



# The Role of Process Improvements Tools in Building Relationship between Suppliers and Industrial Clients

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	<b>ABSTRACT</b>
<p>2016 Research Leap/Inovatus Services Ltd. All rights reserved.</p> <p><b>DOI:</b> <a href="https://doi.org/10.18775/jibrm.1849-8558.2015.56.3002">10.18775/jibrm.1849-8558.2015.56.3002</a> <b>URL:</b> <a href="http://dx.doi.org/10.18775/jibrm.1849-8558.2015.56.3002">http://dx.doi.org/10.18775/jibrm.1849-8558.2015.56.3002</a></p>	<p>The purpose of this research paper is to present the role of process improvements tools in building relationships between clients and suppliers on the industrial goods market. Their identification was based on an analysis of the literature, as well as on the results of empirical research conducted by the CATI technique and covered 300 producers that were suppliers for enterprises from the chemical, metal and automotive industry sectors operating in Poland. The results of the conducted research indicate that the main supplier requirements relating to technical quality of products, shortening cycles of process implementation and willingness of the supplier to reduce costs. One could also observe that for many industrial clients, their relationships with suppliers are not just confined to fulfilling rigorous requirements. Increasingly, they recognize that building their competitive advantage also requires building partnerships with suppliers that are manifested in joint projects in the field of effective application of the requirements of tool (like quality, environmental and safety management systems, Toyota Production System or Lean Management concept), which have an impact on the improvement of the products and processes in the supply chain..</p>
<p><b>Keywords:</b> <i>Industrial goods market, Process improvement tools, Supplier requirements, Supply chain management</i></p>	

## 1. Introduction

Building relationships with partners in the B2B sector is largely the result of the evolution from those repeated transactions based only on trust to becoming a primary source of purchase and true partnership. When building relationships with suppliers, enterprises pay particular attention to the following:

Periodic evaluation and monitoring of the indicators of supplier performance,

- Instigating projects related to improving processes and reducing operating costs (by assisting in the implementation of operational improvement tools),
- Conducting both on-line communication and joint research and development with suppliers in order to improve the quality of products and their positive impact on the environment.

Recurring transactions are often transformed into long-term relationships in which mutual relations are governed by contracts. If the parties are satisfied with the implementation of the provisions contained within, then such co-operations can turn into close-partner relationships. These can lead to many mutual benefits, such as improving product quality and service, shortening order fulfillment cycles, purchasing efficiencies, improved communication between the supplier and the recipient or joint research and development. The observation of business

practice shows that many enterprises improving the processes in a supply chain focus on the implementation of quality, environmental and safety management systems which conform to ISO organization standards requirements as well as operational excellence tools, like Toyota Production System, Lean Management and Six Sigma methodologies. Many companies who are clients in the industrial sectors often define to their suppliers individualized requirements through specifications to determine not only issues related to quality assurance, but also organizational performance related to an increase in efficiency (cost reduction) and reducing the negative impact on the environment. By adapting to these requirements, suppliers create a platform for building partnerships with their clients operating in the manufacturing sector, based on the mutual benefits (Lofti, Sahran, Mukhtar, Zadeh, 2013, pp. 471-488).

## 2. Building Relationship in the Supply Chain

Supply Chain Management is a fundamental concept of current economy, which has evolved to enable organizations to improve efficiency and effectiveness in the global and highly competitive environment of the twenty first century. This comprises processes connected with planning, completion and evaluation related to the flow of materials, equipment, information and human resources among organizations to ensure effective and

fast delivery of tangible products and services between the supplier and the customer. Building a competitive advantage in the manufacturing sector is, in particular, subject to the shaping of long-term partner relationships between companies. An individualized, trust-based approach towards the establishment of contacts, interests and possibilities of cooperation allow the negotiation and execution of transactions with parties, guaranteeing their equal standing (called win-win). A positive evaluation of these activities, through which each party can see a number of measurable benefits, is essential in maintaining relationships, and a sign of readiness for further cooperation (Katiyar, Meena, Barua, Tibrewal, Kumar, 2018, pp. 303-316; Neutzling, Land, Seuring, do Nascimento, 2018, pp. 3448-3458). A condition of this is that effective communication, in its form and content, should meet the expectations of each partner. The activities of multinational corporations which introduced the concept of sustainable development are heavily focused on collaboration with their partners in the supply chain (suppliers and customers). Large manufacturing corporations are increasingly offering support through joint ventures, such as deployment projects, operational improvement tools (environmental and safety management systems, Lean Management, Six Sigma, TPS), or developing concepts for new products. Building partnerships with industrial customers and suppliers can bring the supply chain many important benefits such as:

