A review of enterprise performance: Concepts and frameworks

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In today's unpredictable business environment, enterprises face the challenge of expanding markets and meeting customer's requirements and expectations. Therefore, they need to consider their performance. Performance has always been a considerable influence on companies' activities, and there is need to evaluate performance. Thus, the means and ways of accurately measuring performance is an increasingly important field for research. The purposes of this paper are to: i) identify performance concept, performance indicators and performance measurement systems; ii) identify organization performance, organization performance frameworks, enterprise performance enablers such as enterprise resource planning (ERP), business intelligence (BI), and knowledge management (KM); iii) investigate enterprise performance indicators such as key performance indicators (KPIs) and ICIs and iv) present enterprise performance model.

Key words: Performance, performance measurement, performance framework, performance indicators, enterprise performance model.

INTRODUCTION

Performance has always had considerable influence on companies' activities. Thus, the means and ways of accurately measuring performance is an increasingly important field for research (Folan and Brwne, 2005). Performance is usually measured by estimating the values of qualitative and quantitative performance indicators. An enterprise should determine indicators and their relations based on its goals and performed activities. Nowadays, managers recognize this subject and put serious effort in defining enterprise goals, performance indicators, and measuring them (Popova and Sharpanskykh, 2010). It is necessary to formalize the concept of performance indicators with its attributes; relationships to other performance indicators and concept like processes and goals (Popova and Sharpanskykh, 2010). This paper reviews basic concepts such as performance, performance measurement, and performance indicators for measuring organization performance. It then presents the current frameworks and models for evaluating organization performance. Enterprise performance is defined and enablers which affect on enterprise performance are discussed. Finally, key performance indicators and intellectual capital indicators are introduced, and an enterprise performance model presented.

BASIC CONCEPTS

Performance
Here, we define performance term which is a critical term in our research. In Merriam-Webster's English dictionary, the word "performance" means (Brudan, 2010): i) the execution of an action; ii) something accomplished;
iii) the fulfillment of claim, promise, or request; iv) the action of representing and character in a play; v) the ability to perform: efficiency; vi) the manner in which a mechanism performs; and vii) the manner of reacting to stimuli: behavior.

Performance is defined as “future oriented, customized to reflect particularities of each organization/individual and is based on a casual model linking inputs and outputs” (Folan and Brwne, 2005). A “performing” business is one that will achieve the objectives set by management. Performance needs to be analyzed by elements of environment in which it operates. For example, organization's performance needs to be analyzed in the markets in which organization operates. On the other hand, performance is always linked to objectives and activities in the organization. Thus, an organization evaluates its performance based on objectives which are set internally.

Performance measurement

Here, another concept is defined which is related to performance, it is called performance measurement. Performance measurement has been defined as the process of quantifying the efficiency and effectiveness of actions, and performance measure as a metric for quantifying that action (Sousa et al.2006). In this process, measurable indicators are developed (Bryceson and Slaughter, 2010).

Performance indicator

Performance indicator is a quantitative or qualitative indicator that represents the state/progress of the enterprise, organization, unit, or individual.

The process of identifying performance indicators depends on organization-specific. The relevant performance indicators for a specific organization can be found in documents such as policies, mission statement, laws, job descriptions, etc.

Formalizing performance indicators includes definition of all characteristics which makes the implicit knowledge explicit. For extracting performance indicators, we ask the question: what should be measured to ensure the requirements in the document? Performance indicators are often represented by nouns. Sometimes, such a process is straightforward, for example, it is clear how profit can be defined. In many cases, performance indicators can be very large and often difficult to monitor. So, organizations select a subset of them, called key performance indicators (KPIs), which represents a picture of the performance. Selection of key performance indicators is organization-specific. Further, organization views are discussed, which are important for identifying organization performance and also performance indicators.

Organization views

Before we discuss organization performance, we need to consider organization views. Organizations are considered from different perspectives (views), which (Popova and Shpanskykh, 2010) are:

1) Process-oriented view: this presents the workflow of resources and tasks. This view shows different types of flows in an organization, such as processes, information and resources. Tasks and resources' structure are used for defining these flows. For example, a task structure can be a graph, built based on relations between tasks. Processes are samples of tasks in the workflow. A workflow represents a partial sequencing of process, which is influenced by situations that determine the path of the flow. Resources are software of hardware element such as materials, equipment, and so on, which are used during the execution of processes.

