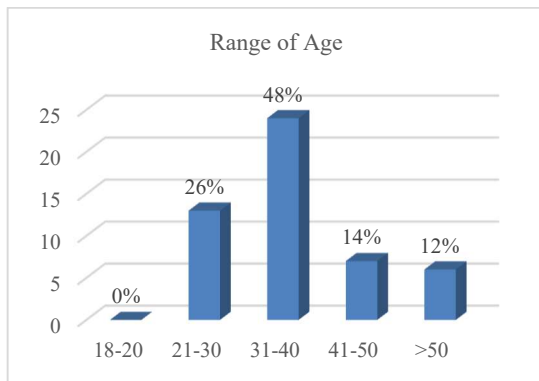

Figure 14: Questionnaire Result on Range of Age

Working year is very dominated by 1 - 5 years. This impacts to the average of overall result that shows in Neutral (3.1) which people are still trying to adopt new process business while they were struggling with the old one. On the other hand, very recent employees are not yet "engrained" in the old process, finding change easier to digest. Both arguments may balance each other out.
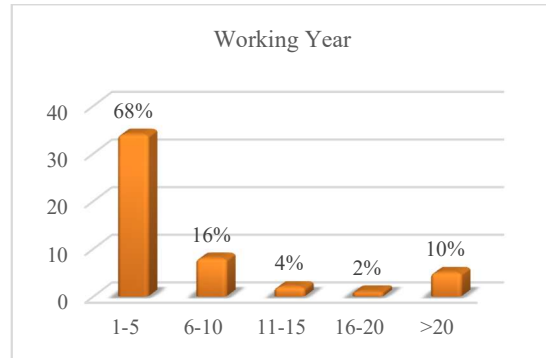

Figure 15: Questionnaire Result on Working Year

Function is dominated by Project Engineering and followed by Production & Maintenance and Site & Project Management. This is very normal and was expected as the process is dominated by OFCE as it is confirming a healthy spread linked to department size.
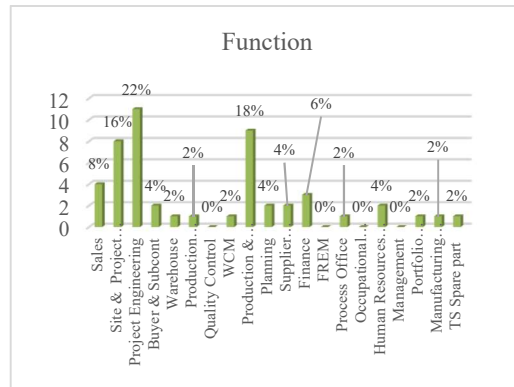

Figure 16: Questionnaire Result on Function

The questionnaire was divided into 4 sections that build this project: Performance = Process + People + Tools/ Technology with the scale of 1 – 5 according to Kreitner and Kinicki (13).

Process variable is based on Business Process Management: A boundary-less approach to modern competitiveness (20). People variable is based on translating reengineering into bottom-line results Industrial Engineering (2) and Readiness and Culture: Don't Reengineer Without Considering Them Inform (4). Tools variable is based on the

implications for information technology infrastructure for business process redesign (3). Performance variable is based on Re-engineering Work: Don't Automate, Obliterate. Harvard Business Review (8). Team variable is based on BPR, all people must be openly and actively involved (2).

The result shows that middle value is the favorite range to choose because some are sceptic and some are optimistic. Strongly Disagree is higher instead of Strongly Agree, especially in category Performance and Tools are dominant in Agree as employee try to make themselves convenient in using it. In fact, mixed observations in statistical processes, there is a correction because indeed negative feedback (complaint) is more readily given than praise. The result is described in below graph.
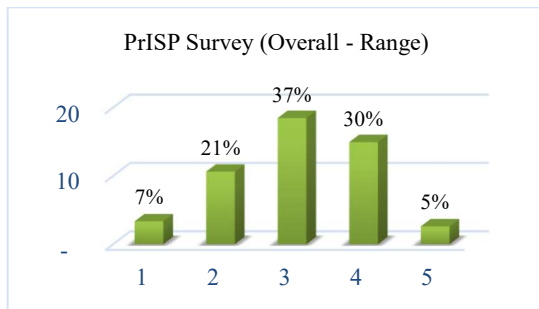

