ABSTRACT

Oil sector is considered to be a backbone industry for any country contributing towards its growth and prosperity. It involves production of crude oil and natural gas, processing and distribution of oil products. Production of crude oil and natural gas from onshore and offshore areas is termed as upstream, while petroleum refining and processing to produce oil products such as petrol, diesel, kerosene and other petro-chemicals, is known as downstream. Upstream business is very risky, probabilistic and requiring high investment. Geological and geophysical surveys of geological basins, both onshore and offshore areas are followed by exploratory drilling to a depth of ranging 1500 meters to 6000 meters in India to explore crude oil and natural gas (also termed as hydrocarbons). Success rate of finding hydrocarbon is very poor. Therefore, a lot of effort and money is required to find oil/gas. Once oil/gas field is found, oil wells are drilled to develop an oilfield for producing hydrocarbons, which is then transported, mostly by pipeline, to an oilfield based processing facility known as group gathering station. Here oil, gas, water and sand gets separated and then pumped to central tank farm, from where it is then despatched to refineries and gas pipelines.

Enterprise performance measurement and management is a comprehensive process to measure and monitor performance on efficient and effective utilization of various resources such as materials, machinery, infra-structure, manpower and money which in turn are creating value to various stakeholders. Various types of performance management system (PMS) has been used since last few decades. Earlier the traditional PMS mainly focusing on financial measurement alone. Later on newer PMS models were developed

which placed more emphasis on non-financial measures such as efficiency, productivity, and effectiveness but these models were focusing on a particular perspective and did not provide a comprehensive picture of business performance.

Today's globalized world posing a lot of uncertainties, competition and turbulence in external and internal environment of an enterprise. As a result traditional PMS are no more effective is measuring and controlling performance of an enterprise. In last two decades, a number of multi-dimensional enterprise performance management system (EPMS) have been developed by different researchers by incorporating performance measures related to strategy, quality, customers and employee satisfaction etc.

The performance measures also known as performance indicators covering various dimensions and perspectives such as financial, process, customer, vendor, employee, quality, productivity, efficiency, strategy etc. were incorporated in modern EPMS models proposed by various researchers. The focus has shifted from performance indicators to key performance indicators (KPI), which is able to identify critical areas requiring attention to improve performance of an enterprise. The KPIs should follow the SMART (Specific, Measurable, Attainable, Relevant and Time-bound) principle. The KPIs are defined as lagging or leading, outcome or driver, financial or non-financial, quantitative or qualitative etc. The leading or driver KPIs are measuring the activities having significant impact on lagging or outcome KPIs. Non-financial KPIs are those related to efficiency, productivity and effectiveness. Quantitative KPIs are based on quantitative data while qualitative KPIs are based on subjective/ qualitative data derived from surveys such as customer or employee surveys. The latter tries to find out root causes impacting the desired outcome.

In most of the models, majority KPIs are lagging, outcome, non-financial and quantitative types.

Few researchers have proposed manufacturing or operational flexibility to be incorporated in EPMS. Since strategy is being operationalised through EPMS and globalization has impacted the business environments and increased the enterprise risk, it has necessitated the incorporation of flexibility into EPMS model. It is evident from the literature survey that there is lack of a comprehensive integrated EPMS model incorporating strategy, flexibility and other perspectives such as customer, employee, process, and financial, which is able to effectively measure, monitor and control enterprise performance and contribute to value creation for various stakeholders of the enterprise. In this study, a conceptual model of enterprise performance management incorporating strategy and flexibility has been developed which will effectively drive performance improvements in upstream oil industry. Flexibility is viewed as freedom of choice externally and internally. Information technology has played important role and affects production, distribution, efficiency and communication. Due to globalization and liberalization, different policies have been adopted throughout the world. Government of India has also introduced new exploratory licensing policy (NELP) since 1991 which allows oil and gas blocks for exploration to be awarded by international bidding process and hence posing more challenges and uncertainties to the oil companies including national, private and multi-nationals. Since oil resources in the country are limited, the Indian oil companies have more choices to bid for overseas oil and gas exploration and production. EPMS interacts with strategy, information technologies and liberalization policies, therefore strategic and information system (IS) flexibilities have been incorporated in the proposed EPMS model.

Strategic flexibility will provide competitiveness whereas IS flexibility will provide efficiency and effectiveness to the EPMS implementation.

The proposed EPMS model has been empirically tested with survey data from Indian upstream oil companies, both the government and private owned. The model's effectiveness has been tested by regression analysis along six dimensions of strategic alignment, strategic monitoring, financial, customer, business process, and learning and growth perspectives. The validated model was interpreted and enriched by case study of two select oil companies. The validated EPMS model was synthesised from survey and case studies, and a final recommended model having linkages to strategy, strategic flexibility, strategy implementation, performance measure and system design, IS flexibility, performance reporting and feedback, and EPMS implementation issues is presented.

The study pointed the need for further work. The recommended model should also be tested for other industries and also incorporating other types of relevant flexibilities to make it more effective in measuring and driving performance improvement. The study also describes the limitations and implication for researchers and practitioners.

* * *