QUALITY MANAGEMENT IN PROCUREMENT AND MANAGEMENT OF MATERIAL RESOURCES

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ABSTRACT

Due to a dynamic and competitive environment, in which prices are subject to ever-increasing pressure, quality becomes a determining factor in the competitive struggle.

Among the key processes of the quality management system, the process of procurement and management of material resources directly affects the quality of the final products, and therefore the performance of the organization. An efficient process of procurement and management of material resources based on good relationships with the suppliers will help increase the effectiveness and efficiency of the organization and achieving lasting success by meeting the expectations of all stakeholders.

KEYWORDS: Quality management, process of procurement and management of material resources, suppliers, reciprocal relationships

JEL CLASSIFICATION: M10

1. INTRODUCTION

At a time when prices are subject to ever-increasing pressure, the competitive struggle moves from price competition towards quality, this becoming a competitive factor in the competitive struggle. To meet the increasing demands of the customers, the organizations focus their efforts and management strategies to meet these needs through continuous improvement of their products and processes. We are thus witnessing the enrichment of the quality concept, which acquires an integrative dimension throughout the entire organization.

In this context, we believe that the process of procurement and management of material resources play a crucial role in ensuring quality, because the quality of the materials supplied determines the quality of final products. In accordance with ISO 9001: 2008, keeping under control the process of procurement the management of material resource is a mandatory requirement.

2. QUALITY MANAGEMENT IN PROCUREMENT AND IN THE MANAGEMENT OF MATERIAL RESOURCES

According to ISO 9000, and ISO 9000: 2005, ISO 9001: 2008, ISO 9004: 2009 standards, an organization can achieve sustainable success by implementing a quality management system designed to continuously improve performance, taking into account the most important

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expectations, those of the customers, shareholders, suppliers and those of the community. Part of the organization's management system, the quality management system aims at streamlining the organization's processes, adding value, lowering costs and increasing adaptability to the needs of the customer.

Lately there has been a growing concern for the quality of the processes. The set of ISO 9000 standards support the model of a quality management system based on processes and their management in a systemic vision to increase efficiency and effectiveness in achieving the objectives of the organization.

The project of the international standard ISO/CD 9001:2013 (the new edition of the ISO 9001 standard that will be published by the end of 2015) further strengthens the process-oriented approach, as the integrated management of processes is deemed the future in management.

Among the key processes of the quality management system, the process of procurement and management of material resources has a direct and decisive influence on product quality because the properties of the resources acquired are mostly traceable in the values of the main quality features of the final product. The control of the process of procurement and management of material resources is a mandatory requirement of ISO 9001: 2008 standard (according requirement 7.4.1).

In a quality management-oriented approach, we can define the **processes of procurement and management of material resources as a set of interdependent, logically linked and value-added sub-processes, which takes place within the organization in order to ensure and manage the elements necessary to conduct business in an efficient and effective manner.**

The following elements play an important role in the efficient execution of the process of procurement and management material resources: a clear definition of the purpose of the process, determining how to achieve each activity within each specific sub-process (issuing procedures) and identifying and assessing the benefit in the established activities.

From a systemic approach, the procurement process should ensure a balance between the needs and the material resources available so that the organization can operate effectively and efficiently (Deac, 2013). For this, the procurement and the management of material resources must satisfy the following conditions:

- ensure all material resources according to specified supply requirements
- purchase the material resources in the necessary quantities and at the right time
- purchasing costs to be at a minimum level.

Thus, we can say that to achieve a competitive advantage, the process of procurement and management of material resources must be carried out in accordance with the principles of the total quality concept: providing the products that are required, with the required quality, in the desired quantity, at the desired time, and at the lowest price possible.

In order to meet the total quality requirements, the procurement process must be strategically and proactively oriented and must effectively participate in developing the general strategies of the organization. Procurement strategies must be an integral part of the overall strategies of the organization and must harmonize with them.

In order to achieve the specific objectives, sub-processes are identified within the process of procurement and management of material resources and indicators and methods of performance control are established. Thus, the procurement process can integrate the following sub-processes:

1. defining the requirements related to the quality of material resources and issuing the technical specifications;
2. identifying, evaluating and selecting suppliers based on their capability to supply material resources in compliance with organizational requirements;
3. establishing, maintaining, managing and developing relationships with the suppliers;
4. monitoring, measuring and analysing the results in order to monitor the efficiency and efficacy of the process.