Figure 17: Questionnaire Result on Overall Range

From Value point of view, it can be concluded that "People" is the highest value. It's seen that people would like to develop themselves and it is supported by the manager after go-live. "Performance" is less than expected since employee were struggling between time for ERP project and business. Even final result is "As Expected", but employees need to catch up to adapt with detail of the system and understand fully for the process alignment. Master data is hoped to have fix data for the smooth of the business.
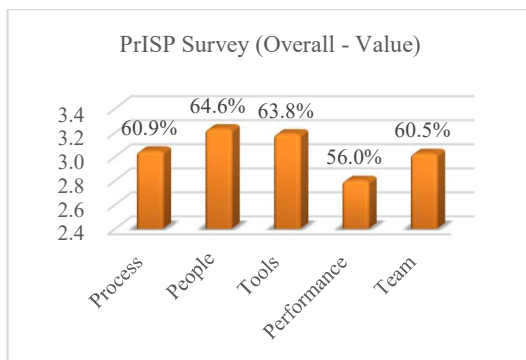

Figure 18: Questionnaire Result on Overall Value

Both summary show middle value as the highest score and more to "Agree" and "Better than Expected" and it might be indicative of a perception of positive evolution. The OPI's we measure confirm this. Over all summary is the highest for Process, People & Tools is Neutral while for Performance and Team is As Expected and this is in line with other PrISP Roll-outs; even actually, process & org alignment always scored lower than all other areas.

BPR is medium successfully applied with some notes/ lessons learnt because the fact was project didn't win the hearts & minds of the people at first.

Interview was done to 25% of management population and returned back for 47%. All variable questions were taken from Business Process Management Maturity (BPPM) Capabilities Areas & Description, Practical Guidelines to Successful Implementations book of John Jeston, Johan Nelis BPM (10). The areas reflect the average perceived importance weighting assigned by the experts participating in the Delphi study that modified the contents for interview purpose at SEC.

Same as questionnaire, this interview gives neutral result while the details are explicitly described. Neutral means one assessed good and the other not. It gives fair perspective on the impact of process alignment improvement and new system.

Starting from Strategic Alignment variable, interviewees tend to see what's not working from the strategic alignment itself is due to improper organizational alignment during the project. It's concluded that the strategic alignment needs to be reviewed and mapped (to get it goals on winning the market by supporting the organizational ways of working) by restructuring the organizational alignment.

Seeing the Governance variable, project governance was very good structured, but minor things came up as issues for those who were not involved in deep, like one person covered more than 1 function, it has been considered well to have such decision. The process business improvement can run is because of the interference of the governance.

It's still questioning for the interviewees for Information Technology (Tools) variable for its usage, but it supports end user for the application. The question is more to ETO/ customization of the product while new system is more for re-used business model. Interviewees also expect the master data is secured and proper.

In People section/ variable, support was there from the team and employees were eager to gain the knowledge while the managers need to cope well and see the future impact on their involvement.

Culture variable is mostly influenced by the communication and collaboration. And it's not an easy task to change the culture. Besides, it should be supported by the leaders for their role model. New system does what the steps should be done, but communication within the company to be better is another thing to consider.

5. CONCLUSION

Improvement of business process for pre-project and BoM has been done based on BPR framework. Improved flow was established and shall be used to fulfil the gap into improvement:

1. Integrated communication between pre-project and fix project management (post).
2. No more overlapped job or one man show as GBR has been mapped and it is shown in the process flow.
3. Decreasing loss

IT platform has changed from legacy to new system. It can be seen from:

1. BoM master data (data base) available that can be used in different project.
2. All items that compile product/ BoM is well arranged and recorded via MCON in every level.
3. Easy to identify and shorten time to find the material.
4. MCON can save a lot of material with the same description but different conFigureurations with reference to the drawing of which project is using the MCON. MSTK is already a clear standard material and initial specification and has only one number for one material specification (it can be raw material or assembling material).
5. All engineers will use a single BoM structure that composes a product to facilitate the identification and collaboration between functions (standardize).

From the questionnaire and interview result, future research can be held to apply strong commitment from top management to all employees, specifically to ask all employees to sign the commitment on paper. Top management should determine all employees' work load allocation in their IO (Individual Object which should not only for project core team), e.g.: Business work 70%, Mandatory learning to support the business 30%. By having this IO, Line Managers need to re-map their team's skill and provide the training needed while Change Management/ Communication need to do campaign to encourage employee to utilize KM usage.

Performance via strategic alignment needs to be reviewed and mapped (to get it goals on winning the market by supporting the organizational ways of working) by restructuring the organizational alignment.

There should be Change Management/ Communication to encourage employee to speak up and share the knowledge among functions. The knowledge should be stored in KM for unlimited time in the global intranet where all employee can access.

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