EVALUATION, MONITORING AND AUDITING OF SUPPLIERS IN SUPPLY CHAIN MANAGEMENT

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Abstract: In the global market, the supply chain performances have a significant impact on the company's business strategy. The quality requirements that must be followed by suppliers require permanent monitoring of processes of design, development, production, installation and service of products through audits qualified based on supply chain management. This paper presents an analysis of the supplier qualification process including the main phases as follows: evaluation, monitoring and auditing of suppliers in supply chain management. Internal quality audits and/or suppliers are one of the key instruments for ensuring sustainability and performance in supply chain management. Auditing of suppliers is a core component of the modern management of suppliers, with the help of which the customer can analyze precisely relevant processes to existing or potential suppliers. Supplier audits help both commercial partners to increase the transparency of the supply chain and also simplify supplier selection, evaluation, monitoring and development. The suppliers must meet the highest quality standards for products and processes. The main purpose of this paper is to give a general view of the supplier qualification process which involves the steps from initial identification until the inclusion of the supplier in the Approved Supplier List (LST). This list should be managed in such way that a complete traceability is assured. Following the proposed qualification diagram the customer can obtain an image about the status of one supplier, can also identify the weak points considering the evaluation, monitoring and audit class.

Key words: Evaluation, monitoring, audit, supply chain, qualification, supplier, customer

1. INTRODUCTION

Internal quality audits and/or suppliers are one of the key instruments for ensuring sustainability and performance in supply chain management. Auditing of suppliers is a core component of the modern management of suppliers. With the help of such an audit, we can analyse precisely relevant processes to existing or potential suppliers.

Supplier audit actions increase the transparency of the supply chain and simplify suppliers, namely selection, evaluation, monitoring and development.

The customers have high requirements and expectations, therefore, a company that delivers semi-finished or finished products in the automotive field to remain in the competitive market must demonstrate a high level of quality and trends to continuously improve the quality of products delivered or services rendered. The suppliers must meet the highest quality standards for products and processes.

The audit has two main types as follows: external audit and internal audit [1, 2]. A statistical method for measuring the quality of the supplied product is presented in papers [3, 4] this method may be employed for organizations to monitor their raw material, work-in-process parts, and final product. The evaluation and selection of suppliers are important tasks in any organization. The companies should choose suppliers based on their quality and reliability, encourage their participation in the design of products and try to improve the suppliers' awareness of the importance of quality to achieve stability in the relationship [5, 6]. To select the right supplier, the buyer may use quantitative and qualitative methods. A supplier selection method based on mathematical models, especially on regression function and time series analysis it is described in [7]. An example of a supplier evaluation matrix or model as well as a case study of an existing company's supplier performance and its details of the calculation was presented in the paper [8]. A new collaboration model between the Original Equipment Manufacturer (OEM) and its suppliers is proposed in paper [9]. Ounnar et. al

propose in [10] an application of the Analytic Hierarchy Process ‘AHP’ method for supporting the decision-making process related to the choice of the best supplier among a set of potential suppliers in the context of a multi-agent simulation of enterprises. Companies are increasingly looking for ways to improve performance. One way to do that is by conducting an audit to identify gaps, evaluate processes, people, and systems, and assess whether they are achieving goals related to efficiency and effectiveness [11]. Yekta et al present in [12] the general definition of an audit as “an evaluation of a person, organization, system, process, project or product”. Paper [13] provides an overview of the quality tools and methods which focus on manufacturing processes and perceived quality problems associated with the supplier’s quality issues. The paper [14], presents the key areas of internal audit activities in assessing risk and analyzing the functioning of the supply chain. Nearly 17.000 code-of-conduct audits conducted at nearly 6.000 suppliers around the world were analyzed in [15].

In this paper, an analysis of the supplier qualification process including the main phases as follows: evaluation, monitoring and auditing of suppliers in supply chain management are described.

The main purpose of this paper is to give a general view of the supplier qualification process which involves the steps from initial identification until the inclusion of the supplier in the Approved Supplier List (ASL).