2.1. Defining requirements related to the quality of the material resources and issuing the technical specifications

The role of the sub-process of issuing the technical specifications is to determine the level of quality required for the material resources to be supplied. The quality level can be defined by selection of brands or standards or by issuing the technical documentation, in the case of processes with particular characteristics or that have a large influence on the quality characteristics of the finished product - e.g. parts, parts for the automotive industry (Baily et al., 2004).

Requirements on the quality of material resources are defined by specifying the technical parameters, in two ways: by indicating performance parameters or compliance parameters.

Performance parameters involve describing the purpose, functions and performances expected by the client. In this case, the provider is encouraged to provide the product that best meets the specified parameters, being free to choose the detailed technical parameters of the product. The main advantage of this method of specifying the requirements is that the supplier may propose new or improved solutions to meet the needs of the buyer. The method is widely used especially for the acquisition of services, when it is not possible to specify some technical parameters of compliance.

Compliance parameters refer to the detailed definition of the technical parameters of the resources. An example of this is the acquisition of parts to be mounted within an assembly or raw materials whose chemical composition is very important for a process. Due to the complexity of defining the parameters of compliance, the procurement department should collaborate with other subsystems within the organization (common situation especially in manufacturing industries). In this case, the responsibility for drawing up the specialized technical specifications belongs with a specialized subsystem (design, technical). The procurement department holds only commercial duties (innovations on the suppliers' market, existence of alternative materials on the market, the possibility of obtaining resources in the amounts, the terms and at the prices you want).

In defining the technical parameters, it is very important to specify the accurate tolerance intervals and to eliminate any unnecessary requirements. It is a known fact that additional costs arise from both unnecessary requirements (excessive quality) and from missing requirements or elements (poor quality). In this case, an accurate analysis of the value will determine whether it is possible to use cheaper alternative resources, if the tolerances are too tight or if unnecessary requirements are added.

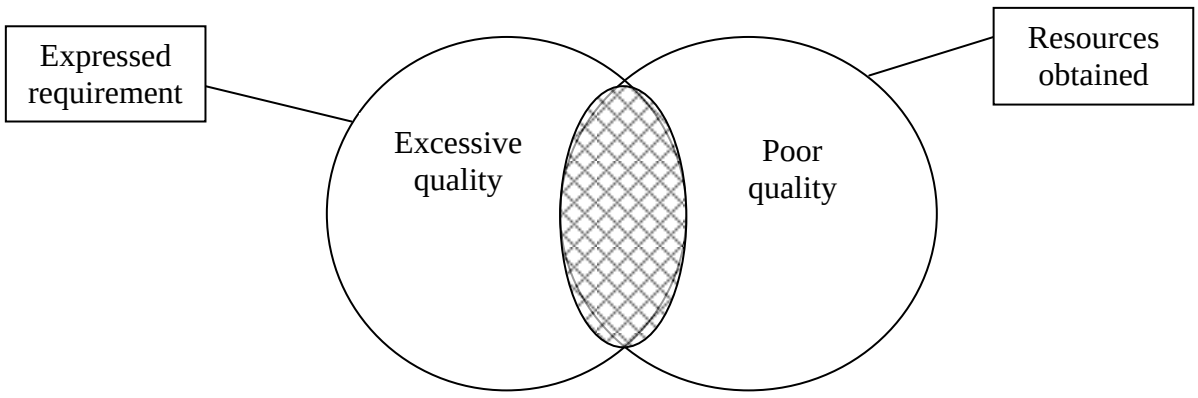

Fig. 2. Relationship between the necessary requirements and the material resources obtained

2.2. Identifying, evaluating and selecting suppliers based on their capability to supply material resources in compliance with organizational requirements

This sub-process aims to monitor compliance of material supplies with the technical specifications and keeping their characteristics within the admitted tolerance.

Due to the competitive environment, higher quality decisions on the choice of supply sources will increase the effectiveness of the procurement process and will implicitly lead to quality assurance.

