

# **A Framework to Review Performance Prism**

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## **Abstract**

**Purpose** – The purpose of this paper is to develop an exclusive review framework for Performance Prism.

**Design/methodology/approach** - An extensive literature survey on performance measurement is used to identify the main aspects of the review in such systems. Various dimensions related to the characteristics of Performance Prism are explored. All the findings are then rationally put together to develop the proposed conceptual framework.

**Findings** - The paper presents a conceptual model to review performance measurement systems (PMS) which are designed based on Performance Prism. The presented framework categorizes review processes and tools into two main categories; Business Performance Review (BPRw) and Performance Measurement System Review (PMSR). In BPRw, a loop is presented in three levels -with regards to the five facets of Performance Prism- which indicates the performance management process. PMSR deals with reviewing the efficiency and effectiveness of the design and implementation of the PMS itself. Several methods and tools have been gathered from the literature (e.g. relevance test, measures profile, etc) in this section to examine the relevance of measures, and some have been introduced (including a method to determine inconsistencies in

organization's performance trends between stakeholder, strategic and operational level) to study and challenge the validity of strategic assumptions and strategies, and appropriateness of infrastructure. Implications of various factors such as organizational culture, change management, and characteristics of the measures (level of the measure, managers who receive reports including the measure, and supporting infrastructure) are highlighted.

**Research limitations/implications** – In contrast to PMS design and implementation, research on PMS review is limited. This is more evident in the literature concerning Performance Prism. The empirical evidence of usefulness is beyond the scope of this article.

**Practical implications** - The framework provides a procedural action for reviewing both business performance and PMS performance when applying the Performance Prism in practice. It provides a foundation for further empirical research.

**Originality/value** - This study adds to the body of literature, by proposing a comprehensive review framework to be used in Performance Prism.

**Keywords:** Business Performance Review, Performance Prism, Performance Measurement System Design Review, Performance Measurement System Implementation Review

**Paper type** – Conceptual Paper

## **Introduction**

Great attention has been paid to Performance Management (PM) issues by academic and business communities in recent years. The number of publications in this area reveals the importance of managing performance in organizations. Reports and articles on this topic have been published at the rate of one every 5 hours between 1994 and 2002. Internet searches reveal more than twelve million sites dedicated to Business Performance Management (BPM) (Marr and Schiuma, 2003) and this number is growing by day.

Neely estimated that between 1994 and 1996, some 3615 articles on performance measurement were published. In 1996, books on the subject appeared at a rate of one every two weeks in USA alone (Folan and Browne, 2005). The past fifteen years have seen significant research and developments in the field of performance measurement, resulting in the generation of various models, frameworks and methodologies by practitioners, consultants and academics. Among them, "Performance Prism" introduced by Adams and Neely

(2000) offers a new approach towards organizations' performance. This framework includes five inter-related aspects:

1. Stakeholders satisfaction; who are the organization's key stakeholders and what do they want and need?
2. Stakeholders contribution; what contributions does the organization require from its stakeholders?
3. Strategies; what strategies does the organization have to put in place to satisfy the wants and needs of these key stakeholders?
4. Processes; what critical processes does the organization need to operate and enhance these strategies?
5. Capabilities; what capabilities does the organization need to operate and enhance these processes?

Neely et al. (2002) argue that one of the greatest fallacies of measurement design is that performance measures should be derived from strategies. It is the wants and needs of stakeholders that must be considered first and consequently the strategies can be formulated.

The measures related to the mentioned facets accompanied by their results, trends, targets, standards, initiatives and action plans are included in scorecards to facilitate managing performance. Measures are connected with each other through sets of hypothetical relationships called "success map".

This framework is best suited for the organizations for which creating stakeholder value is first priority. Also considerable additional levels of detail developed for each of the facets ensure that the framework is comprehensive, enabling all measures to be mapped on to it so that gaps in measurement can be identified.

Kennerley and Neely (2002) consider the framework to be multi-dimensional, reflecting all of the areas of performance that influence the performance of an organization.

The strength of this conceptual framework is that it first questions the company's existing strategy before the process of selecting measures is started. In this way, the framework ensures that the performance measures have a strong foundation. The Performance Prism also considers new stakeholders (such as employees, suppliers or alliance partners) who are usually neglected when forming performance measures (Tangen, 2004).

In spite of all the positive points, the lack of a review procedure (the importance of which has been greatly emphasized by Neely) to maintain the effectiveness and relevance of the system can be considered as one of the Prism's shortcomings. The following concentrates on presenting a framework to address this issue.

Considering the changing business environment, many researchers have mentioned the need for updating the Performance Measurement System (PMS) (Meyer and Gupta, 1994, Ghalayini and Noble, 1996, Dixon et al., 1990, Wisner and Fawcett, 1991). Since 1999, 40-60% of American and European companies have reengineered their PMSs. Among 132 "Cost Management Association" members in 1999, 55% were changing their PMSs and 37% tended to make this change (Frigo and Krumwiede, 1999). The Jointly survey of Cranfield University and Accenture has indicated that in 2001, 96% of companies that have PMS, believed that it needed to be improved (Bititci et al., 2006). Although the necessity for reviewing the PMS has been emphasized, the topic of reviewing PMS has been paid little attention in the literature. Most of the researchers who have tried to present a PM framework or design a system, only briefly mentioned review and failed to address the issue comprehensively. Steple and Medori (2000) dedicated the last step of their 7-step procedure to system maintenance as an essential part of PMS. Also Wisner and Fawcett. (1991) paid attention to periodic re-evaluation of the PMS in their 9-step approach. In their book (Measure up! How to measure corporate performance), Lynch and Cross (1991b) have presented a ten-step implementation plan for changing the yardsticks. This plan offers a practical structure for adjusting the measures with organization's current circumstances. Balanced Score Card (which is known as one of the 15 most important management concepts (Andersen et al., 2001)) considers review as a principal process which is conducted through periodic workshops and management meetings (Kaplan and Norton, 2004). However, Kaplan and Norton have not provided enough information as to its deployment.

In this paper a framework is presented to review business performance and the PMS performance simultaneously and address several issues that have been ignored in previous frameworks. Since Performance Prism:

1. is known as one of the most comprehensive frameworks introduced so far in PM literature (Kennerley and Neely, 2002);
2. is increasingly applied in a great variety of organizations (Neely et al 2001);
3. is one of the least studied among the recently proposed frameworks (in the ISI Web of Science database, only seven papers contain the word "Performance Prism" in their abstracts, titles, or keywords);

The review framework presented in this paper is customized for the PMSs that have been designed based on Performance Prism.

In the remainder of this paper, first, an overview of some of the relevant recommendations and frameworks in the literature of PMS review is presented. Then, the proposed review framework for Performance Prism is introduced in two major sections. The first one, Business Performance Review (BPRw), deals with monitoring the performance of an organization from the perspective of the five facets of Prism. The second section is related to reviewing the Performance Measurement System itself (PMSR) to maintain the effectiveness and efficiency of the developed PMS in the organization. This process evaluates PMS from the points of view of design (including Prism's facets, measures, and their relations as mapped in success map and) and implementation, using different tools. Finally, all the different components of the framework are put together and described in a schematic view. In the end, limitations and shortcomings of the research are explained and the areas requiring future research are outlined.

### **Literature review**

The literature review used in this paper was constructed on June 2008 and updated last on March 2009, using the ISI Web of Science database. Every publication that contained the phrase “performance measurement system”, “performance management system”, or “Performance Prism” in its title, keywords, or abstract was identified and downloaded. This search identified 2483 papers published in 546 different journals. Among these, 1370 papers were in business, management, or economics field, in 173 of which, the keyword “review” had been mentioned somewhere in the main body. The abstracts of these 173 papers were reviewed and 108 of the most relevant ones were used as a literature data set. As it can be perceived from the numbers, despite the importance of the subject, only a few papers were dedicated to the topic of review in the PMS literature.

