PERFORMANCE MANAGEMENT APPROACHES IN ECONOMIC ORGANIZATIONS USING INFORMATION TECHNOLOGY[*]

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Abstract: Performance management includes activities that ensure that goals are consistently being met in an effective and efficient manner. Performance management can focus on the performance of an organization, a department, employee, or even the processes to build a product or service, as well as many other areas.

In these days of globalization and intensive use of information technology, the organizations must define and implement an appropriate strategy that would support their medium-term development, stability and competitiveness. This is achieved through a coherent and interrelated set of activities for understanding the customer expectations and the level at which the offer of organization add value to customers and satisfy their needs, define their internal organization to allow timely response to market demands without losing focus on client, tracking strategy and business model for the accomplishment of the organization mission, aligning the existing IT project management or under development implementation in organization with the strategic management of organization etc. Strategic Management determines the improvement of processes, effective use of resources, focus on critical areas in terms of finance, creating opportunities for innovation and technological progress, improvement of the supply mechanism and the duty to promote personal interaction and negotiation at all levels, continuous assessment of organization and its technological trends, analyze the market potential and competence field etc. Strategic management system will not give good results if the strategy is not defined by a set of operational objectives clearly at all levels.

Business performance is based on a set of analytical processes of business, supported by information technology that defines the strategic goals that can be measured by performance indicators. Enterprise Performance Management creates a powerful and precise environment, characterized by data consistency, efficiency analysis and forecast effectively.

Key words: performance management, business intelligence, key performance indicators, IT management, strategy

1. Performance management approaches of the organizations

The Performance Management deals with optimizing an organization's business processes. It helps finding an efficient use of business processes and financial resources, human and material.

The Performance Management at the organizational, operational or individual is one of the essential functions of management, "performance" being a term with a wide use in everyday life to illustrate the progress made and the achievements. In today's business environment, the Performance Management is a usual term, which is framed in the conceptualization of many disciplines and used at all organizational levels in the scientific management.

The Performance is associated with two key processes: *Performance Management* and *Performance Measurement*, which are closely related, as both performance management precedes and follows the process of measuring performance.

Performance Management is an essential process for achieving the desired level of performance. Like management, the term "performance" may be used at different levels (individual, operational, organizational) to express their accomplishments such as the performance in sports or to facilitate a comparison in similar contexts. Encompass many complementary activities, Performance Management includes elements closely related to many other disciplines, such as Strategic Management, Project Management, Human Resource Management, Accounting and Psychology.

Traditionally, in an organizational context, Performance Management can be approached at three levels: *strategic*, *operational* and *individual*.

At *the strategic level*, Performance Management focuses on achieving organizational goals, being mentioned in the specialty literature under the names of organizational performance, business or corporation management. The strategic management is an essential advisor of the performance management at this level, because the key processes linked to the performance management systems are the strategy formulation and its execution. Tools like the Balanced Scorecard, Performance Prism, dashboard or other models and quality awards such as Baldrige Award and the EFQM Excellence Model are used at this level in order to guide the achievement of organizational goals.

Performance management at *the operational level* is closely related to operational management, because it focuses on operational objectives. Although aligned to organizational strategy, the emphasis in this case is a functional one. Evolution of performance management at the operational level is related to the evolution of accounting and management. This is because the operational performance was evaluated in terms of efficiency and effectiveness. The easiest way to do this is by using financial indicators, provided by the financial accounting function in organizations. Over time, as internal and external operating environment became more complex, the organizations began to turn their attention to the non-financial performance indicators. This has made the connection with operational management and other general management issues.

Scorecards and dashboards are basic tools in the management process, being often used at this level. For example, a dashboard for Human Resources (HR - Human Resources) is used to collect and analyze indicators of human resource management decisions that guide the Human Resources department. Similar tools in other functional areas are the Marketing Scorecards, Dashboards of project portfolio of Scorecards of supply activities. A wide variety of instruments of performance management at the operational level are also used by the finance department, in which case managers develop a wide variety of financial reports used to support the decision process.

The traditional level at which is used the Performance Management in the organizations is the *individual level*, taking into consideration the employees' performance in an organizational context. At the individual level, the performance management is represented by an integrated and planned system for improvement of the all employees' performance. This fact involves defining the objectives and standards, reviewing performance in relation to these standards, active management of all levels of performance and maximizes learning and development. Management performance at the individual level is probably the level with the longest evolution in history as it reflects the degree of organizational maturity.