The main stages in the collaboration with suppliers from the point of view of the client company are: *i) sorting, evaluating and selecting suppliers, ii) monitoring supplier’s performances, and iii) supplier audit.*

The evaluation and selection process is based on the identification and classification of potential suppliers according to the certifications they hold and the delivery capabilities of products and services. Eligibility criteria are established, which include sorting, selection and evaluation. Based on the eligibility criteria, the initial assessment classes are established.

Supplier monitoring process two evaluation parameters: *delivery performance* and *quality performance*. Within the case study presents the audit activities performed by Company A to qualify a supplier – Company B by client – company A.

The paper is organized as follows: the second section presents the first steps for a supplier qualification process, including the steps of identification and sorting which are part of the steps of evaluation and selection of potential suppliers based on their ability to provide products and services according to orders and contract demands. All steps for the qualification process of a supplier based on his capability to fill up all customer requirements are organized in a general flow diagram. The next section presents the process of monitoring, reassessment and ranking suppliers based on the analysis of supplier performance, considering both parameters delivery and quality performance. The fourth section presents the supplier audit process. The purpose of the audit is to evaluate a process with the customer-specific requirements with the requirements specified in the reference documents (procedures, work instructions, technical specifications of the products made by that process) or with applicable legal requirements. Section five presents the audit report analysis. A multidisciplinary analysis of the audit report is requested by the audit team in order to identify weaknesses and improvement opportunities and also the root cause of the non-conformities, corrections and corrective actions identification and implementation in order to improve the supplier performance. In the sixth section, a case study it’s developed in which it is presented the implementation process for the proposed flow diagram considering the qualification process in the case of Company A as a customer and Company B as a supplier. The last section is dedicated to the paper’s conclusion.

2. INITIAL EVALUATION OF SUPPLIERS

From the customer’s point of view, the initial evaluation of the supplier’s capability to ensure deliveries and quality becomes one of the main processes. For this part of the study was considered for a client company the internal procedure “Initial evaluation of suppliers”. The company has identified criteria for sorting and evaluating potential suppliers and has a defined supply policy available for any potential supplier which wants to become a qualified supplier and also wants to be included in the Approved Supplier List (ASL).

A general flow diagram for the qualification process of a supplier based on his capability to fill up all customer requirements, including the steps of identification and sorting, is presented in Figure 1.

The general steps followed by a specific customer, company A, with the scope to qualify a supplier are generically named with numbers from 1 to 4, including the sub-activities from the write side.

In this study, it was considered the parameter “p” for the supplier classification. This parameter is applicable for all three main classification steps (the classification after initial evaluation, the classification after monitoring and the classification after audit). The minimum value considered as reference $p \geq 81\%$.

Starting from this flow diagram a support decision program could be developed to facilitate the partnerships between supplier and customer from the first contact until the communication of the audit evidence acceptance and continuous development from both sides.

Fig. 1. Flow diagram for the qualification process of a supplier

Considering this proposed diagram and all details described in the next chapters, this study offers a possibility to understand the qualification process. This process becomes more and more important today than in the past due to the actual restriction and a good supplier network which includes different qualified alternatives for the same products offer good opportunities to choose the more fitted offer when the purchasing times trend is decreasing. The evaluation and selection process is based on the identification and classification of potential suppliers according to the certifications they hold and the delivery capabilities of products and services.

The sorting, evaluating and selection process includes the following stages:

1. Sorting potential suppliers based on eligibility criteria;
2. Evaluation and classification of potential suppliers of products/services based on evaluation criteria;
3. Selection of potential suppliers based on evaluation and criteria – sample testing, existing certification of management and audit systems at the supplier's premises.

Stage 1. Sorting potential suppliers

The process of sorting potential suppliers of products/services is done by following the steps:

- Identification of potential suppliers for the product to be purchased;
- Contacting the supplier and sending the “*Evaluation questionnaire of suppliers of products/services*”;
- Meetings, visits, presentation of requirements for compliance;
- Product request testing and price offer negotiation;
- Analysis of collected data;
- Sorting of suppliers of products/services.