Improvement is one of the main purposes of PMS. To reach this goal, organizational performance should be reviewed frequently. This review must be carried out in different organizational levels and different periods. Also, it seems essential to review the PMS itself in order to detect the errors and problems. What makes continuous reviews of PMS inevitable is the constant changing environment and competitive markets.

When members of the management team or their beliefs and views change, some inconsistencies might emerge between management activities' focus and measurements, potentially leading to organization malfunction. Therefore, having a review framework beside the PMS is crucial.

Najmi et al. (2005) propose a review framework that consists of two main categories:

1. Business review
2. PMS review

"Business review" assesses the performance of the business through the PMS. "PMS review" deals with the assessment of how efficient and effective the PMS actually is in measuring the company's performance.

In Najmi's framework, business review is divided into three levels based on review frequency:

1. Ongoing; which deals with reviewing the operational performance of the business.
2. Periodic; which deals with reviewing the strategic performance of the company by reviewing the strategic indicators.
3. Overall; which deals with the review of the company's overall strategic objectives, including the mission and vision statement of the business.

The PMS review phase in this framework includes issues such as the accuracy of mapping of the business onto the PMS, and the efficiency of the PMS design process. The schematic view of this framework is provided in Figure 1.

"Take in Figure 1"

Bourne et al. (2000) have proposed that the development of a PMS can be divided into three main phases: design (identifying the key objectives and measures), implementation (collecting and processing the data related to measurements) and use. They suggest that the performance measures can be used to evaluate the success of the implementation of organizational strategy and to challenge the strategic assumptions. They also mentioned that a PMS requires developing and reviewing at a number of different levels including revising targets, developing individual measures, reviewing the complete set of measures and challenging the strategic assumptions. The figure below shows the phases in developing PMS and the four processes which Bourne et al. suggest for review.

"Take in Figure 2"

Neely (1998) states that PMS consists of three inter-related elements: individual measures, set of measures and supporting infrastructure. In their paper, Kennerley and Neely (2003) suggest that in order to manage the evolution and maintain the effectiveness of PMS, these three elements should be monitored. To do so, he proposes different tools such as Dixon's questionnaire and Neely's tests of relevance of individual performance measures. They also identify the factors affecting the evolution of PMS which include process, people, system and culture.

In PM literature, the researchers who have commented on reviewing and maintaining PMS discussed different aspects of this issue. This part of research became more comprehensive as time passed. New aspects are introduced day by day but the review frameworks presented so far have had a general approach to the issues and have not considered specific characteristics of an organization's PMS. These frameworks have not been developed exclusively for a particular PM framework including Performance Prism. As previously mentioned, this paper aims to construct a new framework in order to review PMSs that are based on Performance Prism.

## **Framework**

In the proposed framework, the review process is divided into two main categories: business performance and PMS performance.

### **Business Performance Review (BPRw) Section**

The first section aims to describe how to review the performance of organizations that are using Performance Prism.

According to Globerson (1985), a PMS should include a set of measurable criteria, standards of performance for each criterion, routines to measure each criterion, procedures to compare actual performance to standards and procedures for dealing with discrepancies between actual and desired performance. The elements presented by Globerson can be translated as a loop which is deployed to improve the organizational performance continuously as shown in Figure 3.

"Take in Figure 3"

As it can be seen in the figure, the loop includes four phases which will be discussed in the following.

- *Phase 1: Planning for performance.* Many PM researchers have emphasized the need for determining a target for each measure (Crawford, 1988, Ghalayini and Noble, 1996, Globerson, 1985). Therefore, it is considered as one of the main parts of this phase. These targets should be challenging and determined in a way that fosters an attitude of improvement in the organization, while staying realistic so that they can be met in a particular time period regarding the organization's capabilities. Ghalayini and Noble (1996) state that targets need to be carefully set. According to them, setting the targets too low, will lead to under performance of the company relative to its abilities, and setting them too high can result in disappointment, caused by failing to meet the expectations.

Another important step in the "planning for performance" phase is determining the time-frame during which the targets are supposed to be met. Similar to targets, time-frames should be realistic and consistent with organizational potentials.

In the beginning of each performance period, the targets should be reviewed, but it does not mean that they should necessarily change. By comparing the actual performance against planned performance and considering the organization's strengths and weaknesses, the targets are modified for the next period.

Reviewing targets can be assumed to include two cycles. In one cycle, organization's resources, the performance of the previous periods and the desired performance for the next period are considered. This type of review should be carried out alongside BPRw. The other cycle which has a lower frequency, considers the effects of other factors such as standards of the industry, benchmarking and organizational goals. It can be perceived that the first cycle deals with short-term plans and the other is required for long-term planning.

The management team must be aware of the employees' behavior towards the determined targets. Increasing the targets should be done carefully and with some considerations. Fisher (1992) argues that workers may hesitate to perform to their maximum potential if they realize that the standard for upcoming period may be revised upward based on current results.

After determining the targets, an operational plan should be developed, necessary initiatives defined and required resources dedicated in order to meet the targets. These elements are included in the scorecards which have been developed during the "design" phase. The scorecards will be reviewed at the end of each performance period.

- *Phase 2: Measuring performance.* By completing phase 1, the organization's departments start operating in order to meet the targets. The departments' success in moving towards the pre-set targets should be measured periodically. The frequency of these measurements varies according to the level of the defined measures. Some measures need to be monitored weekly or daily, while for others, this period is over a year or even more.

In their framework, Najmi et al. (2005) divided the review process into three levels based on the review frequency. Similarly, the measures of Prism facets can be categorized into three levels regarding the frequency of the measurements as shown in the pyramid in Figure 3.

The important point is that the defined frequencies for measurements are greatly dependent on the measures' rate of change. Measures like "waste" or "stock price" which have a high rate of change, need to be monitored more frequently than measures like "customer satisfaction" or "employee contribution" in which an increase or decrease occurs in a long time period. Of course there could be some events which lead to the sudden change of these measures. In this case, radical changes could be covered by ad-hoc measurements.

The three mentioned categories of measures are described in the following:

1. The first category of measures –which is placed on top of the pyramid–, is related to "stakeholder satisfaction" and "contribution". Stakeholder satisfaction measures indicate the organization's success in meeting the needs of different stakeholders. The role of stakeholders in helping the organization achieve its goals, is reflected on contribution measures.

Placing this category on top of the pyramid –which involves the lowest frequency of measurements–, has two reasons. First, measuring the satisfaction and contribution of stakeholders is a complicated process. The tools used for conducting this kind of process –such as survey– are generally time-consuming, costly, and require a great amount of resources so organizations cannot afford to measure these indicators repeatedly. Second, one of the most important points that must be considered in analyzing the measures is their trend. Organization's actions reflect on stakeholder satisfaction and contribution measures with a great lag. Therefore, tracking the trend of these measures in a short period (e.g. weekly) is of little practical use for general managers, because they cannot observe the effects of the corrective actions on these measures in that period. The measures

should be monitored in a time period in which a considerable and meaningful change can be observed. Of course gathering the data related to measures like customer satisfaction is not limited to the review period. The data should be collected continuously during the related performance period but be analyzed and reported in the review period.

2. The second category includes the measures related to the organization's "strategy". According to Neely et al. (2002), the strategies should be derived from stakeholder's needs. The organization can ensure meeting the stakeholder's needs by defining relevant and effective strategies. Being in line with strategies and moving towards the strategic objectives can be monitored through the strategy-related measures (placed on the mid-level of the pyramid). According to Najmi et al. (2005), one of the main inputs of the strategy review process is information from the operational level. Regarding the mentioned considerations about the frequency of measurements, strategy related indicators should be measured in a shorter period than the stakeholder satisfaction and contribution indicators.