For best results in defining the supply sources, the research of the suppliers' market must be seen as a natural part of the procurement process. Research of the supply market will ensure identification of current or potential sources and their ability to meet the requirements of the organization, and the investigation of market trends and prospects for long-term supply.

The analysis efforts and the ways of action should be chosen according to the interests of the organization and the position of the supplier in relation to it. Thus, the provider must be categorized from several points of view before it can be appreciated as real. As a preliminary stage of the evaluation-selection efforts, both the suppliers' market and the organization's list of resources must be segmented. Through this segmentation, a gradation of effort, respectively maximum efficiency of the activity of identification, evaluation and selection of suppliers is achieved (Cârstea, 2000).

Identification of suppliers is followed by evaluation and selection. According to ISO 9001: 2008, organizations must find appropriate methods for the evaluation and selection of suppliers based on their ability to provide material resources according to organizational requirements, including the need to define the criteria for reassessment of suppliers.

In the case of existing sources, with whom the organization has ongoing contracts, evaluation will be based on past performance records related to: quality of materials provided, compliance with delivery deadlines, delivery of needed quantities, prices.

In the case of potential suppliers, the organization must assess their capability to meet the specified supply requirements. The type and extent of control depends on the impact of the supplied resources on the finished product. The classification system for evaluating the quality provided by vendors can have three levels.

A first level of investigation involves obtaining information from self-assessment questionnaires, recommendations, or by checking the provider's customer portfolio. The method is applicable when purchasing standardized material resources or products made based on the technical specifications of the beneficiary, but whose quality does not greatly influence the final product quality.

The second level of investigation involves visiting and assessing the provider (second party audit) in terms of its quality competences. Audit is required for parts and subassemblies obtained through complex processes (electronics, microelectronics) whose quality has a direct impact on the quality of final products, where the supplier is responsible both for the design and for the execution of the product. In this case, the following must be checked and assessed: the technical and technological capacity of the provider to achieve the required product, statistical methods used to maintain the quality level through a system of monitoring and adjusting the production process, methods for testing the measurement and monitoring equipment, sources of raw materials and their quality control, and staff qualifications by level of technicality required. At the same time, we can estimate the probability of establishing hassle-free and mutually beneficial relationships with the supplier.

At the last level, independent organizations, registries or certification bodies (third party audit) carry out the qualitative investigation. It is applicable for industries subject to special quality and safety regulations, such as the nuclear, aerospace, energy, automotive, pharmaceutical shipbuilding, and military industries, and for direct suppliers of these industries (e.g. automotive industry).

After the evaluation of potential sources, the organization carries out the selection of suppliers, that is chooses the most effective sources for the procurement process. Suppliers are selected based on their ability to meet the required selection criteria such as quality, delivery time, quantity, price, level of service, timely problem-solving abilities, etc.

Following the example of leading organizations, numerous large organizations have their own supplier accreditation programs, thus imposing a certain quality policy to their suppliers.

For example, in Renault, the selection of suppliers is carried out based on a reference document, like a checklist, adapted to the audited organization, which refers to:

- organization
- overall means of controlling quality throughout the several stages of a product's lifecycle
- logistic system the organization uses for its products: maintenance, packaging, storage, transport.

The Auditor's findings also include the recommendations for improvement (on all three areas of investigation), which are communicated to the supplier. The latter is obliged to submit a written and planned commitment to apply the improvements recommended within two months of receipt of the recommendations.

Based on the audit findings, the providers fall into one of the four compliance levels: A, B, C and D.

According to compliance level A, rated as "suitable", the supplier must meet all 140 of referential criteria in a proportion of 90-100%. This rating certifies the fact that the supplier has the capability to introduce new products into production and is able to implement the quality approach.

Compliance level B (the supplier meets 75-90% of the evaluation criteria) corresponds to the rating "low capacity, which should be improved" and achieving A level is possible within two years, through periodic reassessments. In this case, the supplier can develop new products within minimum one year and the implementation of the quality approach is only possible with support from the company.