“*Evaluation questionnaire of suppliers of products/services*”, includes:

- ✓ The three main points:
 - AI Global company analysis,
 - AII Offer of products/services, and,
 - AIII General requirements about the offer of products/services.
- ✓ The eight eligibility criteria. These eight eligibility criteria correspond to each main point. In turn, these criteria contain several sub-criteria.

The supplier’s answer consists of ticking “X” for each sub-criterion in the fields YES / NO.

The received questionnaires filled up by potential suppliers are then analysed using predefined programs to quantify the results for this stage.

The sum of the eight eligibility criteria represents the weight in the final total, as follows:

- $AI = 0.3 \times \text{the sum of the sub-criteria} \rightarrow 30\%$;
- $AII = 0.4 \times \text{the sum of the sub-criteria} \rightarrow 40\%$;
- $AIII = 0.3 \times \text{the sum of the sub-criteria} \rightarrow 30\%$.

The sorting consists of the admission in stages 2 of the potential suppliers that meet the minimum promotion condition: **S1 ≥ 60%**.

Stage 2. Evaluation of potential admitted suppliers

In this stage, the sorted potential suppliers are evaluated and some sample orders are placed.

Potential suppliers admitted to stage 1, must meet the selection criteria, according to “*Selection Criteria*” and meet the promotion condition $70 \div 100$ points.

Depending on the results from selection criteria application and sample analysis, the period of an audit to be performed at the supplier’s premises is established, according to the procedure.

Stage 3. Select potential admitted suppliers. List of accepted suppliers for products/services

Suppliers promoting stage 2 are listed in “*List of accepted suppliers for products/services*”.

Suppliers have the status of “*Accepted suppliers for products and services*” based on the results of stages 1 and 2.

For the suppliers of accepted products/services, registered in “*List of accepted suppliers for products/services*”, commercial relations can be developed for the purchase of products/services.

Depending on the final results of each evaluation questionnaire it is centralized in a table that contains the classification classes of the suppliers and their meanings (see Table 1).

Table 1. Assessment classes

Degree of fulfillment, [%]	Class	Meaning
91 - 100	A	Fully met requirements
81 - 90	B	Requirements largely met Necessary plan of action
71 - 80	C	Insufficiently met requirements The development of the supplier is necessary, according to the plan of measures
< 70	D	Insufficient potential Rejection of the supplier

3. MONITORING SUPPLIERS

The supplier performance it is monitored based on the mentioned criteria, delivery performance and quality performance.

The company periodically shares with suppliers the results regarding the monitoring of the performance.

Monitoring, reassessment and ranking of suppliers are based on the analysis of supplier performance, considering both parameters delivery and quality performance.

The monitoring and reassessment process includes the following stages:

1. Monitoring the quality and delivery performance of suppliers.
2. Reassessment of suppliers of relevant products/services based on the criteria “quality performance and delivery performance”.
3. Reclassification of suppliers of relevant products/services following the re-evaluation.

Stage 1. Monitoring the quality performance and delivery performance of suppliers

Suppliers for products/services are subject to the process of monitoring the qualitative performance and delivery performance, the final ranking is registered in the monitoring sheet.

Supplier monitoring sheet contains evaluation and selection criteria for the following factors:

1. *Qualitative performance PQ*, with a share of 65% in the supplier’s performance:

$$PQ = \frac{0.4 \cdot PQ_1 + 0.3 \cdot NSC + 0.3 \cdot DL}{0.4 + 0.3 + 0.3} \quad (1)$$

where PQ_1 – the quality of delivery products; NSC – special status notification regarding quality; DL – delivery malfunctions to the company’s customers, including returns from the field.