- Shortening the time for new products (thereby reducing associated costs);
- Ensuring business continuity, together with the methodology developed for identification, analysis, and hazard mitigation (associated with the product and the processes implemented in the supply chain);
- Increased flexibility, efficiency and effectiveness of the processes through efficient and rapid communication (aimed at forecasting demand, joint planning of resource use; use of a compatible infrastructure and the use of operational improvement tools like quality management systems / environment / safety, as well as Toyota Production System based on Kaizen philosophy, Lean Management, and Six Sigma);
- Promotion of ethics in economic activities, through the avoidance of corruption, discrimination (using monopolistic practices), the discharge of contracts (including trade secrets), and compliance with regulatory requirements, design and analysis of product lifecycles according to the guidelines contained in ISO 14 040 series standards (Aboelmagd, 2010, pp. 268-317; Su, Dhanorkar, Linderman, 2015, pp. 31-44).

A partnership comprises a process in which the customer and the supplier gradually build strong and extensive social, economic and technical relations. Creating partnerships usually is a result of some kind of evolution, beginning with repeated transactions, based on loyalty to the source of purchase, and related to the positive image of a particular partner. These repeated transactions often transform into long-term connections in

which relations are regulated by agreements. If parties are content to keep to the arrangements set out in the agreements, their cooperation may transform into a close partnership (Wagner, 2011, pp. 277-283), which has the potential to produce many benefits for the partners.

These are: improved quality of products and services, prompter processing of orders, preferential prices, improved communication between the supplier and the recipient (quicker and more complete exchange of information), joint research and development (Quigley, Walls, Demirel, MacCarthy, Parsa, 2018, pp. 932-947). The benefits gained enhance the positive image of the partners in each other's eyes. In certain cases, a partnership between a supplier and a customer may transform into a strategic alliance which is based on the joint achievement of specific long-term goals.

### **3. The Role of Quality and Environmental Management Standards when Cooperating with Suppliers**

Building a partnership with suppliers is dependent on clearly specifying the requirements they must meet and on the efficiency of the tools employed to ensure the fulfilment of the requirements, e.g. audits, supplier evaluation sheets (which are based on an indicator analysis concerning meeting requirements in the area of technical quality, meeting deadlines, price competitiveness and providing services). Significant conditions shaping this partnership are the speed of information exchange and individualization of approach, e.g. by means of offering an ever wider range of services by the supplier and involvement in joint research and development of new products. The most common organizational standard used by companies to ensure the required quality and raise its level in line with the expectations of the buyers are the guidelines contained in ISO 9001. The guidance in this standard includes criteria for the implementation of operational processes (related to product design, purchasing, production, transportation, storage and delivery of goods, on-site installation of equipment and after-sales service). The standardization of these processes is achieved through standard operating procedures (SOP) and/or employee training programs, provision of resources (personnel qualifications, maintenance of facilities, supervised environment), and the use of monitoring and measurement methods which allow the quality level of provided services to be reached and improved (Boonitt, Wong, Wong, 2017, pp. 1-11). The selection of suppliers is usually preceded by an audit, during which clients focus primarily on the evaluation of the capacity of the suppliers. This assessment includes the following elements: infrastructure (buildings, manufacturing equipment), maintenance, and the efficiency of IT equipment. The periodic classification of suppliers is carried out through continuous monitoring and measurement using indicators relating to the quality of the products, dependable supply (free of damage, theft, or shortage), timeliness of delivery (no delays in deliveries), responsiveness to complaints, compliance with delivery documents, and flexibility (the possibility of changes in

the size and timing of deliveries). Periodic client-run surveillance audits at suppliers' plants include more than the verification of compliance with organizational standard requirements. These audits also provide opportunities for process improvement by reducing the level of risk, e.g. the risks associated with the quality of products, improving the environmental impact and the exchange of information (including documents and records). Some international companies require regular reports on the progress made in the improvement of management systems (feedback report cards) from suppliers, which contain data on cost reduction, reduction of non-compliance, improvement of efficiency and effectiveness indicator processes, reduction of energy consumption, a lessening of process cycle times, and optimization of capacity utilization (Zhao, Huo, Sun, Zhao, 2013, pp. 115-131). More and more customers on the B2B market before starting collaboration with suppliers also take into account the introduction of environmental management standards, based on the monitoring of environmental aspects. These standards emphasize the objectives and programs to reduce the impact on the environment, as well as legal compliance in this area. During the audit, suppliers are assessed for compliance with the requirements of international environmental management standards ISO series 14000 and legal requirements for the protection of the environment (in particular, Directives of the European Union (MacDonald, 2005, pp. 631-643; Igarashi, de Boer, Fet, 2013 pp. 247-263; Wiengarten, Pagell, Fynes, 2013, pp. 18-28). Original Equipment Manufacturers commonly also assess suppliers on the basis of their level of management, focusing on the requirements conforming to ISO 9001 and ISO 14001 standards. Many international companies publish their own holistic requirements (in the form of supplier quality requirements manuals, supplier quality and excellence manuals, customer-specific requirements), which are relevant to a wider range than those of international standards. Compliance with these requirements is verified by the client through audits and the self-assessment of suppliers. The criteria which may determine temporary evaluation of a supplier include: the level of the technical quality which is offered, advantageous price conditions, ability to meet delivery deadlines, favourable payment grace, having a quality system, the level of assistance and responding to complaints. Original Equipment Manufacturers also audit suppliers periodically. Some international companies require regular reports on progress made in the improvement of management systems while monitoring suppliers. Monitoring is also regularly conducted by means of performance feedback report cards, which contains data on lowering costs, reducing incompatibility, improving effectiveness indicators and process efficiency indicators, reducing energy consumption, shorter cycles of process completion and optimization of production capabilities. The above-described behaviour may be considered a cycle of constant improvement. Companies that implement management systems which conform to quality and environmental organisational standards complete self-assessment