3. The "process" and organization's "capability" measures fall into the third category. In order to implement strategies, the organization has to understand what processes are required and must be operated both effectively and efficiently. Processes can only be executed if the organization has the right capabilities in place –the right combination of people skill sets, best practices, leading technologies and physical infrastructure (Neely et al., 2002). In fact, processes are the fundamentals of an organization through which stakeholder's needs are met. Therefore their elements should be under control continuously. Considering this point, the measurements at the process level should be carried out repeatedly in short time periods and the results must be monitored in order to prevent any major deviation.

▪ *Phase 3: Reporting.* After completing phase 2 (measuring), the results should be reported to relevant people. Lynch & Cross (1991b) present some guidelines about reporting. They suggest that reports must:

- ✓ Be designed in a simple and consistent format. All employees in the organization must be able to understand the reports in order to take the corrective actions.
- ✓ Show a balanced profile of performance. Showing measures separately in reports can lead to sub-optimization and ignorance of trade-offs. Reports must include selection of inter-related measures that show the performance of the department/organization as a whole.

- ✓ Facilitate managing performance over time. The main purpose of measuring is to encourage continuous improvement over past performance, so the reporting must show the trend of the results including the past performance and the prediction of future performance.
- ✓ Include control limits to account for random statistical fluctuation.

Furthermore, visualizing the data in a way that communicates a great amount of information is of great importance today. Visualization is the use of computer-supported, interactive, visual representations of data to amplify cognition (Brodie, 2002). The business insight transformed from unstructured data is known as competitive advantage.

- *Phase 4: Analyzing & developing action plans.* Neely et al. (2002) state that the raw data will generally be of little practical use on its own if there is no accompanying analysis and interpretation, followed of course by an improvement action, based on the insight provided by the analysis. Therefore, organizations have to identify what data analysis is required for each report and define how the information needs to be sliced and diced for reporting purposes. After analyzing and reporting the results, the reasons of deviations from the targets and the improvement possibilities will be discussed with measure owners in periodical meetings. One of the main outputs of these meetings is “action plans” which are developed in order to address the current problems.

### **PMS Review (PMSR) Section**

The second part of the review framework deals with reviewing the performance of the PMS. As mentioned before, according to Bourne et al. (2000), there are three phases in developing a PMS; design, implementation and use. In their paper, Bourne et al. introduced “Use” as a process which is conceptually close to review process; the other two phases are the parts of a PMS that need to be reviewed. Therefore, in this paper, the PMSR process is divided into two categories: Design review and Implementation review.

On the other hand, according to Kennerley and Neely (2003), the review process should involve three elements of a PMS which are "individual measures", "a set of measures" and "supporting infrastructure" for collecting required data. Considering the definitions of PMS design and implementation which have been presented by Bourne, processes of reviewing individual measures and set of measures fall into the category of

PMS design review and reviewing the supporting infrastructure can be considered as a process to conduct implementation review.

#### *PMS Design Review Category*

This category includes two processes; "reviewing individual measures" and "reviewing sets of measures". In the first part, reviewing individual measures will be discussed. The organizational circumstances are continuously changing. Some measures might have been defined on the basis of circumstances related to a particular period of time (during a problem-solving process or progress of reaching an achievement), and become useless gradually. According to Neely et al. (2002), what an organization chooses to measure should be dynamic and perhaps 20 percent or more of the measures should be temporary. These measures should be periodically reviewed and deleted from the system upon losing applicability. The frequency of this kind of review depends on the type of organization and the individual measures themselves.

Many researchers in PM literature have commented on the characteristics of a proper measure. Neely et al. (2000, 1997) have gathered an almost complete set of these characteristics in two papers. This set can be used as a checklist in order to review the individual measures. Neely et al. (1996, 1997) presented the performance measure profile which includes the criteria that must be defined for each performance measure. These criteria and some characteristics have been summarized in the Performance Prism book. Table 1 shows these criteria.

"Take in Table 1"

The point is that the act of defining the measure and particularly defining the metric and the formula for calculating it, is crucial because the way you structure the measure affects the behavior of individuals within the organization. Neely et al. (2002) have also designed ten tests (presented in Table 2), which can be used in order to assess the individual measures' appropriateness in different units of the organization.

"Take in Table 2"

Reviewing the individual measures by using the mentioned tools (performance measure profile and relevance tests) seems to be a complicated process that is suggested to be carried out by an expert team (PM team) who have the relevant knowledge and experience in the field of performance measurement and also are familiar with the organization and its goals (Niven, 2002). Many researchers have emphasized the role of a supportive high level manager in developing PMS successfully (Chan, 2004, Kaplan and Norton, 1993, Kaplan and

Norton, 1996, Neely et al., 2002, Niven, 2002), thus convincing a high level manager to be a part of the PM team is recommended. Niven (2002) suggests that there is also a need to have an "organizational change expert" promote the PM team members' knowledge about organizational change and cooperate to find solutions about the change related risks. According to Bitici et al. (2006), the PM team should consider the PMS effects on the employees' behavior, therefore an organizational behavior consultant can help the team investigate the behavioral and cultural consequences of the PM actions. By holding regular meetings, the PM team can carry out the process of reviewing individual measures using the above-mentioned skills.

The second part of the "Design Review Process" is related to reviewing a set of measures. A set of measures can be defined as a group of related measures, which make a performance facet (a performance prism facet) or are related to a particular strategy or strategic assumption. A change in a set of measures might make the organization carry out the whole design phase again and review all measures and relationships (including success maps).

Reviewing a set of measures is necessary only when some particular organizational factors change. In other words, reviewing a set of measures is an event-based process and does not need to be carried out regularly. Event-based review has already been considered in the PM literature by some researchers. Kueng et al. (2001) suggest that the PMS of the organization be reviewed when the triggers presented below are hit:

- the business strategy is modified
- stakeholders state new requirement
- implemented performance indicator is not useful
- new operational IT system is put in place
- new IT opportunity emerge

Conceptually, six triggers can be proposed for reviewing a set of measures in the Prism framework. Four of them are related to the facets of Prism which according to Neely et al. (2002) occurring any kind of change in them is a signal that reveals the need for reviewing different sets of measures and possibly modifying them. The last two triggers help managers check whether their strategies and strategic assumptions are leading organization towards success or not.

1. *New stakeholder's need.* In order to be successful, organizations need to pay great attention to their environment and especially different stakeholders in it. Any organization's survival depends on meeting its

stakeholder's needs. Today, stakeholders are more powerful entities that can have a great impact on organizations' activities and the way they achieve their goals. Furthermore, the stakeholders' expectations are increasingly changing and becoming more ambitious; therefore in order to stay in line with stakeholders' needs, organizations should review these needs regularly and define the suitable measures in case of newly arising needs. For example, prior to environmental pollution becoming an issue, the major expectation of governments from companies was paying the taxes, but nowadays, "being green" has become one of the important issues that is required by governments. Thus environmental concerns have to be considered as a new set of measures and the PMS has to be adapted for the new need.

2. *New strategy.* In order to satisfy the stakeholders, organizations need strategic plans. Because of the increasing rate of change in business environments, organizations have to deploy plans with shorter time-spans and this has led to the increase of the frequency of strategy amendments. The organization's measures indicate the issues which everyone focus on and are important to the management, therefore when the strategy changes, the related measures should be reviewed and modified (if necessary), otherwise the organization will get on a wrong track with an unknown destination. For example, when a company decides to change its current strategy of "cost reduction" to "customer service improvement", it should consider the contradictions between these two strategies. Improving customer service level can increase the costs especially in sales and after sales departments. So in order to implement the new strategy, the company has to modify the PMS and put the new customer related set of measures in a higher priority, otherwise the previous cost related measures would keep the employees and managers in the old cost cutting pattern.