2. Case study on systems of IT performance indicators

Performance indicators are needed to support performance management.

A performance indicator (PI) is composed of a number, which provides a size (how much) and a measure that gives the number a meaning (what).

Performance Indicators:

- represents measures or factors that tend to indicate the status, progress and / or success of a project, process or service delivery area;
- are process-oriented;
- resources are focused on the processes that lead most likely to successful outcome;
- are usually brief, focused, relevant, measurable, repeatable and logical;
- measure the critical success factors.

A Key Performance Indicator (KPI) is a specific measure of performance for an organization in a given field. KPIs are always tied to a goal or an objective.

It is a general concept, with different implementations depending on the type of business and organization goals. KPIs represent a particular category of performance indicators and provides to an organization, quantifiable expression for factors which were established as being important for its long term success. Ability in applying Key Performance Indicators lies in selecting the optimal number, this maximizing the benefit of their use, while the cost of their use is minimized.

There is a very wide range of performance indicators available, and many others that can be developed to suit the needs of specific projects or organizations. However, the performance indicators do not become Key Performance Indicators (KPI) until they are selected and applied as a „key" for a specific issue.

IT is the functional area of an organization that is responsible for the activities of the organization which ensure that the information are available, easily accessible and secure through the study, design, development and implementation of computerized information systems, particularly software and hardware.

In the IT field, such a system of indicators can be implemented for different analyzed aspects or subdomains. The most important of these may be considered:

- Organizational architecture;
- Development of IT applications;
- General aspects about IT;
- IT Security;
- IT Network Management;
- IT Service Management.

a) Organizational architecture supports the organization in establishing a framework for its decision to allow different parties to articulate how information and computer technology can be used in the context of business strategy. Performance indicators refer to the role the organizational architecture plays in business development, to the business methods used to ensure the company structure and to the processes related to strategic objectives (Table 1).

Table 1 - KPIs for organizational architecture

KPIs	Significance
Business interruption caused by IT problems	Measures the number of activity disruptions that were caused by the problems related to information technology (IT).
Savings due to the rapid integration of IT application	Measure the amount of money saved due to faster integration of application through implementation of the Service Oriented Architecture - SOA.
Financial management processes supported electronically	Measures the percentage of financial systems that are supported entirely electronic, from all financial management processes.
Cost savings from the reuse of services	Measures financial savings due to reuse of organizational architecture services.

b) Development of IT Application refers to the use of various technologies to design, develop and implement software applications within their organizations or clients. Performance indicators refer to the applications developed as quantity, especially issues related to quality, such as development time and compliance with customer requirements of design and functionality (Table 2).

Table 2 - KPIs for development of IT applications

KPIs	Significance
Fault removal efficiency of software applications	Measures the percentage of errors found and removed before the software applications to be delivered to customers, the total number of defects identified and eliminated, both during the process of development, support and their maintenance.
Technological platforms used for application development	Measures the number of technology platforms that are used in the application development process.
Defects of software in use	Measures the number of defects in the software application that were discovered only after the application went into use.
Software errors corrected	Measures the number of errors in the application (bugs) that have been addressed during the development and testing.
Maintenance cost per 1000 code lines	Measure the maintenance costs of software, calculated per every 1,000 code lines.
Code lines that require modification per person	Measures the number of code lines that needs to be restored by designated staff to develop an application in a certain period of time, usually one day.
Conform software applications	It measures the percentage of software applications that meet established quality standards from the total number of IT applications developed.
Additional requirements requested	Measures the number of additional requirements requested by users of the software application.
Software application updates completed successfully	Measures the percentage of software updates that have been successfully implemented, from the total number of updates made, except the complete installation of IT applications.
Rates of problem solving by IT applications	Measures the percentage of problems on IT applications that have been resolved under the agreed standard time (in agreement regarding the quality of service), from the total number of problems reported by beneficiaries.
Time-consuming to correct errors	Measure the time spent for resolving the errors (bugs) in comparison with the time spent to develop new application features.
Compliance program in software development	Measuring the punctuality and delivery „quality" in relation to establishing and acceptance criteria.
Within budget	Measures the ability of the supplier to complete the task within the cost limits and agreed budget.

c) General aspects about IT - this subcategory includes general performance indicators for information technology as functional area, other than those specific for proposed subcategories (Table 3).

