

MAF009 Latent accounting standards within emerging economies: the case of oil and gas upstream activities in Libya

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Abstract

Accounting regulation within developing economies merits careful reflection, particularly where local directives disregard globally accepted accounting practice and potentially hinder vulnerable economies. The regulatory arrangements for oil and gas upstream activities, once oil and gas have been discovered, within Libyan Petroleum Law (LPL, 1955) allows discretionary latitude which could reduce the value of fiscal returns between International Oil Companies (IOCs) and the Libyan government. This paper considers the jurisprudence of this ostensibly latent accounting framework, questioning its efficacy. The study finds an apparent dormant intransigence from both the Libyan government and the IOCs regarding this regulation. Applying a diffusion-contingency model to explore influences for accounting reform reveals power dynamics and economic implications as key variables. Fiscal impact is considered utilising simulation modelling techniques, applying differing accounting methodologies using the historic upstream cost data reported by seven IOCs. The simulations show significant value shifts between methodologies, contradicting existing market valuation literature rationalised through cost sharing agreements.

Key words: Libya, Accounting standards, Emerging economies, Oil and gas accounting, diffusion-contingency model

I. INTRODUCTION

The primary purpose of this paper is to consider the development of accounting systems within emerging economies by applying a case study approach, which facilitates a depth of analysis of one country's particular accounting reforms. The study examines the continued application of localised accounting standards, set in 1955, for upstream oil and gas accounting transactions in Libya. Consideration will be given to both the process of accounting reform and the economic value implications caused by such standards between the governmental bodies and international oil corporations (IOCs). The context of the paper pertains to contractual payments within these activities in Libya, a country highly dependent on revenue generation within this sector. The paper also adds to extant literature regarding global accounting practices for such upstream activities relating to full cost (FC) and successful effort (SE) accounting methodologies, recognising the respective impacts on market values of applying such policies.

The development of accounting regulations can be seen as a function of differing economic environments and the demand for financial information (Ashraf and Ghani, 2005). The focus of global accounting standard-setting bodies has been on setting standards which are both

acceptable and flexible to a vast body of constituents in different countries globally (Doost, 1997). Developed economies adopt generally accepted accounting principles, consistent with their similar economic, political and social conditions (Bait El-Mal, 1990). However, these conditions differ in emerging economies where there are localised environmental variations regarding cultural backgrounds, ownership, economies, legal structures and political institutions (Rahman *et al.*, 1994; Hassan, 2008). Accounting systems within these economies are affected by weak indigenous accounting professions (Joshi, 2001) a lack of expertise in setting accounting standards and unfamiliarity with International Accounting Standards. Structured capital markets with their associated robust regulatory frameworks are also less sophisticated in emergent economies (Choi and Mueller, 1978). Whilst favourable socio-economic and political climates have been posited as positive catalysts to improving reporting practices within a country (Assenso-Okofu, 2011), their absence may negate development. Emerging economies lacking formalised indigenous accounting standard-setting processes may consequentially adopt standards established in developed countries (Doost, 1997) but which are questionably apposite to an undeveloped environment (Samuels, 1993). However, a principles-based set of rules enables local customisation (Chua and Taylor, 2008) and may allow effective contextualisation to local socio-economic and cultural environments (Hassan, 1998; Mirghani, 1998). It is also possible that powerful actors might influence such frameworks in these emerging economies to their own benefit (Cortese *et al.* 2010).

A contentious area of accounting regulation relates to the treatment of oil and gas upstream activities where FC and SE principles dominate global practice (Gallun *et al.* 2001). Under the FC method successful and unsuccessful costs of upstream exploration projects are capitalised, whereas the SE method immediately expenses unsuccessful activities. The methods are based on differing views of accruals and conservatism principles (Brooks, 1986). SE supporters assert conservatism with unsuccessful wells, having no economic benefits, being written off immediately. FC supporters justify the capitalisation of unsuccessful costs by the accruals concept, with costs perceived as a fundamental part of the cost of finding oil and gas as all exploratory activities, successful or otherwise, ultimately lead to future economic benefits. However, the capitalisation of such unsuccessful costs, e.g. abandoned properties, contradicts the matching concept as these costs will not match any future economic benefits (Baker, 1976). Both methods are currently permissible and at the discretion of IOCs (SEC, 1978) with the IASB continuing to debate their value within the extractive industries (IASB, 2010).

Present literature asserts that oil and gas companies report different income statements under FC and SE methods (e.g. Murdoch and Krause, 2008). With SE expensing unsuccessful exploratory activities and FC capitalising and writing them off to the income statement gradually, this has a timing effect on profit with a propensity for lower profits in the SE companies (Lilien and Pastena, 1981). There is also the potential for volatility for SE companies (Dhaliwal, 1980) due to the immediacy of write off rather than a smoother profile of expensing (Cooper *et al.* 1979). This affects short-run (but not long-run) expected earnings

growth (Yee, 2006), as well as taxation charges (Baker, 1976). Likewise, corporate balance sheets differ based on the accounting methods (e.g. Sunder, 1976) as the FC method capitalises unsuccessful activities. This significantly affects oil and gas companies reported values (Collins and Dent 1979) although the impact is reduced through a ceiling test designed to consider impairment on FC assets (Boone and Raman, 2007). The market value of oil and gas companies is also affected, with companies adopting the FC method showing superior equity performance to those under the SE method (e.g. Collins and Dent, 1979; Cooper *et al.* 1979; Sunder, 1976). This is explained by the higher balance sheet book values and the risk-reducing (through income-smoothing) effects of FC companies.

Libya differs from such globally established practice, applying a local variant with Libyan Petroleum Law (LPL) permitting oil and gas companies either to expense or capitalise some of the differing categories of costs (LPL, No.25, regulations 8 and 9, 1955). This increases management discretion compared to internationally recognised methodologies under which, once a company adopts either SE or FC, they have no further discretion regarding the differing categories of costs. Under LPL the potential for management discretion is increased, being applied individually to numerous cost categories. The LPL permits oil and gas companies either to expense or capitalise some types of costs such as intangible geological and geophysical (G and G) costs. Existing local standards are thus not aligned to global practice, and the logic applied to the formation of such regulations is indeterminate. There are three possible explanations for this. Firstly the level of discretion under LPL may relate to the government's encouragement of foreign investment. Secondly, at the time of the LPL development most companies treated upstream activities under SE accounting principles but the FC approach was being introduced by small and new companies (Brock *et al.* 1982), resulting in the hybrid approach adopted in Libya. Thirdly, the level of freedom adopted may be a device of the IOCs who helped draft the law (Waddams, 1980) to allow management discretion. This has resulted in IOCs expensing rather than capitalising these costs when they have the option (Mahmud and Russell, 1998). This increased discretion could result in timing effects for the cost recovery contractually agreed by the government and the IOCs where costs are being shared. This could result in a time related movement of value from the government (as principal) to the IOC (as agent) due to the potential earlier remittance of cost. The self-interest of the IOCs permitted by the LPL's management discretion results in potential agency cost which is presently uncontested. A comparison of the treatment on the upstream cost categories under LPL, SE and FC is provided in Table 1.