2) Performance-oriented view: this view represents an organization objective, performance indicators and their relations. In order to evaluate performance of an organization, we need to consider relations between objectives and performance indicators, relations between objectives and tasks. Performance indicators are defined in this view.

3) Organization-oriented view: in this view, organization roles are defined. Each role is associated with a subset of functionalities or a set of tasks. Each role is characterized by responsibility relations on tasks, information and resources.

4) Agent-oriented view: within this view, different types of agents (such as skills) are defined. For allocating agents to roles, it is necessary to match between agent capabilities and competences defined for roles. In all views, environmental conditions play an important role in Modeling organization performance indicators based on these views are presented thus.

MODELING ORGANIZATION PERFORMANCE INDICATORS

In order to reduce the complexity of the modeling process, the general framework incorporates different organization views. Each view describes a specific perspective on an organization. The following four views are distinguished in the framework: process-oriented, performance-oriented, organization-oriented and agent-oriented view. Both components and modeling views of this framework can be related to the components of the GERAM (the Generalized organization reference architecture and methodology) (Popova and Shpanskykh, 2010). The GERAM provides a template
Table 1. A comparison of performance measurement frameworks.

<table>
<thead>
<tr>
<th>Framework typology</th>
<th>Framework name</th>
<th>Measurement dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedural</td>
<td>Sink and Tuttle's ten-step model, Kaydo's framework, Wisner and Fawcett's framework, SME performance measurement framework</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Performance measurement matrix, Results and determinant framework, Performance measurement system models, Performance pyramid, Internal/external configuration framework, Balanced scorecard, AMBITE performance measurement cube, Brown's framework, EFQM model, Performance prism, (Gaiardelli et al., 2007), Multi-national companies framework, Integrated performance measurement framework</td>
<td>Cost, non-cost, internal/external environment, financial performance, competitiveness, quality, flexibility, resource utilization, innovation, lead time, delivery, vision, market, customer satisfaction, productivity, cycle time, waste, time, internal business, inputs, process, outputs, outcomes, enablers, results, stakeholder satisfaction, strategies, capabilities, stakeholder contribution, cross-process, cross-border, corporate culture/climate, structure</td>
</tr>
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</table>

Folan and Brwne (2005).

for developing organization modeling frameworks. It defines a set of behavioral and structural needs for modeling frameworks views. Two groups of recommendations are i) select performance measures and ii) design performance measures frameworks and systems. The first group emphasizes on the requirements of good performance measures, while the second focuses on design and development of performance measures frameworks and systems.

- Performance measures are supported by top manager, involve employees (meet customer satisfaction needs), are relevant to managers and employees and help them to accomplish their jobs, uses non-financial performance techniques, and support organization requirements changes (Folan and Brwne, 2005).

Performance measurement frameworks

Before we discuss performance measurement frameworks, it seems necessary to define framework term. The term framework refers to the active employment of particular sets of recommendations for example, a set of measurement recommendations may cause the development of structural framework (such as BSC) and the others may suggest procedural framework (such as Wisner and Fawcett framework). A performance measurement framework clarifies performance measurement borders, dimensions or views. Major frameworks are introduced in Table 1 (Folan and Brwne, 2005).

As Table 1 shows, there are two framework typology named procedural and structural. Majority of introduced framework in Table 1 are based on structural typology. There are no measurement dimensions for procedural frameworks and most of the measurement dimensions in structural frameworks emphasize on financial measures. Researcher's works defined performance measurement systems based on introduced frameworks. These systems will be considered next.