3. *New process or operational system.* As previously said, processes are the organization's tools for meeting the stakeholders' needs. Any change in current processes, development of a new process or deployment of a new operational system (due to emerging new technologies, outsourcing, process reengineering and so on) should be reflected on the organization's PMS. Therefore, when a process changes, the sets of measures related to it should be reviewed. For example, in the past, Ford company had a reputation for having a huge and pervasive supply chain and being in charge of meeting all of its production and service requirements; from supplying the raw materials to after sales services. In accordance with this complex chain, the company used various sets of measures in different parts. Gradually, Ford outsourced the supply related processes and replaced them with supplier management process (Bowersox et al., 2000). Consequently, the

company had to modify the related measures and make them relevant with the new process of supplier management.

4. *New opportunity or capability.* In order to implement the strategies in an effective and efficient way, organizations require specified enablers. A part of these enablers is related to internal factors, such as employees' skills, financial sources, brand, etc. These can be affected by management decisions and can be referred to as "capabilities". The other part is related to external factors and stakeholders of the organization which can be referred to as "opportunities" such as natural resources availability, low tax rate, suitable tariff regulations, etc. This part involves stakeholders contribution and other enablers over which the organization and its stakeholders have the least control. Any change in these enablers affects the way an organization carries out its processes, therefore reviewing the PMS is necessary when these factors change.

5. *Invalid Strategic Assumption.* According to Bourne et al. (2000), one of the uses of performance measures is challenging the strategic assumptions. Strategic assumptions are defined as the supposed links that connect the results of the operational level (processes and capabilities related measures) to strategic objectives and indicators. For example, a company assumes that decreasing the dedicated resources in each department (operational level), could lead to cost reduction as one of its strategic objectives. The measures and the relation between them are generally defined on the basis of these assumptions; therefore once management recognizes the invalidity of some assumptions, the set of measures based on those should be reviewed and modified as well as the assumptions themselves. In order to examine the validity of strategic assumptions, a method is proposed in the following.

A strategic assumption is considered valid, if it can lead the organization to the related strategic objective. In the above example, based on the mentioned strategic assumption, the management starts to rededicate resources to the different parts of the company, including raw material warehouse. This leads to the decrease of service level, responsiveness and reliability of the warehouse and consequently the increase in the amount of missed products. As a result, despite the headquarters' assumption, "the increased missed products costs" may exceed "the reduced resources costs" and the overall costs of the company may increase in long run. In other words, a positive long-term trend in the operational level measures (dedicated resources) does not lead to a positive long-term trend in strategic level measures (overall costs) and this shows the invalidity of the strategic assumption.

The above example clearly states that the paradox between the organization performance in operational level (measures that are directly related to a particular strategy, in this case "dedicated resources") and strategic level (measures of being in line with that strategy, in this case "overall costs") is one of the main indicators of "invalid strategic assumption". Changing a strategic assumption may indicate that the organization needs new processes or capabilities in order to achieve the related strategic objective. Developing new processes or capabilities should be reflected on the PMS by defining relevant measures.

6. *Invalid strategy*. Organizations define strategies to satisfy their stakeholders. These strategies may not lead them to the desired goals, because sometimes it's difficult to predict the stakeholders' behavior. As an example, after conducting a customer survey, a manufacturing company found out that "price" is an important factor to its customers and decided to decrease the prices of the products as its marketing strategy to satisfy customers. After pursuing this strategy for a while, managers encountered a surprising decrease in total sales and customer satisfaction. Further investigations showed that the reason of the missed sales was a change in customers' perceptions of products' value and quality. In other words, decreasing the price led to products discredit. During this period, the measures of the strategic level indicated desired results (the prices had been decreased according to plan) but the satisfaction measures showed critical decline. Therefore it can be perceived that the strategy of "price reduction" did not lead to customers satisfaction which was its final goal.

The above example clarifies that the paradox between stakeholders satisfaction and the related strategies' measures is a signal of invalid strategy. This contradiction between satisfaction and strategic level can be considered as a trigger for strategy modification and consequently the related set of measures review.

#### *PMS Implementation review Section*

According to Bourne et al. (2000), implementation is defined as the process of data collection, collation, sorting and distribution. Conducting the process properly requires appropriate supporting infrastructure. It can be perceived from Kennerley and Neely's work (2003) that the main elements of this infrastructure are people, process, system and culture. Therefore in order to review the implementation phase, organizations should assess these elements.

Reviewing the implementation process provides the organization with two types of information. The first type is related to the "deficiencies" in the process. The problems of the system will not be revealed until it is used

in practice. Implementing the system, managers can realize the contradictions between what is designed and organization's abilities to perform it, thus the process of implementation should be reviewed periodically in order to discover its difficulties. In this case, there are two alternatives; the first one is to amend the implementation process and the second one is to modify the PMS design in order to make it conform with current infrastructure. Cost-benefit analysis can help the organization choose the suitable alternative between modifying design or implementation phase.

The second type of information is related to the "improvement opportunities" that indicate the areas in which organizations can improve their implementation performance. The ability of organizations to implement the designed PMS can be promoted. By changing the supporting infrastructure's elements (such as improvement in organizational culture, employees' skills, organizational learning, information systems or databases) organizations might become able to measure performance in areas which could not be measured before. Therefore the infrastructure should be monitored continuously to provide feedbacks for PMS design and the design should be modified according to the feedbacks of implementation review, if necessary. Of course there may be some improvement opportunities which are ignored by the organization because of their costs or difficulties. Infrastructure improvement opportunities and deficiencies are discussed in the following:

- ✓ *Process.* The method of data collection, turning them into information and reporting to related persons should be assessed repeatedly. The process improvement opportunities can include conducting the process more quickly and effectively and less costly, finding new data sources and new methods of reporting. Some symptoms of deficiency in implementation are as follows; a report is no longer handy for a manager, process of data collection and reporting is costly and time-consuming, and the selected measuring process does not suit the related measure. In such cases, the organization can either review the design of the measures or deploy an appropriate and less costly process for measuring, collating and/or reporting, regarding the cost-benefit analysis.
- ✓ *People.* Dedicating human resources with required skills to the implementation process is essential to the PMS success. Availability of appropriate skills to "use measures effectively" and "quantify performance objectives" can affect the performance of the measurement system. The lack of qualified human resources in organization can either lead the decision makers to review the PMS design or develop the required skills through training the employees and/or recruitment.

- ✓ *System.* Appropriate information systems and databases can facilitate the implementation process. Many researches have discussed the contribution of information technology to support PM (Kueng et al., 2001, Bititci et al., 1997, Sharma and Bhagwat, 2006, Marchand and Raymond, 2008). Production of various PM software packages, development of information systems and PM solutions and improvement of communication provide numerous opportunities for every organization to improve its data collection, analysis and reporting system. Therefore organizations should consider the opportunities constantly and use the ones which are beneficial regarding the cost-benefit analysis. During the implementation, organizations may also realize that the system-related abilities required for measuring or reporting some measures, do not exist. In this case, the organization should decide whether to improve the system or review the PMS design.
- ✓ *Culture.* Implementing PMS demands for a specific organizational culture. Culture is the behavioral outcome of repeated interactions in which individuals develop beliefs and strategies based on the incentive structure of social life (Aoki, 2001). Indeed, cultures are remarkably resilient and notoriously difficult to change (Parsons, 2007) but through some external shock. Cultural transition may result from any number of environmental changes – e.g. changes in technology, law, outside markets opportunities, or complimentary institutions. In order to transit to a new culture, the environmental changes mentioned above must be sufficient to overcome the inertia of established cultural norms and produce a crisis of shared beliefs (Williams, 2007). Since culture is not easily adjustable, thus it is better to modify the PMS design to be in harmony with the organizational culture.