Table 1 about here

The paper makes the following contributions. Firstly, the paper considers the standard-setting process within an emerging economy, adding to the limited extant literature but with particular emphasis on localised accounting standards. The specificity of this study to local accounting standards differs in approach from studies in emerging economies, which are often generic to the adoption of international standards (e.g. Hassan, 2008). Secondly, a diffusion-contingency model is adapted and applied from governmental accounting reform. The researchers believe the model is apt to the research area due to Libya's socio-political

environment and its lack of a professional accounting body as a standard-setting body. Thirdly, the paper considers the economic impact on an economically and politically vulnerable society of applying existing accounting regulations as opposed to more accepted practice. The findings should not only be of interest to the Libyan economy and accounting reform process, but also contribute to the understanding of accounting innovation within emerging economy and extractive industry reporting literature.

The remainder of the paper is structured as follows. The next section details the theoretical frameworks applied to the qualitative aspects of the study regarding accounting developments. Consideration is also given to the methodology adopted for the quantitative aspect of the paper regarding the fiscal impact of alternative accounting treatments. An analysis and discussion follows of the factors influencing developments in this particular context and the results of the simulation study. Finally, there are concluding comments and areas for further research.

II. THEORETICAL FRAMEWORK

The dominant framework applied to accounting standard development is institutional theory. Accounting regulations in Libya are significantly affected by government law, partly due to a professional accounting body deemed ineffectual in developing an accounting regulatory framework. Therefore the paper will also draw on diffusion-contingency models normally applied to government accounting innovations. The models have been applied separately to developed and developing economies due to the significant differences recognised between these classifications (Hassan, 2008). In addition the paper considers agency theory as accounting regulation in both its development and application involves the participation of principal and agency actors.

Institutional theory

Institutional theory aids consideration of the relative power of stakeholders to influence accounting regulations, particularly within developing economies (e.g. Hassan, 2008; Mir and Ramahan, 2005). Institutional theorists argue a case for isomorphism (where institutions may move towards similar form, shape, or structure of other entities) and legitimacy as drivers for accounting regulatory change (DiMaggio and Powell, 1983; Scott, 1995). Institutional isomorphism creates change through social forces that impose pressure particularly from the state (coercive isomorphism), the accountancy profession (normative isomorphism) and adopting of best practice (mimetic isomorphism) as seen in other countries (DiMaggio and Powell, 1983). Legitimacy would lead an entity or country to adopt practices that would legitimise their existence in the eyes of society and its key stakeholders. Legitimacy concerns and institutional isomorphism can conjoin to change accounting practice. For example, in emerging economies foreign companies are seen to influence local regulation towards global standards (Wei *et al.* 2001).

Diffusion-Contingency model

A Diffusion-Contingency Model for government accounting reform developed from an initial contingency model by Luder (1992) which considered stimuli, structural variables, and implementation barriers to reform. The model undertook various transformations including work by Godfrey *et al.* (2001), who introduced a diffusion perspective initially applied within a developing economy environment. The model is based on an iterative process involving the interaction of political, social and administrative actors (those individuals who have the potential to have significant influence), filtered by the government's organisational structures. The diffusion-contingency model has been applied mainly to developed countries (e.g. Ouda, 2008; Caba-Perez *et al.* 2009) with limited exposure to emerging economies (e.g. Upping and Oliver, 2011). Variations of Contingency models continue to be applied to accounting regulation studies (e.g. Justesen and Mouritsen 2011).

The stimuli originally propounded for accounting change include fiscal stress (e.g. shortage of public financial resources), dominant political doctrines, external standards, financial scandal, and professional interest (Luder, 1992). Change can also be promoted by people or organisations with a vested interest in change (Upping and Oliver, 2011) including numerous potential change agents such as consultants, commentators, academics and professional bodies (Christiensen, 2002). Of particular interest to developing economies is a dependency ethos placed on economies which may induce accounting reform. For example, donor agencies often require accounting innovations prior to receiving funds, expertise and technologies (Godfrey *et al.* 2001).

Key to accounting innovation is the role played by political, administrative and social actors. Luder (1994) recognised the influence of political variables, specifically the political culture (e.g. openness of particular economies), political system (e.g. democratic) and the existence or otherwise of political competition. Carruthers (1995) considers these political factors more important than economic motivations. Moreover, innovation may be impeded or facilitated by a weak or strong politico-administrative system. Reform may be constrained by the pervading administrative culture, staff formation system, or the standard-setting efficiency of the organisation and its amenability towards accounting (Luder, 1994). Accounting innovation is also positively related to affirmative attitudes to change; decentralisation where control is not distanced from the operational problem; levels of complexity (knowledge and expertise); and levels of formalisation or being rule bound (Godfrey *et al.* 2001). Within Libya the relative importance and power of the differing actors is critical as they may have varying prominence. For example, the principal governmental and societal actors may be perceived as ancillary relative to the more powerful and influential IOC agency actors, whose resource and power-hold on emerging economies should not be understated.

The characteristics of any innovation are also critical in the reform agenda. Relative economic advantage in adopting an initiative e.g. through its fiscal revenue generation, should influence reform. Compatibility of the innovation to the adopting organisations'

existing values and requirements may impact positively or negatively. Likewise complexity in the perceived difficulty in understanding and using the reform may be a barrier to change. Numerous other barriers to innovation have also been considered including the legal system in situ, the qualifications of accountants and the political culture (Luder, 1992).

Contractual behaviour and agency theory

Agency theory can be used to understand the dynamics of relationships between principal and agent (Jensen and Meekling, 1976). This can be applied at a macro level (e.g. regulatory policy) as, in this context, regarding the contractual arrangements between the national government (the principal) and IOCs (the agents). Significant exploration, development and production work is carried out in emerging economies through varying forms of production-sharing contract. Strong and active contractual partnerships in the oil and gas industry are seen as essential, leading both parties to benefit through cooperation (Pongsiri, 2004). For the governments of emerging economies, foreign contracts are critical due to their need to access risk capital, expertise and technology. Many of these contracts include cost-sharing, which will be impacted by the choice of method in recording costs, and provide the context and locus for the paper.