Performance measurement systems

In comparison to performance measurement frameworks, there are few performance measurement systems. Most of these systems are a collection of companies' best practices. The main requirements for designing a successful performance measurement system are two frameworks (procedural and structural); and performance management tools, such as measures lists, etc. The major performance measurement systems are as follows:

i. Balanced scorecard performance measurement system: this system is based on balanced scorecard framework and consists of four perspectives of organization's vision and strategy. These perspectives include: financial; customer; internal business and learning and growth (Rodriguez et al., 2009).
ii. Business process reengineering (BPR)
iii. Medori and Steeple's performance system (Folan and Brwne, 2005) Bradley, using AMBITE framework, developed a performance measurement system that specifically addressed BPR processes. This system presents a tri-axis cube whose dimensions are (Folan and Brwne, 2005):
   i. Business processes (first axis): customer order fulfillment, vendor supply, manufacturing, design coordination, co-engineering
   ii. Competitive priority (second axis): time, cost, quality, flexibility, environment
   iii. Manufacturing environment (third axis): make-to-stock
Table 2. Performance measurement systems.

<table>
<thead>
<tr>
<th>System</th>
<th>Dimensions</th>
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<tbody>
<tr>
<td>Balanced scorecard (Saiz et al.2007)</td>
<td>Financial, internal business, customer perspective, innovation and learning</td>
</tr>
<tr>
<td>BPR performance measurement system</td>
<td>Time, cost, quality, flexibility, environment</td>
</tr>
<tr>
<td>Medori and Steeple performance measurement system</td>
<td>Quality, cost, flexibility, time, delivery, future growth</td>
</tr>
</tbody>
</table>

(MTS); assemble-to-order (ATO); make-to-order (MTO); engineer-to-order (ETO)

Each point in the cube is a strategic performance indicator (SPI). These SPIS are organization-specific. Also, by applying critical success factors (CSF) which are based on organization's strategy statement and customer requirements (CRs) which present customer needs and expectations to AMBITE framework, SPIS are assessed. At this step, a pre-defined set of performance measures provided according to business processes of CSFs and CRs.

Finally, for finding critical performance measures, a process design matrix was introduced. This matrix allows various forms of correlation and comparative analysis to be performed in regard to relationships between critical performance measures and CSFs and CRs.

In a similar work, Medori and Steeple have suggested a framework in order to design and audit performance systems. Their framework operates as a system. This system measures six competitive priorities including quality, cost, flexibility, time, delivery and future growth. It also introduces a procedural framework for performance measure design. This procedural framework includes four stages as follows:

i. Define organization's manufacturing strategy and identify strategic requirements.
ii. Strategic requirements meet competitive priorities.
iii. Select measures from a separate pre-defined list of performance measures
iv. Audit - here, the existing set of measures is listed and compared with measures that have been identified in the previous stage.

Table 2 shows these three performance measurement systems and their dimensions. Also, researchers categorized performance measurement systems into two major groups named traditional and innovative groups these systems were compared. Traditional performance measurement systems are based on cost/efficiency, short term and profit orientation, individual and functional metrics and focus on evaluation, but innovative performance measurement systems focus on value, long term and client oriented, team and transversal metrics, improvement and its aim is evaluation and involvement (Folan and Browne, 2005).

ENTERPRISE PERFORMANCE

Previously, we discussed basic concepts, frameworks and performance measurement systems about organization performance; these led us to consider another concept called enterprise performance. An enterprise consists of the main components as follows; organization, people, technology and operations (S. Sherehiy, 2007). Each component is multidimensional and complex. Also, manufacturing, product, market (O’Sullivan and Butler, 2009), and information, are four main important dimensions in an enterprise which must be considered in enterprise performance. As organization is one of the enterprise component, its performance frameworks and performance measurement systems help us to consider enterprise performance. Further, we considered enablers which affect on enterprise's components and dimensions such as enterprise systems. These lead to the definition of enterprise performance indicators and finally, a model for evaluating enterprise performance is presented. This model will be based on enterprise's components, dimensions, and enablers.

Enterprise performance enablers

As aforementioned, there are enablers which affect on enterprise performance. We categorized these enablers as (Hendricks et al., 2007):

Supply chain management (SCM)

In today’s competitive market, businesses must offer products which meet customer needs in order to achieve competitive advantage. So, enterprises need to have effective integrated processes besides, synchronized operations of all partners in a supply chain. According to the researches, SCM has effect on inventory, cycle time and financial performance (Martin and Patterson, 2009). Supply chain management helps businesses to reduce operating costs and enhances customer satisfaction. Therefore, enterprises begin to adopt SCM for improving their performance. One of the most factors in SCM which affects on enterprise performance is supplier management. It helps businesses to enhance supply productivity.
Enterprise resource planning (ERP)