### **Putting it all together**

Different parts of a framework which is developed to review both performance of the organization and its PMS which is based on Performance Pism are presented above. This framework includes different levels of categorization as presented in Figure 4.

Take in Figure 4

In the first level, the review process is divided into two categories; Business Performance Review (BPRw) and Performance Measurement System Review (PMSR).

The BPRw category deals with evaluating the status of organization's Prism aspects in particular time periods and is subcategorized into three levels based on frequency. At the first level which includes stakeholders satisfaction and contribution, measurements have the lowest frequency because of the measures' slow rate of change and the high costs of assessment at this level. Strategies fall into the second level. Strategic indicators should be measured more often than the first level. Finally, processes and capabilities are placed in the last level which needs ongoing measurement. Periodic performance reports for related managers and employees are among the main outputs of processes under this category. Furthermore, analyzing the results in management meetings can lead to developing action plans to improve performance.

The PMSR helps organizations evaluate their PMS design (including Prism's facets, measures, and their relations as mapped in success map) and implementation, using different tools. In the design review section, firstly, reviewing each individual measure periodically using tools such as "Measures' Profile" and "10 Relevance Tests" is recommended. Secondly, the organization should pay attention to the six triggers which reveal the need to review sets of measures related to Prism's facets, strategies, and strategic assumptions. Four of the triggers are defined as changes occurring in Prism's facets; stakeholders need, strategy, process or operational system, and capability and stakeholders contribution. The other two triggers, which are considered as the links between BPRw and PMSR, are the invalidity of strategic assumptions and strategies.

A valid strategic assumption can help an organization achieve its related strategic objectives by determining a success map between operational level and strategic level. In order to detect an invalid strategic assumption, an organization needs to monitor the trends of operational level and strategic level measures constantly. Observing a desirable result in operational level and an undesirable result in the related strategy's measures in long run is an indicator of the invalidity of the strategic assumption. In a similar way, having negative results in operational level while having positive results in the related strategic measures can lead the organization to the same result; invalid strategic assumption. These invalid assumptions need to be reviewed and substituted by valid ones through immediate management meetings and the new assumptions should be considered in the PMSR design phase.

The last trigger – invalid strategy – can be spotted the same way as the previous one with a small difference. The organization needs to monitor the trends of the measures of stakeholder satisfaction level and the strategies which are supposed to help the organization meet those stakeholders needs. Any inconsistencies

between the trend of the results in these two levels is a signal of invalid strategies which should be addressed in an immediate management meeting. Any modification in strategies should be reflected in the PMSR design phase. The last two triggers could be considered as the link from BPRw to PMSR. Figure 5 summarizes the feedback processes between BPRw and PMSR.

"Take in Figure 5"

Reviewing individual measures could lead to defining new measures while reviewing sets of measures could challenge strategies or strategic assumptions or result in changing an aspect of Performance Prism and consequently modifying a related set of measures.

On the other hand, the PMS should be evaluated from the implementation point of view. Process, people, culture and system are the four perspectives from which this review can be carried out. The results of this periodic review can lead to either changing implementation or PMS design regarding cost-benefit analysis. The summary of above issues is presented in Table 3.

"Take in Table 3"

Figure 6 shows a schematic view of the framework as a whole.

"Take in Figure 6"

## **Discussion and Conclusion**

As one of the most credited performance measurement frameworks, Performance Prism suffers from the lack of a comprehensive and exclusive review framework that maintains the relevancy, efficiency and effectiveness of the measurement system, which takes Prism's unique characteristics into consideration. The primary focus of this paper is the development of a conceptual framework that can be used to review the performance measurement systems that are based on Performance Prism. The proposed framework is based on recommendations made in the literature and needs to be tested through a series of action research studies. The framework categorizes the review process based on findings in the literature. The categorization is one of the main contributions of this paper. It provides, firstly, the possibility to utilize different approaches, tools, processes and frequencies in implementing each review section, and secondly, the opportunity to bring up the shortcomings of the literature regarding the implementation phase and the process of eliminating or adding a new measure.

The framework comprises two sections: Business Performance Review (BPRw) and Performance Measurement System Review (PMSR).

In BPRw, organizations can assess their current performance status in all Prism aspects through a feedback loop in three levels. The idea of reviewing performance of the organization with measures in levels with different measurement frequencies is recommended in the literature but yet again the categorization of the proposed framework (1- stakeholder satisfaction and contribution, 2- strategies, 3- processes and capabilities) is based on reasoning and needs empirical evidence.

In PMSR, an organization can evaluate the design and implementation of its PMS. As suggested by the framework, an organization should review the design of its PMS in two different ways; periodic (for reviewing individual measures) and event-based (for reviewing sets of measures) which covers maintaining the relevance and comprehensiveness of measures as well as challenging strategies and strategic assumptions. Challenging a strategic assumption or a strategy is a risky and resource-consuming process, so the framework proposes a new method, which determines (based on the existence of a contradiction between the organization's performance trends in stakeholders level, strategic level and operational level) whether or not the situation absolutely calls for an immediate challenge of a strategy or strategic assumption. This method is another main contribution of this paper that also establishes the link from BPRw to PMSR.

In the implementation review section, the organization deals with infrastructure in order to use the developed PMS. This review leads to the detection of the problems the system encounters during the implementation phase and also could indicate the areas in which organizations can improve their implementation. By changing the supporting infrastructure's elements (such as improving organizational culture, employees' skills, organizational learning, or information system) organizations may become able to measure performance in areas which could not be measured before. There are two alternatives; first to amend the implementation process, and second to modify the PMS design in order to make it conform with current infrastructure. Using cost-benefit analysis in making this decision is suggested.

Modifying the design of the PMS is a challenging and complex process. Whether the modification includes adding a new measure or a set of measures, or eliminating an obsolete measure or a set of measures, many factors need to be taken into consideration. Some of these factors are as follows; the level to which the measure belongs (stakeholder satisfaction and contribution, strategies, processes and capabilities), the

necessary instructions for the people involved in calculating and analyzing the measure, organizational culture (the level of resistance against change), the infrastructure required for the new measure, and the managers who receive the reports related to the measure. One of the main attributes of the PMS design modification process which should be determined by taking the above factors into account is the pace of the change (whether the process should be carried out gradually or instantly). Research into these issues and how they can be addressed is much needed.

Overall, the framework puts together all the main aspects of necessary reviews found through extensive literature review and adapts them to be in harmony with the unique characteristics of Performance Prism.

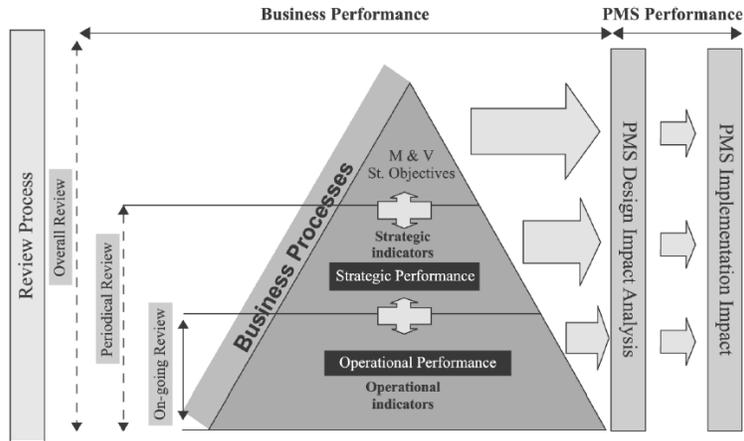
Finally, an evaluation of the research activities related to the field of PMS review reveals that the focus was intensively on measures themselves, which can be considered as a part of design review. Reviewing other aspects such as data gathering, processing, and the backbone for it (which are considered as the implementation elements) is not addressed substantially. Based on these observations, it is obvious that there is still a need for further research in order to develop a much more comprehensive review framework.