A number of assumptions pertinent to agency theory are relevant to this study, including economic actors engaging in opportunism (Wright *et al.* 1996) and self-interest affecting the setting and functioning of contractual agreements (Vickers and Yarrow, 1988). It is also assumed that agents and principals will have different goals, with clashes exacerbated by cultural and institutional differences (Jacobs, 1992). The objectives of the government and the IOCs often clash (Bindemann, 1999) as host countries aim to maximise economic values and IOCs to maximise profit (Pongsiri, 2004). Fattouh and Darbouche (2010) note that the negotiated contracts between governmental bodies and IOCs are also driven by country-specific factors including the size and quality of reserves, the political capability of the domestic government, the countries' own parastatal entities and international sanctions.

III. RESEARCH DESIGN

The research questions being addressed in the paper are as follows:

1. What are the influencing factors in the standard-setting process of the Libyan government's oil and gas upstream accounting contractual arrangements with IOCs?
2. What is the impact on Libya's economy of applying the existing latent discretionary-based LLP methodology, as opposed to the Libyan government selecting an alternative global standardised practice?

The first question will be considered with regard to documentary evidence and discussions with the key actors, using the variables identified in the diffusion-contingency model. The

actors were interviewed using a semi-structured questionnaire methodology and were all at senior management levels (Table 2):

Table 2 about here

To gain the views of practitioners in the sector, a questionnaire was sent to financial managers in all IOCs operating in Libya with 20 responding (a response rate of 87 per cent). Documentary evidence considered included the existing law regulating related transactions, IOC accounting returns and relevant literature on oil and gas upstream accounting.

The second research question considers the cost share cash flows of historic actual transactions of IOCs, regarding the government's repayments to IOCs under the cost-sharing arrangements. The cash flows are considered under the existing LPL legislation and then reconfigured using SE and FC methodologies by simulation. This allows consideration of the fiscal impact to the Libyan government of selecting either the FC or SE methods for upstream transaction recording instead of the existing LPL method. The second research question also applies a further simulation exercise which assumes that the Libyan government will require IOCs to use the same method as their holding companies presently use (either FC or SE), thus aligning accounting practice to globally accepted standards.

The researchers selected the data from the detailed annual reports of oil and gas upstream costs of IOCs as presented to NoCorp (the Libyan oil parastatal), where LPL regulations were applied. The data, showing cost repayment information by category of expenditure, represents eight years' (2000-2007) activities for the IOCs, which are then simulated under differing FC and SE assumptions to investigate the fiscal impact of each methodology. The researchers utilised data from all IOCs producing during this period, except one company who did not permit release of the information. The researchers were not able to obtain information outwith this period as more recent years' data was unaudited at the time of the study, and data prior to 2000 was unavailable. Similar simulation models to those applied in this study have been used in accounting literature to investigate the impact of using different accounting methodologies (e.g. see Healy *et al.* 2002).

The eight years' upstream transactional costs (subject to cost sharing costs as considered) are assumed to typify normal upstream activities, the researchers having found no data to the contrary. To simulate the cost sharing value changes under different methodologies, the researchers were provided with information as to how IOCs applied the LPL in regard to discretionary clauses. The simulation extrapolated forward depreciation and amortisation costs related to the eight years' activities for any capitalised costs (e.g. tangible and intangible G and G costs), based on the different alternative accounting treatments. The researchers only calculated the costs of oil and gas upstream activities where they are treated differently under the LPL, FC and SE methods. As shown in Table 1, this will include: tangible G and G costs, intangible G and G cost, exploratory dry hole costs, intangible exploratory successful wells and development dry hole costs. The researchers noted that where under LPL companies could elect to capitalise or expense, they chose to expense, as this resulted in earlier payback

of the upstream transactional costs (consistent with Mahmud and Russell, 1998). The only difference in regard to the IOCs transactions is the timing of the expense and resultant reclaim from the Libyan government, the total expenses for all simulations being identical (17,336 million Libyan Dinar, equating to circa £8.65 billion for the eight year period).

The cost-sharing value changes are considered using net present value (NPV) principles, assuming that corporate value is the sum of its future cash flows discounted at an appropriate cost of capital. In the agency-based contractual agreement the cash recovery payments to IOCs under cost sharing contracts, which affect their corporate value, has the equal opposite value effect on the Libyan economy. The NPV to the Libyan economy is therefore calculated based on the outgoing cost share payments to the IOCs, which will be considered for comparison purposes using firstly the dimensions imposed by existing LPL based practice (NPV_{LPL}) as follows:

$$NPV_{LPL} = \sum \text{Upstream cash flow repayments to IOCs}_n / (1 + r)^n$$

This same cost base will then be simulated using (i) full FC or full SE standardised methodology adoption and (ii) methodologies adopted by companies as being congruent with those of their holding company (SE or FC), as evidenced from the IOCs holding company's annual report. The simulations therefore provide the NPV of the cost sharing payments made to the IOCs by the Libyan government, based on the same economic upstream financial transactions but where the timings will differ based on the methods used, resulting in the following four model valuations:

Model 1: Upstream cash flows based on Libyan government adopting LPL principles and IOCs applying their existing discretion (NPV_{LPL})

Model 2: Upstream cash flows based on Libyan government adopting FC principles (NPV_{FC})

Model 3: Upstream cash flows based on Libyan government adopting SE principles (NPV_{SE})

Model 4: Upstream cash flows based on Libyan government allowing IOCs to adopt FC or SE principles in line with their holding companies existing global practice (NPV_{hold}).

The resultant NPVs will be compared on the criterion of minimising the negative NPV impact on the Libyan Government's cash outflows. . The NPVs will also be calculated based on differing costs of capital, allowing simulation of differing economic conditions.

IV. FINDINGS AND DISCUSSION

Accounting for oil and gas upstream activities

The oil and gas sector has had a profound impact on Libya, bringing major developmental opportunities and accounting for over 95 percent of the country's merchandise exports and over 50 percent of its Gross Domestic Product (IHS Global Insight, 2009). From a political perspective, the industry has placed large resources at the government's disposal for

allocation to the development of industry, public works, agriculture, and for economic and social welfare (Waddams, 1980). Since economic sanctions were lifted in 2003 by the UN the Libyan energy market has blossomed (Otman and Bunter, 2005), with increased interest from IOCs resulting in the state awarding numerous licenses in 2003 (Ali, 2005).

The Libyan oil and gas industry is administered by the state-owned National Oil Corporation (NoCorp), which develops its exploration and production operations either through its own fully owned companies, or in participation agreements with IOCs. In 1965 Libya adopted a royalties-based remunerative contract (based on the OPEC formula) to all in-country operators in Libya, in order to create contractual agreements between Libya's government and the IOCs (Hallett, 2002). The Libyan authorities hoped that such contracts would attract foreign oil and gas companies, but granting Libya at least 51 percent of output from operations through royalty and income tax payments (Otman and Bunter, 2005). In 1970, oil price and Libyan tax rate increases necessitated a change in the existing contract arrangements to Exploration and Production Sharing Agreements (EPSAs), generating greater profits for Libya's economy (Waddams, 1980). EPSAs allow cost recovery of IOC exploration, development and production costs in cases where successful discovery occurs. The contracting company incurs all costs during the exploration stage. If oil is found in commercial quantities, these costs are divided between the partners; otherwise the IOCs incur all costs (Abozrida, 2000). Thus, when production commences the IOCs can then reclaim from the Libyan government the government's share of the exploration and development costs already incurred and also any further costs.