questionnaire, which consists periodical evaluation indicators. Creating partnerships with suppliers allows the recipient on the B2B market to transform what was a commercial cooperation into various types of alliances, thus gaining a range of benefits:

- Time saving connected with choosing a supply source;
- Reduced risk, which is connected with not having to choose a new supplier or a new product;
- Quicker and more effective flow of market information;
- Joint solving of technical and, occasionally, organisational problems, which allows greater effectiveness in the use of resources in process enhancement.

Increasingly, institutional clients (especially producers) are concentrating on the selection of key suppliers, shaping long-term relations with them based on the advancement of the technical quality of product solutions (running research and development projects together) and reliability of deliveries (based both on their flexibility and shortening of the order cycle). These actions, executed by both sides, lead to decreased costs (Krause, 1997, pp. 12-19; Casadesús, de Castro, 2005, pp. 345-357; Arumugem, Derakhshan, Boon, 2011, pp. 35-43; Garfamy, 2011, pp. 240-255; Tolonen, Haapasalo, Harkonen, Verrollot, 2017, pp. 237-245).

#### **4. The Role of Operational Improvement Tools when Building Relationships between Partners in the Supply Chain**

Institutional purchasers, particularly large multinationals companies, increasingly attach importance to ensuring continuity flows in the supply chain (exchange of products and information) and to improving efficiency. They use operational improvement tools such as elements of the Toyota Production System (which includes, Kaizen, 5S, Total Productive Maintenance), the concept of Lean Management, and Six Sigma methodologies to improve the efficiency and effectiveness of processes. The implementation of these tools is often seen as a collaborative project by the partners in the supply chain. Through the introduction of TPS, one can avoid discrepancies relating to the flow of information (in case of hardware or a computer network failure), as well as products in the process of production, storage, transport and related losses (non-compliance, failure of goods, or delays in the timely performance of the contract and delivery to the buyer).

Enterprises wanting to further eliminate possible losses associated with the flow of products and information decide to implement the concept of Lean Management (Konecka, 2010, pp. 23-31). This concept is often introduced by using the Six Sigma methodology. The most commonly used methodology is DMAIC (Define-Measure-Analyze-Improve-Control), which focuses on improving existing processes and products. A second methodology is DMADV (Define-Measure-Analyze-Design-Verify), which is used in the implementation of

new processes and products. Joint implementation projects, Lean Six Sigma and Six Sigma allow supply-chain partners to achieve many benefits, such as improving the technical quality of products, shortening cycles, improved efficiency of processes, increased effectiveness of internal and external communications, as well as helping to improve the safety of processes and reducing any detrimental environmental impact (AboelMaged, 2010, pp. 268-317; Jauhar, Tilasi, Choudhary, 2012, pp. 67-74).

### 5. The Methodology of the Empirical Research

The subject of the conducted research was the criteria affecting the building of relations with suppliers on the B2B market. The research was carried out between October and November 2017 through the use of the Computer Assisted Telephone Interview (CATI) technique. The research covered 300 producers who were suppliers for enterprises from the automotive, metal and chemical sectors operating on the Polish B2B market. The selection criteria for suppliers have been assigned a rank on a scale from 5 (the most important criterion) to 1 (least significant). The study was commissioned to a specialized research agency that conducted a targeted selection of companies registered in the Kompas database, which is a search platform of a business directory. Detailed results of the research are presented in the tables below:

**Table 1:** Criteria affecting building relations with suppliers; general results and a comparison between the segments depending on the sector, rank correlations (results of empirical study, 2017 )