## References

- ADAMS, C. & NEELY, A. (2000) The performance prism to boost M&A success. *Measuring Business Excellence*, 4, 19-23.
- ANDERSEN, H., COBBOLD, I. & LAWRIE, G. (2001) Balanced scorecard implementation in SMEs- reflection in literature and practice. SMESME Conference. Copenhagen, Denmark.
- AOKI, M. (2001) *Toward a Comparative Institutional Analysis*, Cambridge, MA., MIT Press.
- AZZONE, G., MASELLA, C. & BERTELE, U. (1991) Design of performance measures for time based companies. *International Journal of Operations & Production Management*, 11, 77-85.
- BEISCHEL, M. E. & SMITH, K. R. (1991) Linking the shop floor to the top floor : Here's a framework for measuring manufacturing performance. *management Accounting (US)*, October, 9-25.
- BESSIRE, D. & BAKER, R. (2005) The French Tableau de bord and the american Balanced Scorecard-a critical analysis. *Critical Perspectives on Accounting*, 16, 645-664.
- BITITCI, U. S., CARRIE, S. A. & MCDEVITT, L. (1997) Integrated performance measurement system-a development guide. *International Journal of Operations & Production Management*, 17, 522-534.
- BITITCI, U. S., MENDIBIL, K., NUDURUPATI, S., GARENGO, P. & TURNER, T. (2006) Dynamics of performance measurement and organisational culture. *International Journal of Operations & Production Management*, 26, 1325-1350.
- BOURNE, M., MILLS, J. F., WILCOX, M., NEELY, A. & PLATTS, K. W. (2000) Designing, implementing & updating performance measurement system. *International Journal of Operations & Production Management*, 20, 754-771.
- BOWERSOX, D. J., CLOSS, D. J. & STANK, T. P. (2000) Ten mega-trends that will revolutionize supply chain logistics. *Journal of Business Logistics*, 21.
- BRADLEY, P. (1996) *A performance measurement approach to the reengineering of manufacturing enterprises*. CIMRU. Ireland, NUI Galway.
- BRODLIE, K. (2002) *Data Visualization*. University of Leeds.
- BROWN, M. (1996) *Keeping Score-Using the Right Metrics to Drive World Class Performance*, New York, NY., Quality Resources.

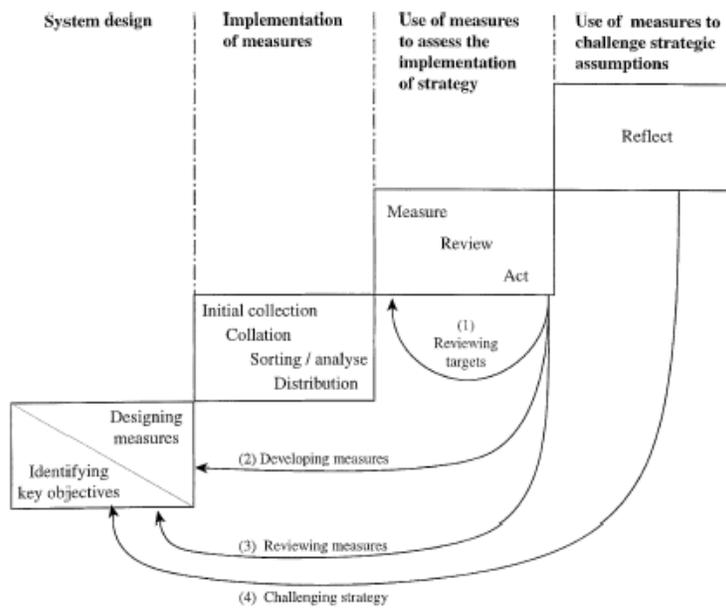
- CHAN, Y.-C. L. (2004) Performance measurement and adaptation of balanced scorecard-a survey of municipal governments in the USA and Canada. *International Journal of Public Sector Management*, 17, 204-221.
- CRAWFORD, K. (1988) An analysis of performance measurement systems in selected just in time operations. University of Georgia.
- DIXON, J. R., NANNI, J. & VOLLMANN, T. E. (1990) *The New Performance Measurement Challenge-Measuring Operation for World Class Competition*, Homewood, IL., Irwin.
- DOUMEINGTS, G. & DUCQ, Y. ECOGRAI-A method to design and to implement performances indicators systems for industrial organizations-Concepts & application to the maintenance function. Université de Bordeaux-Talence cedex-FRANCE, Laboratoire d'Automatique et de Productique (LAP).
- EFQM (1999) *Assessing for Excellence-A Practical Guide for Self Assessment*, Brussels, EFQM.
- FISHER, J. (1992) Use of non-financial performance measures. *Journal of Cost Management*, 6, 31-38.
- FITZGERALD, L., JOHNSTON, R., BRIGNALL, T. J., SILVESTRO, R. & VOSS, C. (1991) *Performance Measurement in Service Businesses*, London, CIMA.
- FOLAN, P. & BROWNE, J. (2005) A review of performance measurement towards performance management. *Computers in Industry*, 56, 663-680.
- FRIGO, M. L. & KRUMWIEDE, K. R. (1999) Balanced scorecard-a rising trend in strategic performance measurement. *Journal of Strategic Performance Measurement*, 3, 42-44.
- GHALAYINI, A. M. & NOBLE, J. S. (1996) The changing basis of performance measurement. *International Journal of Operations & Production Management*, 16, 63-80.
- GLOBERSON, S. (1985) Issues in developing a performance criteria system for an organization. *International Journal of Production Research*, 23, 639-646.
- KAPLAN, R. S. & NORTON, D. P. (1992) The balanced scorcard-measures that drive performance. *Harvard Business Review*, 70, 9-71.
- KAPLAN, R. S. & NORTON, D. P. (1993) Putting the balanced scorcard to work. *Harvard Business Review*, 71, 134-147.
- KAPLAN, R. S. & NORTON, D. P. (1996) Using the balanced scorcard as a strategic management system. *Harvard Business Review*, 74, 75-85.
- KAPLAN, R. S. & NORTON, D. P. (2004) *Strategy Maps-Converting Intangible Assets into Tangible Outcomes*, Boston, MA., Harvard Business School Press.
- KAYDOS, W. (1991) *Measuring, Managing & Maximizing Performance*, Cambridge, MA., Productivity Press.
- KEEGAN, D., EILER, R. & JONES, C. (1989) Are your performance measures obsolete? *Management Accounting*, 70, 45-50.
- KENNERLEY, M. & NEELY, A. (2002) *Performance measurement frameworks-a review*. Business Performance Measurement-Theory & Practice. Cambridge, Cambridge University Press.
- KENNERLEY, M. & NEELY, A. (2003) Measuring performance in a changing business environment. *International Journal of Operations & Production Management*, 23, 213-229.
- KUENG, P., MEIER, A. & WETTSREIN, T. (2001) Performance measurement systems must be engineered. *Communication of the AIS*, 7, Article 3.
- LYNCH, R. L. & CROSS, K. F. (1991a) *Measure Up-The Essential Guide to Measuring Business Performance*, London, Mandarin.
- LYNCH, R. L. & CROSS, K. F. (1991b) *Measure Up! How to Measure Corporate Performance*, Boston, MA., Blackwell Publishers Inc.
- LYNCH, R. L. & CROSS, K. F. (Eds.) (1995) *Measure Up! Yardsticks for Continuous Improvement*, Oxford, Blackwell.
- MALTZ, A. C., SHENHAR, A. J. & REILLY, R. R. (2003) Beyond BSC : Refining the search for organizaional success measures. *Long Range Planning*, 36, 187-204.
- MARCHAND, M. & RAYMOND, L. (2008) Researching performance measurement systems-An information systems perspective. *International Journal of Operations & Production Management*, 28, 663-686.
- MARR, B. & SCHIUMA, G. (2003) Business performance measurement-past, present & future. *Management Decision*, 41, 680-687.
- MEDORI, D. & STEEPLE, D. (2000) A framework for uditing & enhancing performance measurement systems. *International Journal of Operations & Production Management*, 20, 520-533.
- MEYER, M. W. & GUPTA, V. (1994) *The Performance Paradox*. IN STRAW, B. M. & CUMMINGS, L. L. (Eds.) *Research in Organizational Behaviour*. Greenwich, CT., JAI Press.