If the supplier falls into compliance level C and receives the rating "unsuitable", it means that it cannot develop new products and the quality approach is impossible. Progressing to Level B is possible only based on a short-term improvement plan that must be verified through periodic reassessment every six months.

If the supplier receives compliance level D, it is declared unfit and it cannot be accepted.

Renault's major objective is to accept only those suppliers who have achieved A-level compliance. The rating is updated periodically at interval ranging from every six months to up to every three years, depending on: the level of compliance, the importance of different product categories (particularly those who have direct impact on company requirements), and function of significant changes that have occurred in the organizational structure of the providers.

For the vendor, the evaluation represents a diagnosis followed by recommendations that allow him to progress, and for the buyer it is an important criterion of choosing from a variety of offers (Oprean et al., 2012).

2.3. Establishing, maintaining, managing and developing relationships with the suppliers

Although choosing one of the most efficient suppliers is a reliable source for securing sustainable success, the lack of a strategy in relations with suppliers can lead to a significant reduction of the results. This is the reason why lately the importance of supplier-customer relationship increased and a relationship of mutual satisfaction is obviously required.

Unfortunately, at often times, the organization's relations with its suppliers are characterized by limited trust in which the two partners are dealing from hostile positions and appear to have conflicting targets. Starting from the idea of a large number of suppliers that can be placed in competition, organizations believe that this is an appropriate way to acquire material resources at the lowest possible price. Currently, despite the trend towards strategic procurement and partnership

and cooperation of suppliers in multifunctional teams, many buyers continue to consume a lot of time bargaining with suppliers on price (Kotler, 2008).

While the classical transactional approach is not yet obsolete, organizations must move towards establishing mutually beneficial relationships. Current standards of quality management face a growing expansion of the client-provider relationship as the organization and its partners are interdependent and therefore a mutually beneficial relationship enhances their ability to create value (ISO 9004: 2009).

Through their quality policy, organizations need to establish the principles underlying their relationships with suppliers. They need to collaborate with suppliers to achieve a common goal and improve their products by understanding and assuming responsibility.

However, one single type of relationship does not apply to all providers. In the early 1990s, in the United States, automobile constructors opted for establishing classical relationships with their suppliers, while South Korean carmakers mainly developed partnerships with their suppliers (Calvi, et al., 2003, *apud* Le Moigne, 2013). The first to have established different relationships depending on the characteristics of automotive suppliers were the Japanese carmakers. Thus, the transactional approach can be considered relevant for current, routine supplies, while an orientation towards reciprocity will be advantageous for the procurement of critical products, with a strong impact on the quality of final products.

Large companies are moving towards sizing the relationships with their suppliers. In this sense, they are oriented in the following directions:

- cooperation in designing new products and technologies
- participation in joint research and development programs
- joint management of stocks
- supporting the suppliers' development programs
- information exchange related to processes, products and strategic issues
- sharing profits and risks.

The development of these relationships require changes in behavior and attitude of both partners. The prerequisite of the new relationship is for both partners to reach a common view on how they are going to collaborate.

2.4. Monitoring, measuring and analysing the results in order to monitor the efficiency and efficacy of the process of procurement and management of material resources.

At the organization level, the effectiveness of the quality management system is determined by the effectiveness of its processes.

Due to the strong impact of the process of procurement and management of material resources on compliance with the product requirements, controlling and establishing appropriate monitoring and measurement methods will have an important contribution to further improve the efficiency and effectiveness of the organization. The methods used to monitor, measure and analyze must demonstrate the ability to achieve the planned results and to comply with the organization's strategy. Performance is measured based on key performance indicators that must be established from the phase of designing the procurement process. If, for reasons of feasibility, certain indicators cannot be measured and monitored, criteria will be established (Popa, 2013).

Usually, performance indicators relate to operational activities. However, for the process to be effective, it is necessary that the performance indicators address tactical and strategic issues.

Monitoring, measuring and analyzing the performance of the process of procurement and management of material resources means to assess its efficiency and effectiveness.

The analysis of efficiency of the process of procurement and management of material resources aims to identify the deviations between what was planned and what was achieved, and runs on three directions: quality, costs and planning.