The Libyan contractual terms for IOCs are among the harshest in the world, with the aggregate government share for its most recent tranche of contracts (EPSA IV) averaging around 88 per cent of revenue (Johnston, 2005). Fattouh and Darbouche (2010) argue that the country has a strong negotiating position due to its prime geographical location close to Europe, its attractive geological features and its high-quality oil. Also, production costs are relatively low and the region is relatively under-explored, partly due to the impact of past sanctions. The government's improved negotiating skills has also created tougher fiscal terms for IOCs, for example the government timing its negotiations with favourable oil market conditions, introducing innovative bidding procedures, and when obtaining maximum concessions from one of its oil partners applying these terms to the other IOCs (Fattouh and Darbouche, 2010).

Within Libya there is no agreed accounting standard to be applied by companies, due primarily to the lack of an institution responsible for issuing accounting standards. This has resulted in varied practices and an undeveloped accounting culture displaying disparity in the application of accounting principles (Bait El-Mal, 1990, Eldanfour and McChlery, 2012). Chua and Taylor (2008) note the practice of institutionalising accounting standard-setting to national agencies such as local accounting professional associations. Such relinquishing of control by government bodies is questionably effective in developing economies but is likely to be ineffective in countries with poorly developed accounting professions. Theoretically, the

Libyan Accountants and Auditors Association (LAAA) is responsible for establishing and monitoring accounting standards and practices in Libya (Accounting Profession Law no. 116 of 1973). However, the LAAA failed to propose accounting standards until 2005 when it issued the Libyan Accounting Standards (LAS), and only thirteen of its twenty nine proposed standards were eventually adopted in 2008 (LAAA, 2008). The remaining standards (14 to 29) have not yet been issued, nor have the thirteen standards set been monitored by the LAAA for compliance. Furthermore, these standards do not relate to oil and gas accounting regulation which is governed solely by the LPL.

The LAAA's weakness makes the State, *de facto*, the sole statutory body for accounting regulation. The most important influences on the regulation of Libya's accounting practices are its commercial and income tax law, and the General People's Committee for Inspection and Control (Shareia, 2006). However, the legal stipulations are general and basic for commercial law requirements in terms of reports and audit (Bait-Elmal, 1990). The same is true of income tax law, which stipulates practice merely for reporting of revenues and expenses (Gzerna, 1999) without specifying any accounting standard to be adopted in determining taxable income (Buzied, 1998). The legislative infrastructure was found incapable of drawing up specific upstream activities legislation. Therefore the IOCs helped draft the regulations under the jurisdiction of the Ministry of Finance and Economics (Waddams, 1980, p57) with obvious potential danger of conflict of interest influencing the legislation. The resultant inbuilt management discretion accords with Cortese *et al.* (2010) findings that corporate interference has successfully maintained management discretion within oil and gas standards. The non-engagement of regulatory bodies in the upstream accounting issue suggests at best latent normative isomorphism.

Libya's openness to foreign trade before and after the period of sanctions exposing her to best practice and mimetic behaviour (Wei et al, 2001) did not lead to the adoption of global oil and gas practice. Neither did a coercive isomorphism stemming from resource dependency and legitimacy concerns (DiMaggio and Powell, 1991) lead to development of appropriate standards. Libya's government failed to embrace, let alone enforce, global practices with NoCorp remaining silent on legislative changes. Powerful lobbying may influence regulatory practice in other domains, but within Libya's oil and gas industry (Cortese et al, 2010) this has not been the case. The IOCs could potentially have derived economic benefit by securing standards reflecting differing practice from LPL, but they did not seek change. Likewise, whilst professional norms move other countries' accounting practices towards accepted practice (Parboteeah et al, 2002; House and McGrath, 2004) this has not happened in Libya as the LAAA appears disengaged with the formation of accounting legislation. Thus, the influential variables of institutional theory fail to explain the standard-setting milieu in this particular context. The influential factors are therefore considered utilising the diffusion-contingency model, with its close links to government reform which conform it more aptly to the Libyan environment.

Regarding stimulus and promoters of change there would seem to be little impetus for change. There was no evidence of a stimulus for change from within the government,

according to the government administrator or academic interviews. Global external standards, developed by the global accounting forum and evolving since the LPL's introduction, have been ignored by Libya whether intentionally or through intransigence. This may be because the dominating political doctrine engendered a closed political system and limited collaboration with external bodies, particularly during the period of sanctions. Libya inherently suffers from fiscal stress and economic crisis. However, the timing of revenue flows related to upstream oil and gas cost recoveries has never been raised as a means of alleviating such stress. Financial scandal, corruption or fraud were also not raised within interviews as a stimulus for change in this accounting area.

Promoters of change amongst the various actors are often regarded as key stimulants within accounting reform, but in this situation no evidence was found of first movers. With the context being regarded as a localised problem and thus of little global significance this has resulted in a lack of interest from change agent consultants or commentators. Academic knowledge of an area peripheral to mainstream accounting accounts for its absence from curriculum and research studies within Libya, although academics did demonstrate understanding of local and global methodologies. However, this level of comprehension does not extend to the indigenous accounting profession. There appeared to be a groundswell of opinion amongst interviewees that this specific accounting practice should be aligned to global practice. Their rationale came not from a conceptual stance, but from a desire to develop their accounting practices by learning from the global accounting profession. Interviewees believed there was urgency for change, recognising the weakness of the indigenous accounting profession. However, all interviewees save NoCorp believed they had any power or legitimacy to influence change, and NoCorp seemed passive about reform. Whilst a dependency on donor agencies within a developing country may link funding commitments to accounting reform, such as adopting IASs, this is unlikely in such a peripheral area of concern. However, there appears to be a form of dependency regarding the accounting knowledge of the international accounting community working within IOCs. This community are believed to be the primary actor capable of maintaining the accounting regulatory process regarding such a technical area as upstream oil and gas transactions. As such the IOC community reflected as a whole a preference for change by implementing globalised accounting practice. Each company recognised the time and cost effect of the existing dual reporting, as they have to report under LPL rules for the Libyan government and under global standards for their own international reporting. A number of IOCs (35 per cent) recognised that the present dual systems cause confusion to staff due to conflicting treatments. However, this has not moved the IOCs to seek change.