Table 3 - KPIs for IT general aspects

KPIs	*Significance*
Incidents due to violation of IT policies	Measures the number of incidents due to violation of IT policies in a period of time.
IT expenses per employee	Measure the amount of money saved due to faster integration of application through implementation of the Service Oriented Architecture - SOA .
Time dedicated to creative IT activities	Measure the length of time spent by IT staff in creative activities, relative to total working time devoted to IT activities during the time of measurement.
IT expenses per client	Measure the average costs related to information technology (IT) that correspond to the served clients.
Outsourced IT work	Measure the volume of IT work that was outsourced from the overall volume of IT work (expressed in man-hours or man-days)
New business initiatives generated by IT	Measures the number of creative and innovative business initiatives that are generated in the IT department compared with total new business initiatives.
Efficiency of IT assets	Measure the efficiency of IT equipment from the data center of a company regarding their use and energy needs while producing results.
Cost per PC	It measures the average cost of acquisition and maintenance for a computer.

d) IT security deals with protecting information and IT systems, ensuring confidentiality, integrity and availability of data regardless of their form. Performance indicators refer not only to the quantity of IT security systems in place, but also to their quality implementation and outcomes of real security (Table 4).

Table 4 - KPIs for IT Security

KPIs	Significance
Costs arising from security incidents	Measure the amount of money spent to resolve the security incidents.
Incidents caused by malware programs caused by employees	Measures the number of incidents due programs that damage the computer system and are caused by employee actions, such as the use of Web 2.0 at the workplace or a social media.
Intrusion detection rate in security system	Measures the percentage of detected intrusions in security system from the total number of intrusions (unapproved access cases from some external parts in the IT security system of organizations).
IT Security Staff	It measures the percentage of IT security specialists from the total employees of IT department.
Budget allocated to IT security	Measures the percentage from total IT budget that is allocated to security problems.

e) IT network management deal with technical support and professional services for network operation and storage of information. Key Performance Indicators measure whether the operation, administration, network maintenance and systems' supply are conducted properly (Table 5).

Table 5 - KPIs for management of IT network

KPIs	*Significance*
Size of router buffer size	Measure the volume of data packs that the router can store temporarily for preparation of disc writing.
Using the average storage volume	Measures the percentage of the average volume of storage used, from the total amount of memory available.
Daily use of network traffic	Measuring the average network traffic of data during a day.
Server Response Time	Measure the time between a call and identification and its transmission by the server (time to download a Web page in milliseconds).
Availability of data network	Measures the percentage of time when the network data is available to users.
Using data network	Measures the percentage of data network capacity that is actually used.

f) IT Service Management is a subcategory that targets the client's perspective regarding the contribution of information technology to the business. Performance indicators in IT service management refer to the support

and services offered by the IT to the company and its customers so it respond to their needs and requirements (Table 6).

Table 6 - KPIs for the IT services management

KPIs	Significance
Software cost	Measure the amount of costs associated with software acquisition for optimization the organization operations (such as licenses, subscriptions, etc.).
Penalties for service delivery	Measure the amount of penalties paid as a result of violations of the Quality Services Agreement (SLA) during the measurement period.
Service requests per Representative	Measures the average number of service requests received by a representative of the IT services department or a call center.
Incidents resolved by the service provider	Measures the number of incidents closed by the service provider relative to the total number of open incidents.
Services covered by the Quality of Service agreements (SLAs)	Measures the number of services covered by the Quality of Service agreements (SLAs) related to the total number of services.
IT budget spent on service delivery	Measure the amount of money spent on service delivery activities reported to the entire IT budget.
The rate of propagation for computers	Measures the number of laptops and computers that the organization offers its employees.
IT incidents handled during the agreed response time	Measures the percentage of IT incidents managed and resolved during the response time agreed upon Quality Services Agreement (SLA).
Incidents delayed	Measures the number of delayed incidents (not concluded and resolved within set time interval) in relation to the number of open incidents.
Incidents per PC	Measures the total number of support incidents in relation to total PC.

In order to provide the information an organization needs to accomplish its goals, it must invest in and to manage and control all IT resources, using a structured set of processes for delivering information that provide services required by the organization.