Enterprise resource planning (ERP) systems are integrated software solutions which integrates business processes in organization. ERP handles an enterprise's system requirements in areas such as human resource, manufacturing, sales and marketing, and finance. This system integrates information flow through an enterprise (Basoglu et al., 2007). ERP helps businesses access updated information which is necessary in responding to customer needs and to improve performance. ERP implementation affects enterprise performance. Researches show the impacts of ERP on financial performance (Weider et al., 2006). We can mention ERP benefits as an enabler for enterprise performance in four perspectives (Yang and Su, 2009); 1) internal business process, 2) external business process, 3) customer service, and 4) cost management. These perspectives contain factors such as total revenue and sale growth, inventory accuracy, manufacturing lead time, responsiveness to urgent order, material control, information sharing and scheduling, new product time to market, etc.

Business intelligence (BI)

Business intelligence (BI) systems help to analyze business information and support management decision-making through business activities in organization. Business value of BI systems is defined at two levels: 1) business process performance includes operational efficiency in business processes enabled by BI such as cost reduction and productivity improvement; 2) organizational performance. Here, BI affects on performance across an organization. Metrics used for this purpose are factors such as return on investment (ROI), sales growth which represent an organizational objectives and competitive advantage (Elbashir et al., 2008).

Customer relationship management (CRM)

Today's firm success increasingly depends on ability to operate Customer relationship management. On the other hand, CRM technology positively affects on market capability. CRM technology enables firms to formulate marketing strategies. Marketing strategies leads to organization performance. In order to formulate marketing strategies, we need to consider customer management. Customer management refers to "demand management practices through long-term customer relationship, satisfaction improvement and complaint management". Customer management has three main indicators: 1) customer involvement, 2) customer satisfaction, and 3) customer service (Lai, 2010). Customer involvement helps enterprise to specify customer needs and expectations which leads to product/service quality. Customer satisfaction causes customer loyalty to occur. Customer service refers to product pre-sales and after-sale support.

Total quality management (TQM)

Researchers realized that there is a relationship between total quality management (TQM) and enterprise performance (Prajogo and Sohal, 2004). TQM framework which has three main components – Teams, systems and tools, affects on innovation and innovation leads to organization performance.

Knowledge management (KM)

Knowledge management's (KM) aim is to deliver the right knowledge to the right person at the right time (Ho, 2008). KM activities result in knowledge circulation processes which have five main components: creation, accumulation, sharing, utilization and knowledge internalization. KM focuses on the management of knowledge in an enterprise (Holtshouse, 2007), and its ultimate goal is to improve enterprise performance KM tools can impact the financial performance of businesses (Vaccaro et al., 2010).

Vision, mission, strategies, policies, objectives

Vision, mission, strategies, policies and objectives cause key performance indicators to form. These concepts are affected by internal and external environment. If these concepts are defined and run accurately, they could lead to enterprise performance (Alavi and Karami, 2009). Top managers regard internal and external environment to include market, workplace, competition and they make decisions to improve enterprise performance. Here, performance indicators have been defined. Performance indicators will be introduced further.

Enterprise performance indicators

In order to categorize enterprise performance indicators, we should pay attention to various perspectives in an enterprise. Here, these perspectives are presented thus:

i. Internal processes perspective: this perspective considers indicators such as cycle time (production time, service time, delivery time, etc.), innovation (product innovation, process innovation, service innovation, marketing innovation, etc.), productivity, quality, capacity
utilization, product/service standards, etc.,
ii. Financial perspective: it considers profitability, turnover increment, inventory costs, cost measures, etc., (Saiz et al., 2007);
iii. Leadership perspective: this includes indicators such as operational management, management systems, marketing strategy, resource management, organization culture, learning and growth (ˇSkerlavaj et al., 2007), etc.,
iv. Stakeholders perspective: in this aspect, indicators such as customer management (customer involvement, customer satisfaction, customer service), supplier management, and employee management will be considered;
v. Information perspective: indicators such as information management, information availability, etc., are defined.