Criteria	General N=300	Automotive N=99	Metal N=104	Chemical N=97
Quality of products	3.83000	3.75757	3.69230	4.05154
Shortening process cycles	3.77666	3.76767	3.87500	3.68041
Cost reduction	3.61333	3.54545	3.55769	3.74226
Improvement of QMS	3.59333	3.56565	3.65384	3.55670
Timely deliveries	3.56000	3.74223	3.45192	3.49494
Flexibility of supply	3.47000	3.67010	3.25961	3.49494
Improvement of EMS	3.33333	3.40404	3.23076	3.37113
Product innovations	3.31666	3.39393	3.19230	3.37113
Eco-friendly products	3.16000	3.16346	3.13131	3.18556

The results of the conducted research indicate that the main criteria affecting the building of relationships with suppliers are the technical quality of products (no defectiveness), shortening cycles of process implementation and willingness of the supplier to reduce costs. The following criteria are also important in building relationships; Improvement of the Quality Management System (QMS), timely deliveries, providing emergency supply plans (recovery plan) and supplier's flexibility. Whereas the least important are: improvement of the Environmental Management System (EMS), product innovation, as well as limiting the negative impact of products on the environment. When analyzing the detailed research results and the differences between the individual segments considered, it can be noticed that the technical quality (product safety) as a criterion affecting the building of relations with suppliers on the B2B market is particularly important for manufacturers of chemical products

and companies with Polish capital. It can be seen that shortening cycles of operational processes is of particular importance to car manufacturers and metal producers as well as to large enterprises with Polish capital. Cost reduction is key for manufacturers of chemical products and small and medium enterprises with Polish capital.

**Table 2:** Criteria affecting building relations with suppliers; general results and a comparison between the segments depending on capital and number of employees, rank correlations (results of empirical study, 2017)

Criteria	Polish N=120	Foreign N=180	-250 N=223	251- N=77
Quality of products	3.91666	3.77222	3.71748	4.15584
Shortening process cycles	3.90833	3.68888	3.73094	3.90909
Cost reduction	3.70833	3.55000	3.67264	3.44155
Improvement of QMS	3.55000	3.62222	3.52914	3.77922
Timely deliveries	3.65000	3.50000	3.51569	3.68831
Flexibility of supply	3.59166	3.38888	3.45739	3.50649
Improvement of EMS	3.30000	3.38333	3.30493	3.41558
Product innovations	3.27222	3.38333	3.28251	3.41558
Eco-friendly products	3.10833	3.19444	3.14798	3.19480

Improvement of the QMS as a criterion affecting building relations with suppliers on the B2B market is particularly important for metal product manufacturers and large enterprises with foreign capital. One can also observe that ensuring timely deliveries and flexibility of supply are most important for car manufacturers and large enterprises with Polish capital. Improvement of the EMS, product innovations and eco-friendly products have meaning for car and chemical product manufacturers and large companies with foreign capital. The research results clearly indicate that the expectations of customers towards suppliers is the focus on improving products and processes. To meet these customer expectations, suppliers are increasingly implementing process improvement tools such as quality and environmental management systems as well as Toyota Production System tools and Lean Management projects.

### 6. Conclusion

Recapitulating, it should be noted that manufacturing buyers define customized requirements to their suppliers through detailed specifications, which determine not only the issues related to ensuring the quality (ensuring technical quality), but also related to the increase in organizational efficiency (shortening implementation cycles), efficiency (cost reduction), safety (working conditions, information management), reducing any negative impact on the environment, and implementation of product and process innovations (We, Wu, 2009, pp. 335- 341; Wiengarten, Pagell, 2012, pp. 18-28). This approach is an important incentive for companies to improve the management system by introducing environmental and safety organizational standards, as well as other excellence tools that require more active involvement of employees in order to improve the performance of operational processes. The actions taken by companies in the field of continuous improvement has a significant impact on ongoing globalization. The international expansion of many companies, especially global companies,

increases the importance of technical standardization (to ensure the consistent quality required), and organization standardization. This is particularly important in countries where investments are due to lower labor costs, like Central and Eastern Europe and Asia. In these countries, one may perceive a gap in the field of organizational solutions between international corporations and indigenous businesses. In many cases, this gap is the introduction of the concept of sustainable development.

International companies implementing this concept focus on cooperation with their partners in the supply chain (suppliers and customers), offering them support through joint projects. These initiatives are aimed at improving common processes and developing concepts for new products. For many companies, relationships with suppliers are not limited to imposing their stringent requirements and continuous improvement on sustaining development (Huq, Stevenson, Zorzini, 2014, pp. 510-638; Fabbe-Costes, Rousst, Taylor, Taylor, 2014, pp. 664-669). It is increasingly being recognized that the creation of a competitive advantage requires industrial customers to build relationships with suppliers, which manifests itself in joint projects. These projects focus on the implementation of product innovations (improving the technical parameters of existing and implementation of a completely new product) and contribute to the improvement of organizational performance as well as process efficiency through reducing costs by increasing employee productivity, infrastructure capacity, and eliminating wastes.

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