- NAJMI, M., RIGAS, J. & FAN, I.-S. (2005) A framework to review performance measurement systems. *Business Process Management Journal*, 11, 109-122.
- NEELY, A. (1998) *Measuring Business Performance-Why, What and How*, London, UK, Economist.
- NEELY, A., ADAMS, C. & Crowe, P. (2001) The Performance Prism in Practice, *Measuring Business Excellenc*, 5, 2, 6-12.
- NEELY, A., ADAMS, C. & KENNERLEY, M. (2002) *The Performance Prism: The Scorecard for Measuring and Managing Business Success*, London, Financial Times/Prentice Hall.
- NEELY, A., MILLS, J. F., GREGORY, M. J., RICHARDS, A. H., PLATTS, K. W. & BOURNE, M. C. S. (1996) *Getting Measure of Your Business*, London, Findlay.
- NEELY, A., MILLS, J. F., PLATTS, K. W., RICHARDS, A. H., GREGORY, M. J., BOURNE, M. & KENNERLEY, M. (2000) Performance measurement system design, developing & testing a process based approach. *International Journal of Operations & Production Management*, 20, 1119-1145.
- NEELY, A., RICHARDS, A. H., PLATTS, K. W., MILLS, J. F. & BOURNE, M. C. S. (1997) Designing performance measures-A structured approach. *International Journal of Operations & Production Management*, 17, 1131-1153.
- NIVEN, P. R. (2002) *Balanced scorecard step by step: maximizing performance and maintaining results*, John Wiley and Sons.
- PARASURAMAN, A., ZEITHMAL, V. A. & BERRY, L. L. (1988) SERVQUAL : A multiple item scale for measuring customer perceptions of service quality. *Journal of Retailing*, 64, 12-40.
- PARSONS, J. (2007) Measuring to learn whilst learning to measure. *Measuring Business Excellence*, 11, 12-19.
- ROUSE, P. & PUTTERILL, M. (2003) An integral framework for performance measurement. *Management Decision*, 41, 791-805.
- SHARMA, M. K. & BHAGWAT, R. (2006) Performance measurements in the implementaion of information system in small and medium sized enterprises-a framework and empirical analysis. *Measuring Business Excellence*, 10, 8-21.
- SINK, D. S. & TUTTLE, T. C. (1989) *Planning and Measurement in Your Organization of the Future*, Norcross, GA., Industrial Engineering and Management Press.
- SMITH, M. & DIKOLLI, S. (1991) The demystification of the acronym in management accounting. *Accounting Forum*, 15, 97-114.
- TANGEN, S. (2004) Performance measurement-from philosophy to practice. *International Journal of Productivity & Performance Management*, 53, 726-737.
- WILLIAMS, L. K. (2007) How culture evolves-an institutional analysis. *International Journal of Social Economics*, 34, 249-267.
- WINSER, J. D. & FAWCETT, S. E. (1991) Link firm strategy to operating decisions through performance measurement. *Production & Inventory Management Journal*, 3rd quarter, 5-11.