On the other hand, and based on afore stated perspectives, enterprise performance indicators consist of two categories: 1) key performance indicators (KPIs), and 2) intellectual capital indicators (ICIs). KPIs reflect enterprise strategy mission and objectives (Jussupova-Mariethoz and Probst, 2007). KPIs emphasize financial and operational indicators in an enterprise (Wen et al., 2008). KPIs measure how enterprise is close to strategic objectives. KPIs categorize at three levels strategic, tactical, and operational; but there are non-financial assets too, which are called ICIs; most of the frameworks aforementioned use financial indicators. But there are non-financial indicators which need to be considered. ICIs measure non-financial and non-physical assets of an enterprise (Dossi and Patelli, 2010). These monitor the intellectual capital of the enterprise, represented by the enterprise core competences, human, organizational and informational capitals. ICIs are categorized at three levels to include (Jussupova-Mariethoz and Probst, 2007):

i. Alliance/cooperation management indicators which control business partnership;
ii. Competence management indicators which consider professional (core) competences;
iii. Resource management indicators which control information distribution.

Enterprise performance model based on enablers, KPIs and ICIs is presented next.

Enterprise performance model

Now, regarding organization performance frameworks, enterprise performance enablers and perspectives aforementioned, enterprise performance model is presented. This model consists of the following components:

- Enablers: as mentioned in previously, enterprise dimensions are influenced by a number of enablers such as SCM, ERP, BI, CRM, TQM (Prajogo and Sohal, 2004), KM and vision, mission, strategies, policies and objectives.
- Consideration areas: enterprise consists of areas such as business processes, organization structure, organization size, organization culture, systems and methods, operations, workplace, technology and market environment (Nazemi and Tarokh, 2006).

By considering enablers and enterprise areas, we can define KPIs and ICIs of this model as follows (Figure 1):

i. Quality - indicates product/service quality and means how a product meets customer requirements and product specifications.
ii. Productivity - indicates resources usage to resulted product ratio.
iii. Innovation - indicates how an enterprise can response to market needs and adaption to environmental changes.
iv. Agility - this indicator represents enterprise speed and flexiblility to response market and technology changes, customer query time.
v. Processes - this indicator includes internal processes.
vi. Profitability - represents return on assets, return on sales.
vii. Learning and growth - indicates investment in R&D, training, and innovation.
viii. Reliability - indicates order fill rate, on time delivery, forecast accuracy, on time production, etc.
ix. Product liability - indicates enterprise must take care in the producing process and if it produces a defective product that causes injury to the consumer, it is responsible.
x. Social responsibility – represents responsibility to society needs, such as environment.
xi. ICT usage - indicates level of ICT usage such as software, hardware, communication and infrastructure provision for accomplishing enterprise processes (Mercader et al., 2006).
xii. Information availability - prepares and shares correct and updated information to the right persons at the right time.
xiii. Employees’ empowerment - preparing a safe workplace with job satisfaction, training and job upgrade.

CONCLUSION

In today’s unpredictable business environment, organizations face the challenge of expanding markets and meeting customer expectations. So, organizations need to evaluate their performance. Organization performance has always been a considerable influence on the organizations activities. There are various
definitions for performance. Performance needs to be analyzed by each element in the environment which it operates. Organization evaluates its performance based on objectives which are identified internally. In order to measure performance, we must define performance indicators. Performance indicator is a quantitative or qualitative indicator that represents the situation of the organization, unit or individual. The process of identifying performance indicators depends on organization-specific. For this purpose, we need a framework in which performance indicators are defined. So, some frameworks were formed over time, which may be structural or procedural.

In comparison to performance measurement
few performance measurement systems have developed. Most of these systems are a collection of companies' best practices. On the other hand, organization is one of the enterprise components. Enterprise consists of the main components such as organization, people, technology, and operations. So, organization performance helps us to consider enterprise performance. This paper aimed at presenting a model for measuring enterprise performance model. For this purpose, we considered enablers such as SCM, ERP, BI, CRM, TQM, KM; which affect on various enterprise areas and make key performance indicator and intellectual capital indicators. This model is also affected by enterprise vision, mission, strategies, policies and objectives. Enterprise performance model presented here is based on internal processes perspective, financial perspective, leadership perspective, stakeholder perspective and information perspective.

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