To meet business objectives, information must meet certain criteria that represent requirements of business for information. The most important criteria are:

▪ Effectiveness requires that information be relevant and pertinent to the economic process, and to be delivered in a timely and proper manner, consistent and easy to use.
▪ Efficiency refers to the provision of information by using the optimal (most productive and economic) resources.
▪ Confidentiality concerns the protection of sensitive information against unauthorized disclosure.
▪ Integrity refers to the accuracy and completeness of the information, and their validity in accordance with company values and expectations.
▪ Availability means that information is available when the economic process requires, at present or in future. It is also about taking care of the necessary resources and associated capabilities.
▪ Compliance refers to the laws and contractual agreements to which is subject to the economic process, for example, both external criteria and internal policy requirements.
▪ Reliability refers to the provision of adequate information to operate the entity and management in order to exercise its fiduciary and governance responsibilities.

While information criteria provide a generic method for defining business requirements, define a generic set of economic objectives and IT provides a more refined basis for establishing economic needs and development of indicators that allow quantification of these objectives.

Any enterprise using IT in order to facilitate economic initiatives, and they can be represented as economic objectives for IT. If you need to deliver IT services to support successful enterprise strategy, then there should be a responsibility and a clear direction from the economic part (the customer) and a clear understanding of what needs to be delivered and how it must be delivered by IT (the provider). Thus, the strategy should be translated by the enterprise according to the objectives of IT initiatives (economic objectives for IT). These objectives should lead to a clear definition of their IT own objectives (IT objectives), which, in turn, define IT resources and capabilities (enterprise architecture for IT) required to achieve a successful IT component of enterprise strategy.

Once the aligned objectives were defined, they must be monitored to obtain assurance that what is delivered meets expectations at that time. This is done through indicators derived from targets and are summarized in an IT scorecard (scorecard).

For a client to understand the IT objectives and records, all these objectives and associated indicators should be expressed in economic terms with significance for the client. This, combined with an effective alignment of the hierarchy of objectives, will ensure that the business can confirm that IT is probably able to support enterprise objectives.

In the proposed model, we can use these three options to address the performance, decomposed from the strategic level to operational level, through a top-down methodology:

▪ IT objectives and indicators that describe what business expects from IT and how these expectations are measured.
▪ Objectives of processes and indicators that describe what the process should provide IT to support IT goals and how these expectations are measured.
▪ Setting objectives and indicators of activities which must take place within a process to achieve the required performance level and how these provisions are measured.

The objectives are defined from top to bottom, so that an economic objective will determine a number of IT goals that support them. Further, an IT objective is achieved as a result of a process or interaction of a number of processes. Thus, IT objectives help define the various objectives of the process. In turn, each process needs a number of activities, establishing in this way, the objectives of the activities. Fig. 1 exemplifies this type of relationship between economic objectives, IT, processes and activities.
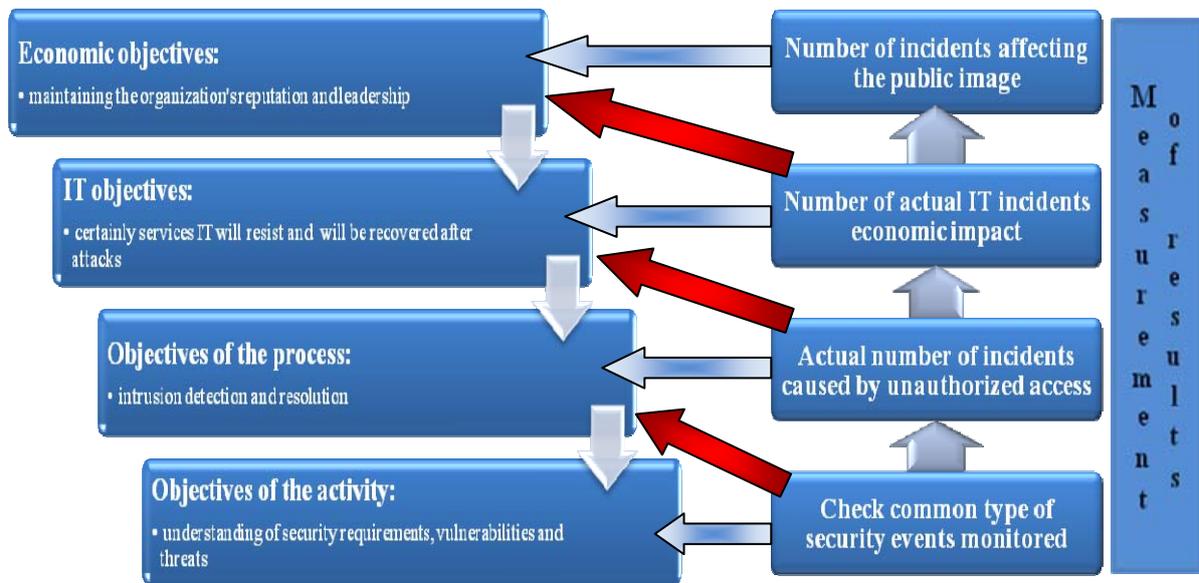