Few of the key actors involved in accounting reform, appear to be catalysts for change. The political climate has resisted change, particularly change evolving from the developed West where proponents of oil and gas accounting (such as the SEC and IASB) are based. Likewise, the dominant political leadership did not lend itself to internal political competition, effectively inhibiting any critique likely to challenge weaknesses, including accounting and tax regulation. Neither are administrative bodies (such as the upper echelons of the GPCIC, the GPCPF and NoCorp), regarded as promoters for change. Accounting regulation is not

presently seen as the responsibility of the fragile indigenous professional body. Similarly, the centralised GPCIC provide only general legal stipulations for reporting and income tax law and will not interrogate the complex specificities of oil and gas accounting. Notably, the administrators interviewed all supported change, especially towards the rigorously-developed global standards. In the light of governmental administrators' legalistic rule-based culture and lack of staff formation systems there is little capacity to deal with such complex technical issues. The IOCs as social actors seem to possess the requisite specialisation and resource to develop any changes; however, since the LPL's inception they have not questioned its legislation. This may arise from, economic or political self-interest i.e. not wishing to adversely affect relationships with the host government who are in a powerful negotiating position over mineral resources.

Other factors affecting change might include the characteristics of the innovation itself. The compatibility of methodologies is important to stakeholders, as current practice applies accounting principles differing from the LPL. Notably, the current law disregards recognised accounting conventions and is also internally inconsistent. The complex nature of any change will be challenging. Five of the seven stakeholders interviewed recognised a difficulty in implementing any revised framework due to the complexity of present global reporting and the lack of professionalisation within Libya's accounting profession. However, there is apparently no problem regarding change within the IOC community, as they already apply global standards for their own reporting. Amongst other stakeholders, only the academics showed any understanding of global methodologies and the differences between FC and SE. Other barriers to change include the economy's openness to changes such as the global models for upstream accounting. This now appears less likely to be a barrier than under the previous governmental structure with a willingness amongst those interviewed to change to such standards. The existing legal system may be cumbersome to change and is unlikely to be aided by the indigenous accounting profession. Whilst aid distortion may not be relevant to this accounting reform, there may be dependency on the IOCs to be the first mover and driver of change. Government bodies' intransigence or lack of technical proficiency may lead to a position of agency-related self-interest.

Applying different accounting methodologies

Consideration is now given to evaluating the fiscal impact on Libya's economy of each different accounting methodology - a potentially significant driver of accounting reform. The criteria for selecting the most appropriate method is finding the lowest negative NPV for the Libyan government of expending its cost share paid to the selected IOCs. The findings for each alternative method, based on the eight years' relevant upstream activities, are shown in Table 3.

The first simulation of the costs of oil and gas upstream activities of all IOCs relates to the government adopting either FC or SE for all its operative IOC's. This assumes that the government selects one homogenous method for adoption throughout Libya. Transferring reporting practices from the LPL method to an FC method required changes to the cost

figures of intangible G and G, exploratory dry holes, intangible exploratory successful wells and development dry holes. These costs are capitalised under the FC method, having being previously expensed under LPL.

The second simulation relates to costs being altered from the LPL to the SE method. In this permutation, tangible G and G costs, presently capitalised under LPL, require recalculation to be expensed under SE. The figures of intangible exploratory successful wells and development dry hole costs require similar adjustment. Presently these costs, which require to be capitalised under the SE method, are expensed by IOCs, thus exploiting their discretionary choice under LPL of capitalisation or expensing.

Table 3 shows the differential in NPV for the Libyan government of adopting LPL, FC and SE methods. The simulations apply four different interest rates, recognising that interest rates are variable within Libya's economy. Evidently, the most favourable method irrespective of interest rates is the FC method, which provides a positive swing in NPV. This is due to slowing down expensing and reclaiming cash flows from the government. The most significant value saving occurs when interest rates are 20 per cent with a change in NPV of 200.5 million LD (circa £100 million), a swing of 8 per cent in terms of net present value. This relatively insignificant change happens because the majority of upstream costs considered are tangible G and G costs. Under LPL rules these costs are capitalised, leaving management no further discretion to expense this cost (unlike other cost categories). Occurring differences can be explained by IOCs presently opting for immediate expensing, with the associated immediate cost-share payback. This assumes a self-interested agency mode of behaviour, with IOCs now deferring such expensing under FC e.g. intangible G and G costs. Should the IASB opt for a "capitalise and test for impairment approach" (IASB, 2010), this would have no significant impact on the Libyan economy.

If Libya's government requires IOCs to use the SE method it will lose significantly, irrespective of the interest rate. The greatest swing in net present value of 83.72 per cent is realised at a 20 per cent interest rate, representing a value change of -2,099 million LD (circa £1,100 million). These significant changes in value are the result of immediate expensing of previously capitalised costs under LPL, particularly the sizeable tangible G and G costs. The above comparisons should be considered relative to the GDP of Libya's economy as a whole, which the IMF (2012) calculated at £77.4 billion in 2010 (reduced by 2011's political crisis to £30.2 billion). Should the Libyan government select one accounting method over the other, the FC method would be preferable if only on economic grounds.

A further alternative to the Libyan government selecting either SE or FC outright is to accept the current global accounting practice of allowing companies to self-select to use either SE or FC. A simulation on this premise was applied where of the seven IOCs considered two applied FC, and five applied SE methodologies. Table 3 shows that the Libyan government would significantly lose value if it altered to a more globally accepted practice of self-selection. For example, with an interest rate of 10 per cent a loss in value to the Libyan

government of 1,965 million LD (circa £1,000 million) would occur representing a shift in NPV of 32.69 per cent in favour of the IOCs. This significant negative impact is caused by the majority of companies considered adopting SE principles in their global practice, which allows for the expensing of the sizeable tangible G and G costs. The adoption of holding companies' accounting practices has a significant negative impact, but less so than outright adoption of the SE method. This is an expected middle position as the dominating SE reporting companies IOCs are counter-balanced by several FC reporting companies.

Table 3 about here

The economic benefit of such alternative systems might explain the apparent intransigence and passivity of the Libyan Government to alter the existing accounting method. Despite the increased potential for management discretion and the LPL's obfuscated logic, the only methodological change which might benefit the Libyan government would be conversion to FC. However, this may seem of inadequate value to warrant change, with greater government reforms warranting preference. In addition it is a hypothetical methodology, not being globally accepted accounting practice at present thus raising legitimacy questions around its adoption. A change to a complete SE methodology, or the methodology congruent with current global practice, would have a significant negative impact on the Libyan economy. Adopting the SE methodology is presently hypothetical and not recommended as global practice by the IASB working group, alleviating the Libyan government of legitimacy concerns. There may be a strong catalyst to adopt the globally accepted practice of IOCs choosing between FC and SE, based on resource dependency or legitimacy concerns. In other contexts these concerns have led to the adoption of international standards and practice (Godfrey et al, 2001). However, these factors have not swayed Libya's government to change. Instead they maintain a system to their economic advantage.