Source : Najmi et al., 2005

Figure 1 – PMS review framework



Source : Bourne et al. 2000

Figure 2 – Phases in developing a performance measurement system



Figure 3 - BPRw loop

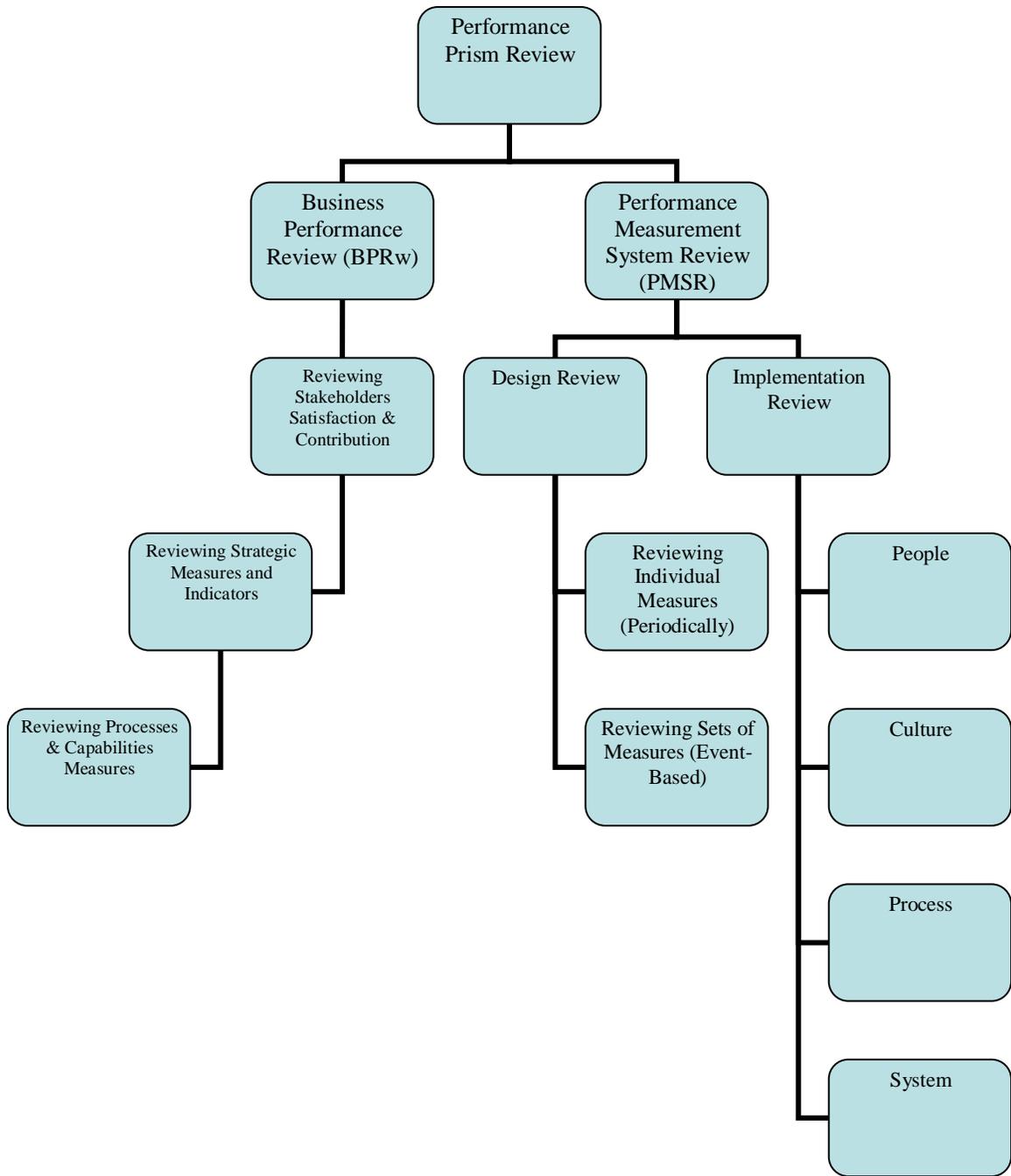


Figure 4 – Levels of categorization

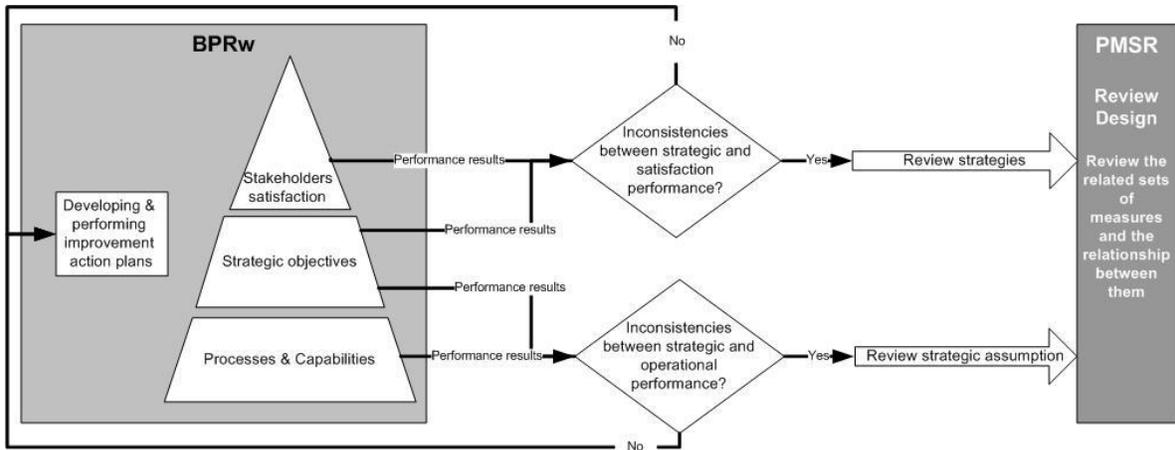


Figure 5 - Link between the BPRw and PMSR

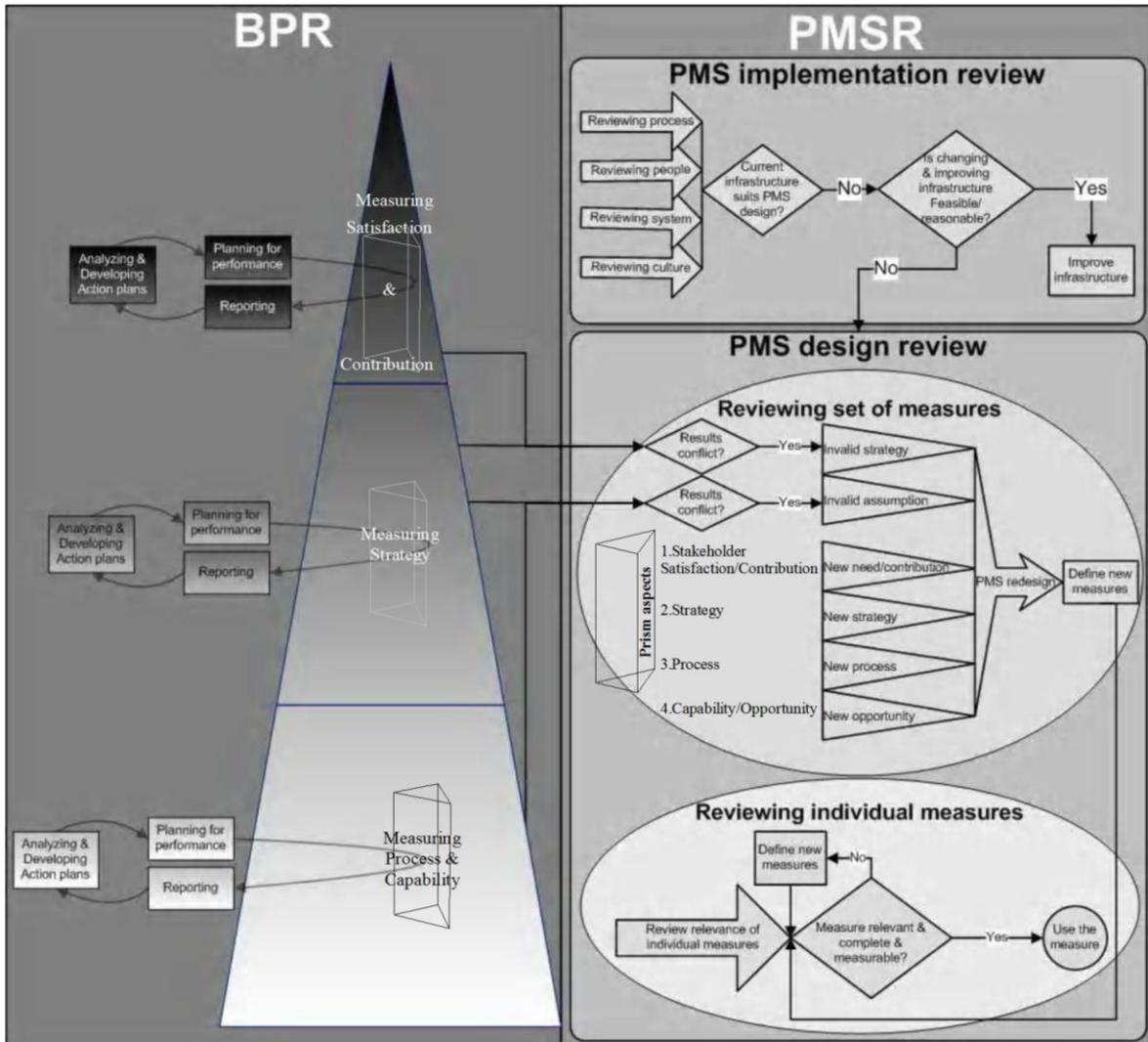


Figure 6 – Schematic view of the framework

Table 1 - Measure's profile (Neely et al., 2002)

Criteria	Description
Title	Should explain clearly and simply what the measure is so that everyone will understand it and its importance.
Purpose	Should clearly indicate the intention of the measure and the behavioral consequences.
Relates to	Should indicate relations with other measures and strategies or initiatives supported by the measures.
Formula	Should specify mathematical terms to calculate measure based on accurate data and appropriate scale.
Target	Should define desirable level of performance and a time-frame for reaching it. It should be competitive, challenging and realistic.
Frequency	Should be sufficient to track the effect of actions taken to improve.
Source of data	Should be clearly defined in detail.
Who measures	Should be specified by name, function or external agency.
Who acts on the data (owner)	Should determine the one responsible for initiating actions and insuring that performance along this dimension improves.
What do they do	Should reveal measure's applications and action plans for performance improvement.

Table 2 – Ten relevance test (Neely et al., 2002)

Truth test	Is the measure definitely measuring what it's meant to measure?
Focus test	Is the measure only measuring what it's meant to measure?
Relevance test	Is the measure consistent whenever or whoever?
Access test	Can the data be readily communicated and easily understood?
Clarity test	Is any ambiguity possible in interpretation of results?
So what test	Can, and will the data be acted upon?
Timeliness test	Can the data be analyzed soon enough so that action can be taken?
Cost test	Is it worth the cost of collecting and analyzing the data?
Gaming test	Does the measure encourage any undesirable behavior?
Consistency test	Is the organization definitely measuring the right thing?

Table 3 - Framework's sections

		Tools/Methods	Results	Type of review
<b>BPR<sub>w</sub></b>	Stakeholder satisfaction/contribution	Business Performance Management Solutions	Reporting performance, Developing action plans	Periodic
	Strategy			
	Process and capability			

<b>PMSR</b>	Design review	Reviewing individual measures	10 relevance tests, Measures' profile	Defining new measures	Periodic
		Reviewing sets of measures	Validating strategies, Validating strategic assumption, Monitoring Prism aspects	Challenging strategies, Challenging strategic assumptions, Defining new sets of measures	Event-based
	Implementation review	Process	Cost/Benefit analysis	Redesigning PMS and/or Modifying implementation	Periodic
		People			
		System			
		Culture			