Fig. 1 Relationship between objectives, measurements of results and performance indicators

In this model, there are used two categories of indicators:
➢ Indicators of results (for output) - reveals if the objectives were achieved. They can be determined only after the activity took place and therefore can be considered „lag indicators" – „delayed indicators".
➢ Indicators of performance - highlight the fact that the objectives could be achieved. They can be determined before the outcome is certain, and therefore may be considered „lead indicators".

The results' measurements from a lower level become performance indicators for a higher level (in Figure 1, red arrows). If we consider the presented example, an indicator that indicate that the intrusion detection and resolution are correct, indicating at the same time, a more probability that IT services can resist the attacks and that they can recover from attacks. In this way, an indicator from a lower level of performance has become an performance indicator of the superior level. This illustrates how indicators of results (for example taken) become indicators of performance.

Indicators define the metrics that inform the management - after the event - if the IT function, a process or activity has achieved its objectives. The indicators of IT functions are often expressed in terms of information criteria:
▪ Availability of information needed to support business needs.
▪ Absence of risks associated to integrity and confidentiality.

The performance indicators define the business size, IT functions, IT processes perform to offer the possibility that the objectives are achieved. They are lead indicators on the likelihood that the objectives to be achieved, leading and following, thus, targets related to higher levels.

In general, they indicate the availability of appropriate capabilities, practices and skills and the result of related activities. For example, a service of IT is an IT goal, but at the same time, an indicator of business performance and capability. Therefore, performance indicators are sometimes called as performance generators.

Therefore, indicators are simultaneously a result indicator for the objectives of IT business process or assessed activity, but also a performance indicator by which is reached the objective of a higher level of business, the IT function or IT process.

3. Conclusions

➢ The paper places particular emphasis on how to relate to the IT management with the strategic management of the organization&, IT performance measurement in organizations pursuing strategic goals.

➤ Regarding performance measurement, systematic integration and alignment at all levels within the organization are considered to represent an important role in order to assess whether organizational strategy is implemented or not. Measuring the organizational performance is an important part in translating corporate strategy into results, with the need to develop a paradigm for integrating strategy formulation with the performance measurement process in organizations (Pun & White, 2005).

➤ In recent years, can be noticed an integration trend between the strategic performance management and individual performance management by facilitating the introduction of tools such as Balanced Scorecard. Organizational objectives were thus reflected in individual objectives, namely the individual indicators have become correlated with the organizational level, in an effort to increase the responsibility of all employees in the implementation of organizational strategy (Brudan, 2010).

➤ Implementation of an information technology support, such as a software application for operation and data estimation may increase the chances of achieving higher levels of maturity and reaction time performance in decision-making processes. This is especially true for innovation, organizational agility and competitive advantage.

➤ Performance management is a long term investment. The most important effects can be seen in time, through the results obtained at a performance oriented culture. Performance management programs need to address long-term perspective, emphasizing employee development and process improvement.

➤ For any solution regarding the planned performance to be implemented in future, it must be adapted and linked to those already in force. Solutions integrations (system, tool, software application) and alignment of levels within the organization is a very important process, being a main influential factor for the successful management of performance.

➤ In today economy, the tendency of any organization is to become an intelligent organization. This can be done through computerized strategies of Business Intelligence new and innovative which offers to the organizations a competitive advantage in the marketplace. Due to changes in the software industry, recent years have marked the end of what is generally understood on BI - methods, tools and systems for handling quantitative data used in building the performance visions and analysis necessary in decision making - and the beginning of a new BI era, proactive, extensible, performance-oriented. This new era can be seen as a new way in which BI is combined with business process management, engines of business rules and other tools and techniques with direct and immediate impact on business decisions.

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