The key constituent of the LPL regulation affecting the simulations is the stance of capitalising tangible G and G costs. This cost category is the most significant expense, which negates the discretionary impact elsewhere in the regulations. This might suggest a stronger governmental understanding on the fiscal impact of the legislation, as capitalising slows the repayments to IOCs. This economic advantage may have been clearly understood in the standard-setting process and explains their maintaining the status quo, despite this law contravening global standards, being conceptually inconsistent with basic accounting concepts by mixing SE and FC practices and increasing agency problems by increased management discretion. It is unclear whether this economically advantageous continuance of LPL practice is by the government's design or indifference.

There has been no lobbying for change by IOCs in Libya despite the potential for IOCs to derive economic benefit, for example by securing standards reflecting global practice. Alternatively, making a case for discretion regarding tangible G and G, the most significant cost category, would provide IOCs the most significant value transfer. This intransigence or weakness in agent influence at the point of reforming the law may still have self-interest at heart. It may be a longer-term strategy to maintain concord and stable relationships for future

license negotiations. It may also recognise that in global corporation value terms the alterations in market value are less significant to the IOCs than to the Libyan economy. Further, it might allude to the strength of Libya's contractual negotiation position in regard to the commercial strength of its mineral reserves (Fattouh and Darbouche, 2010).

The findings indirectly contribute to the existing literature on the impact on market value of using different upstream accounting methods. Prior literature purports that FC companies provide higher market values for shareholders. However, from Table 3 it can be seen that FC companies would lose value in such cost sharing contracts, due to the later payments of certain cost categories. Conversely, SE companies would improve their market value by being allowed to expense some of the items earlier, most notably tangible G and G costs. The signage of value change contrasts with prior literature of higher relative FC values. This does not necessarily conflict with the prior empirical work, but may suggest that the balance sheet and smoothing effects previously suggested are stronger than thought. However, these findings suggest that they are offset by the value transfers implicit in the contractual obligations regarding cost sharing.

A revised diffusion-contingency model

For accounting reform in emerging economies the researchers believe that where the accounting profession is weak on accounting reform there is reliance on government processes. Thus the diffusion-contingency model provides a more useful framework to understand accounting reform in such contexts. Within Libya the model identified a number of stimuli towards reform in addition to elements identified in the previous models. These include the removal of current obfuscation caused by duality of practices globally and locally, the perception that any globalisation would contribute to strengthening a weak accounting profession, and a robust link to the global corporate community. However, these stimuli did not lead to accounting reform with no ostensible movement by any actor towards such change.

The study reveals several new insights from the previous models that might explain the intransigence. The balance of power between the legislative bodies and those they legislate for may dictate that the abundance of resource and the government's strong negotiating platform silences the IOCs. This is despite the IOCs accounting specialism and capacity to make a strong case. A further variable relevant to accounting reform is the economic implications of any changes. In this case there is no apparent governmental pressure to enforce reform as the impact on the economy by pursuing FC methodologies is not significant. Likewise IOCs may not pursue global or SE methodologies as they are of little significance in the light of their corporate wealth. Figure 1 depicts an adaptation of Luder (1994) and Godfrey et al (2001) diffusion-contingency model as it impacts on this specific Libyan legislation. Of particular note are the two new variables introduced to the model regarding the balance of power and economic consequences, and several other explanatory characteristics of existing variables (all shown in italics).

V. CONCLUSION

Production-sharing contracts are widely used in developing and transitional economies (Pongsiri, 2004) and it is imperative that governments create agreements that will bolster their growing economies. In recent years much attention has been given by such economies to negotiating strong positions under the umbrella of resource nationalism, being protective of their minerals (Fattouh and Darbouche, 2010). However, whilst attention is given to the production-sharing agreement terms it is possible to ignore or underestimate the impact of accounting regulations which may siphon wealth from such economies. This paper has sought to consider Libya as a case study for such value seepage. The apparent management discretion built into the Libyan system could have resulted in this value transfer had it not been for the treatment of tangible G and g costs, which more than counters the increased management discretion. However, the study highlights the apparent lack of rationale to the current LPL legislation resulting in such increased discretion which is differentiated from global upstream oil and gas transaction regulations. Thus whilst Libya has proved over the years its ability to impose tough fiscal terms (Fattouh and Darbouche, 2010), they may unwittingly have failed to apply the same rigor to the regulations governing the accounting of such transactions.

Figure 1 about here

The conceptual logic behind the existing LPL is unclear, whilst the unwillingness to challenge such regulations shows a lack in governmental, professional accounting and academic institutions. There is no apparent explanation for the inconsistency of approach adopted in the LPL in regard to global practice and also conceptually in the treatments of the different cost categories. This is perhaps understandable in the light of an apparently weak normative force in both the accounting profession and academic community. This could be affected by the capacity-building of the accounting profession through education, training and the publication of technical and academic journals (Wallace, 1993; Ahmad and Gao, 2004). Bait El-Mal (1990) suggestion of establishing a committee to issue accounting standards within Libya could be developed, but the effectiveness of the LAAA as a regulatory body in its current form makes this an unlikely solution. There is also a noticeable lack of coercive influence by either the governmental or the IOC communities, as propounded by institutional theory.

The paper, whilst applied to an oil and gas context, allows consideration of the factors impacting on government reform which can be transferred to other accounting areas of both localised accounting standards and the adoption of global accounting practice. Particularly in reviewing accounting reform within emerging economies the revised diffusion-contingency model may assist in an understanding of developments or the lack thereof. The customary application of institutional theory lacks insight into such an environment where neither coercive, mimetic nor normative forces function. Further, circumstances may be similar to the context of this paper where there are economic implications related to the regulations which cannot be ignored. Placing a value on economic consequences through techniques such as simulation modelling may be a catalyst to change or at least to invigorate deliberation.

The more pragmatic approach adopted within this paper could be transferred to other developing economies, with further research giving insight into accounting reform processes within these economies and also to further augment the model. Consideration should be given to the process of evolving such regulations and the roles of fundamental stakeholders including principal(s), agent(s) and other actors. It is also concerning that latent localised standards of uncertain origin or logic may still exist. Further research could be undertaken to ascertain their existence and impact on their economy. The focus could continue specifically on upstream oil and gas activities but could be broadened to other areas of localised interest. The formation of accounting regulation requires a grounded study of policy makers and their social context (Puxty and Willmott, 1987). This study has sought to apply such an approach within an emerging economy such as Libya to provide insight into the power dynamics involved in regulatory framework construction and diffusion. Similar studies in the multi-various developing economies could produce additional valuable insight.