- **Maintaining quality control** takes into account the fact that quality deficiencies lead to additional costs. In this respect, the analysis will be achieved through a systematic evaluation of suppliers in terms of quality.
- **Cost control** takes into account the evolution of the total cost of supply. Monitoring the evolution of the total cost of supply allows to understand better the causes of variation and to perform corrective actions when necessary. The causes of variation are not limited to increasing the selling prices of the material resources but also to other elements in the supply chain such as storage costs, inspections, increased transportation costs, increased price for raw materials, etc.

  Due to the significant share that the costs of supply hold in the turnover of an organization, any action to reduce them will have a huge impact on costs and therefore on profitability. In general, in developed economies, the process of procurement and management of material resources can reduce the cost with an estimated 5-10% (Cârstea, G., 2000).
- **Evaluation of meeting the deadlines** can consider, for example, purchase order processing time, the time required to adopt the corrective actions, suppliers' performance related to deliveries, number of stock-outs, etc.

Efficiency analysis of the process of procurement and management of material resources focuses on the main resources of the organization: management, employees, processes and information systems. Examples include annual number of training hours for procurement department employees, number of key suppliers connected to an electronic system of data exchange, etc.

The systematic evaluation of the performance of suppliers, as part of the performance evaluation of the procurement and management of material resources process, aims to continually improve supplier's capability and to ensure that the material resources provided meet the requirements of the organization.

Key performance indicators should be chosen to realistically reflect the contribution of suppliers to achieving the performances of the procurement process. These must be:

a. **relevant** for the activity requested by the suppliers and fully harmonized with the objectives of the organization
b. **regularly updated** and monitored to provide real-time information with a specific frequency thus allowing corrective measures
c. **reliable**, easily measurable, uninterpretable, to measure progress in real time, to provide an accurate evaluation, especially a qualitative evaluation
d. **objective** – a SMART objective must always be associated with an indicator (Canonne & Petit, 2013).

Evaluation of suppliers' performance can be achieved based both on quantitative and qualitative criteria, quantifiable indicators being the most frequently used. For example, Table 1 presents indicators that can be used to monitor supplier performance.

Table 1. Examples of indicators used to monitor suppliers' performance

Analysis directions	**Indicators**	
	Quantitative	**Qualitative**
1. Quality	- non quality costs - rat of refuse - number of non-conforming products delivered - number of certified suppliers (ISO, specific certifications)	- satisfaction of internal customers - quality of services provided

Analysis directions	Indicators	
	Quantitative	**Qualitative**
2. Cost	- target prices - budget deviations - productivity	- price positioning relative to the market price - adequacy of the price / performance rapport
3. Meeting deadlines/ service	- rate of timely deliveries - rate of satisfying the demand - the time the supplier needs to develop a new product - level of services offered, rate of meeting the demand	- flexibility - adaptability - reactivity
4. Innovation	- research and development progress - recommendations for improvement	- creativity of recommendations and suggestions
5. Management	- adherence to the organization's procurement policy - OHSAS 18001:2007 certification - financial position	- climate and quality of the fostered relations - capability to understand and solve problems of the organization

In addition to monitoring, measuring and analysing the performance of procurement and management of material resources process at an operational level, its strategic efficiency must also be assessed. In this case, the evaluation will focus on analysing the strategic contribution of the process of procurement and management of material resources and its degree of involvement in the foundation of the overall development strategy of the organization.

3. CONCLUSIONS

In an uncertain and highly dynamic environment, long-term survival of the organizations is possible by developing quality products at a competitive level. The best quality on the market can be achieved through continuous improvement of processes and by adding value to activities.

In this context, organizations can turn to the process of procurement and management of material resources as a source for quality improvement, given that it has a decisive role in quality assurance. Thus, management at the highest level of the organization must ensure the design and implementation of effective processes of procurement and management of material resources in order to ensure compliance of materials supplied with specified purchase requirements, to identify, evaluate and select sources supply, and to develop mutually beneficial relationships with suppliers and assess their capability to deliver products that comply with the requirements of the organization.

By means such as planning, controlling and determining appropriate methods for monitoring, measurement and analysis, the process of procurement and management of material resources will have an important contribution to improve further the efficiency and effectiveness of the organization.

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