REFERENCES

- Abozrida, M. 2000. *Petroleum accounting - its assets scientific and applied*, Arab Development Institute, Cairo.
- Ahmed, N.S. and S.S. Gao. 2004. Changes, problems and challenges of accounting education in Libya. *Accounting Education* 13(3): 365-390.
- Ali, R. 2005. *Outside view: Libya's oil prospects*. Available at: http://mideastlaw.com/article_outside_view_Libyas_oil_prospects.html, accessed 11/9/2009.
- Ashraf, J. and W.I. Ghani. 2005. Accounting development in Pakistan. *International Journal of Accounting* 40(1): 175-201.
- Assenso-Okofu, O., M.J. Ali, and K. Ahmed. 2011. The development of accounting and reporting in Ghana. *The International Journal of Accounting* 46: 459-480.
- Baker, C.R. 1976. Defects in full-cost accounting in the petroleum industry. *Abacus* 12: 152-158.
- Bait El-Mal, M. A. 1990. Survey and Evaluation of the Accounting Principles Applied in Libya. *Journal of Economic Research, National Academy of Scientific Research: The Economic Research Centre* 2(1): 14-26.
- Bindemann, K. 1999. *Production-sharing agreements: an economic analysis*, World Petroleum Market Report. Oxford, Oxford Institute of Energy Studies.
- Brock, H.R., J.P. Klingstedt and D.M. Jones. 1982. *Accounting for oil and gas producing companies Part 2: amortization, conveyances, full costing and disclosures*. Denton, Texas, North Texas State University,.

- Brooks, M.J. 1986. Financial reporting in the oil industry. *Management Accounting* 64(9): 24 - 26.
- Boone, J.P. and K.K. Raman. 2007. Does implementation guidance affect opportunistic reporting and value relevance of earnings?. *Journal of Accounting and Public Policy* 26(2): 160-192.
- Buzied, M. M. 1998. Enterprise accounting and its context of operation: the case of Libya. PhD Dissertation, Durham University: UK.
- Caba-Perez, C., A. Lopez-Hernandez, and D. Ortiz-Rodriguez. (2009). Governmental financial information reforms and changes in the political system: The Argentina, Chile, and Paraguay experience. *Public Administration and Development* 29: 429-440.
- Carruthers, B.G. 1995. Accounting ambiguity and the new institutionalism. *Accounting Organisations and Society*: 29(4), 313-328.
- Choi, F.D.S. and G.G. Mueller. 1978. *An Introduction to Multinational Accounting*, Englewood Cliff, NJ: Prentice Hall.
- Christensen, M. 2002. Accrual accounting in the public sector: the case of the New South Wales Government. *Accounting History* 7(2): 93-124.
- Chua , W.F. and S.L.Taylor. 2008. The rise and rise of IFRS: an examination of IFRS diffusion. *Journal of Accounting Public Policy*: 27, 462-473.
- Collins, D.W. and W.T. Dent. 1979. The proposed elimination of full cost accounting in the extractive petroleum industry: An empirical assessment of the market consequences. *Journal of Accounting and Economics* 1(1): 3-44.
- Cooper, K., S.M. Flory and S.D. Grossman. 1979. New ballgame for oil and gas accounting. *The CPA Journal*, 49(1): 11-17.
- Cortese, C.L., H.J. Irvine, and M.A. Kaidonis. 2010. Powerful players: How constituents captured the setting of IFRS 6, a standard for the extractive industries. *Accounting Forum* 34(2): 76-88.
- Dhaliwal, D.S. 1980. The effect of the firm's capital structure on the choice of accounting methods. *The Accounting Review* 55(1): 78-84.
- DiMaggio, P.J. and W.W. Powell. 1983. The iron cage revisited: institutional isomorphism and collective rationality in organisational field. *American Sociological Review* 48: 147-160.
- DiMaggio, P.J. and W.W. Powell. 1991. *The New Institutionalism in Organisational Analysis*. Chicago,: University of Chicago Press.
- Doost, R.K. 1997. Viewpoint: Ethical standards or accounting standards for developing countries: which one should come first?. *Managerial Auditing Journal* 12(9): 506-508.

- Eldanfour, I and S. McClery. 2012. Accounting for oil and gas upstream activities: A study in discretionary reporting behaviour in Libya, *Petroleum Accounting and Financial Management Journal*. July.
- Fattouh, B. and H. Darbouche. 2010. North African oil and foreign investment in changing market conditions, *Energy Policy* 38: 1119-1129.
- Gallun, R.A., C.J. Wright, L.M. Nichols, and J.W. Stevenson. 2001. *Fundamentals of oil and gas accounting*, 4th edition, PennWell.
- Godfrey, A.D., P.J. Devlin, and C. Merrouche. 2001. A diffusion-contingency model for Governmental accounting innovations, *International Comparative issues in Government Accounting*: 279-296.
- Gzerna, A. M. (1999). Management Control in Developing Countries: A case study of management control in the Oil industry of Libya, Ph.D. Thesis, The University of Manchester.
- Hallett, D. 2002. *Petroleum geology of Libya*. Amsterdam, Elsevier.
- Hassan, N. 1998. The impact of socio-economic and political environment on accounting system preferences in developing economies. *Advances in International accounting*1: 43-88.
- Hassan, M.K. 2008. The development of accounting regulations in Egypt: legitimising the International Accounting Standards. *Managerial Auditing Journal* 23(5): 467-484.
- Healy, P.M., S.C. Myers, and C.D. Howe. 2002. R and D accounting and the trade-off between relevance and objectivity. *Journal of Accounting Research* 40(3): 677-710.
- House, J. and K. McGrath. 2004. Innovative governance and development in the new Ireland: Social partnership and the integrated approach. *Governance*17: 1-30.
- IASB. 2010. *Extractive Industries, Discussion Paper*, IASB.
- IHS Global Insight. 2009. *Economic: Risks*, IHS Global Insight, available at: <http://myinsight.ihsglobalinsight.com/servlet/cats?filterID=1154andserviceID=4078andtypeID=1543landpageContent=reportandpageType=ALL>, [accessed 03/11/2009].
- IMF. 2012. *World Economic Outlook Database*, sourced April 2012, <http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/weorept.aspx>.
- Jacobs, J. 1992. *Systems of Survival: A Dialogue on Moral Foundations of Commerce and Politics*, New York, NY, Random House.
- Jensen, M.C and W.H. Meckling. 1976. Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics* 3(4): 305-360.

- Johnston, D. 2005. Impressive Libya licensing round contained rough terms, no surprises, *Oil and Gas Journal*, 18.
- Joshi, P.L. 2001. The international diffusion of new management accounting practices: the case of India. *Journal of International Accounting, Auditing and Taxation* 10: 85-109.
- Justesen, L and Mouritsen, J. 2011. Effects of actor-network theory in accounting research, *Accounting, Auditing & Accountability Journal*, 24 (2), 161 – 193.
- LAAA. 2008. *Libyan Accounting Standards*.
- Libyan State, Law No. 25 of 1955. *Petroleum Law*. April 1955.
- Libyan State, Law No. 116 of 1973. *The Official Gazette, to Organise the Accountancy Profession in Libya*. February 1974.
- Lilien, S. and V. Pastena. 1981. Intra-method comparability: the case of the oil and gas industry". *The Accounting Review* 56(3): 690-703.
- Luder, K. 1992. A contingency model of governmental accounting innovation in the political administrative environment, *Research in Governmental and non-profit Accounting* 7: 99-127.
- Luder, K. 1994. The contingency model reconsidered: experiences from Italy, Japan and Spain. *Perspectives on Performance Measurement and Public Sector Accounting*, E. Buschor and K. Schedler (eds.), Haupt, Berns, 1-15.
- Mahmud, M.B. and A. Russell. 1998. Survey of Libyan oil and gas accounting practice. *Petroleum accounting and financial management journal* 17(3): 117-160.
- Mir, M.Z. and A.S. Rahaman. 2005. The adoption of international accounting standards in Bangladesh, an exploration of rationale and process, *Accounting, Auditing and Accountability Journal* 18(6): 816-841.
- Mirghani, M. 1998. The development of accounting standards in the kingdom of Saudi Arabia: an international accounting standards perspective, *Advances in International Accounting* Supplement 1: 195-206.
- Murdoch, B. and P. Krause. 2008. An investigation of the earnings quality of the successful efforts and full costing methods. *Petroleum Accounting and Financial Management Journal* 27(3): 99-111.
- Ouda, H. 2008. Towards a generic model for Government sector reforms: The New Zealand experience. *International Journal of Governmental Financial management* 8(2): 91-115.

- Otman, W. and M. Bunter. 2005. The Libyan petroleum industry in the twenty first century: the upstream, midstream and downstream handbook, *Alexander's Gas and Oil Connections*, Limbach.
- Parboteeah, K., J. Cullen, B. Victor, and S. Tomoaki. 2002. National culture and ethical climates: A comparison of U.S. and Japanese accounting firms, *Management International Review* 45: 459-480.
- Pongsiri, N. 2004. Partnerships in oil and gas production sharing contracts, *International Journal of Public Sector Management* 17(5): 431-442.
- Puxty, A.G. and H.C. Willmott. 1987. Modes of regulation in advanced capitalism: locating accountancy in four countries, *Accounting, organisations and Society* 12(3): 273-291.
- Rahman, A.R., M.H.B. Perera, and G.D. Tower. 1994. Accounting harmonisation between Australia and New Zealand: towards a regulatory union. *International Journal of Accounting Education and Research* 39: 316-333.
- Samuels, J. M. 1993. International accounting standards in The Third World: A synthesis of six articles. *Research in Third World Accounting* Vol.2: 19-25.
- Scott, W.R. 1995. *Institutions and Organisations: Foundations for Organisational Science*, London, Sage.
- SEC. 1978. *Accounting Series Release No. 253*.
- Shareia, B. 2006. The role of accounting systems in decision making, planning and control in a developing country: the case of Libya, PhD Dissertation, University of Wollongong: Australia.
- Sunder, S. 1976. Properties of accounting numbers under full costing and successful-efforts costing in the petroleum industry, *The Accounting Review* 51(1): 1-18.
- Upping, P. and J. Oliver. 2011. Accounting change model for the public sector: adopting Luder's model for developing countries, *International review of business research papers* 7(1): 364-380.
- Vickers, J. and G. Yarrow. 1988. Regulation of privatised firms in Britain, *European Economic Review* 32: 465-472.
- Waddams, F.C. 1980. *The Libyan Oil Industry*. London, Croom Helm Ltd.
- Wallace, R.S.O. 1993. Development of accounting standards for developing and newly industrialised countries. *Research in Accounting in Emerging Economies* 2: 121-165.
- Wei, Y.L., H. Song, and P. Romilly. 2001. Endogenous innovation growth theory and regional income behaviour in China, *Journal of International Development* 13: 153-170.

Wright, P., S.P. Ferris, A. Sarin, and V. Awasthi (1996). The impact of corporate insider, blockholder, and institutional ownership on form risk taking, *Academy of Management Journal* 39: 441-463.

Wright, C.J. and R.A. Gallun. 2008. *Fundamentals of oil and gas accounting*, 5th edition, United States, Penn Well Corporation.

Yee, K.K. 2006. Capitalization of costs and expected earnings growth. *European Accounting Review* 15(4): 565-58.

Table 1

The treatment of upstream costs under FC, SE and LPL.

Oil and gas upstream costs	FC	SE	LPL
Tangible G and G costs	Capital	Expense	Capital
Intangible G and G costs	Capital	Expense	Capital or expense
Exploratory dry hole costs (within successful fields)	Capital	Expense	Capital or expense
Tangible exploratory successful wells	Capital	Capital	Capital
Intangible exploratory successful wells	Capital	Capital	Capital or expense
Development dry hole costs	Capital	Capital	Capital or expense
Development successful wells	Capital	Capital	Capital
Production cost	Expense	Expense	Expense

Source: Adapted from Wright and Gallun (2008), Libyan Petroleum Law No.25 and Libyan Petroleum Regulation No.9 (LPL, 1955).

Table 2

Stakeholders interviewed.

Stakeholder	Reason for selection
NoCorp Exploration Department	Responsibility for oil and gas companies in the exploration stage
NoCorp Financial Analysis Department	Responsibility for financial transactions with IOCs
General People's Committee for Inspection and Control (GPCIC)	Government auditing section including oil and gas sector
General People's Committee for Planning and Finance (GPCPF)	Government section responsible for revenue collection including oil and gas sector
Academic staff in Finance	Education including accounting and accounting for the oil and gas sector
Libyan Petroleum Institute	Training Libyan accountants

Table 3 Net present values of impact on Libyan economy comparing the LPL with FC and SE methodologies (Figures in Libyan Dinar where Libyan Dinar = £0.50).							
Interest rate	NPV _{FC} vs. NPV _{LPL}	Significance of change in selecting FC v LPL position	NPV _{SE} vs. NPV _{LPL}	Significance of change in selecting SE v LPL position	NPV _{HOLD} vs NPV _{LPL}	Significance of change in selecting holding company v LPL position	
5%	+173,755,990	1.75%	-2,115,064,136	-21.25%	-1,618,353,491	-16.26%	
10%	+216,525,513	3.60%	-2,577,720,676	-42.88%	-1,965,258,233	-32.69%	
15%	+215,483,224	5.67%	-2,432,333,121	-63.97%	-1,846,271,804	-48.56%	
20%	+200,514,275	8.00%	-2,099,117,767	-83.72%	-1,585,256,634	-63.23%	

Figure 1

Diffusion contingency model for government accounting: adapted from Luder (1994) and Godfrey et al (2001).