$$PQ_1 = 100 - \left(\frac{\text{non-compliant quantity}}{\text{quantity delivered}} \right) \times 100 \quad (2)$$

$$NSC = 100 - \left(\frac{\text{number of notifications}}{\text{number of deliveries}} \right) \times 100 \quad (3)$$

$$DL = 100 - \left(\frac{\text{no. cases reported by customers}}{\text{no. orders supplied}} \right) \times 100 \quad (4)$$

2. *Delivery performance PL*, with a share of 35% in the supplier’s performance:

$$PL = \frac{0.3 \cdot PLT + 0.3 \cdot PLC + 0.2 \cdot NSL + 0.2 \cdot CL}{0.3 + 0.3 + 0.2 + 0.2} \quad (5)$$

where PLT – delivery performance on time; PLC – quantitative delivery performance; NSL – special status notification regarding delivery instalments; CL – the quality of logistics.

$$PLT = 100 - \left(\frac{\text{no. days delays}}{\text{no. planned days}} \right) \times 100 \quad (6)$$

$$PLC = 100 - \left(\frac{\text{missing quantity}}{\text{delivered quantity}} \right) \times 100 \quad (7)$$

$$NSL = 100 - \left(\frac{\text{number of notifications}}{\text{number of deliveries}} \right) \times 100 \quad (8)$$

$$CL = 100 - \left(\frac{\text{additional delivery costs or price evolution}}{\text{total transport cost or total acquisition cost}} \right) \times 100 \quad (9)$$

The final evaluation and classification criterion in the performance class represents the supplier’s performance PF :

$$PF = \frac{0.65 \cdot PQ + 0.35 \cdot PL}{0.65 + 0.35} \quad (10)$$

The monitoring results transposed in the supplier's classification class are registered in the "List of suppliers from products/services".

Stage 2. Reassessment of suppliers of product/service

The reassessment of the suppliers of products and services is made based on the data from the monitoring process: the qualitative performance and the delivery performance.

The reassessment process starts for the criteria for decreasing or increasing the score when:

- the values of the performance indicators change;
- an audit is performed;
- when the certificates/authorizations expire.

Depending on the supplier's classification class, the number of samples taken/ the frequency of verification in the reception phase of the products can be increased or decreased.

If the calculated value of the supplier's performance does not fall within the initial evaluation class, the reassessment is made for the criteria for which the score is decreased or increased and the suppliers are required to take corrective action plans and actions.

Stage 3. Re-classification of the supplier of product/service

The reclassification of the performance classes of the supplier of products and services it's done after each reassessment. The final results following the monitoring, a final table of classification of the suppliers in one of the classes is drawn up (see Table 2).

Table 2. Monitoring classes

Degree of fulfillment, [%]	Class	Meaning	Decisions
$91 \leq A < 100$	A	Good	<ul style="list-style-type: none"> - orders will continue to be placed; - the performance criteria will be monitored every six months; - the classification result is communicated to the suppliers.
$81 \leq B < 90$	B	Sufficiently	<ul style="list-style-type: none"> - orders will continue to be placed; - the performance criteria will be monitored every six months; - suppliers will be informed of the criteria for which they have been downgraded; - improvement action plans or corrective action plans are required;
$70 \leq C < 80$	C	Insufficiently	<ul style="list-style-type: none"> - no orders will be placed; - suppliers are informed of the criteria for which they have been downgraded; - development action plans are required; - a new qualification process will start.

4. AUDITIONG SUPPLIERS

The audit methodology of the suppliers of products/services is established, as partners of the company based on criteria and performance indicators.

The stages of performing audits at the supplier's sites are:

1. Identification of company needs, evaluation of supplier's for introduction maintenance as "accepted supplier";
2. Identification of suppliers (who supply raw materials, products with a high degree of risk or a significant share) that require a second party audit;
3. Establishing contact details with the suppliers to be audited;
4. Preparation of Audit Plan and Audit Questionnaire, according to the needs of the company, the reference standard, the characteristics of the purchased product or services, etc.;
5. Transmission of Audit Plan and Audit Questionnaire to the respective supplier;
6. The audit itself:

- verification that the characteristics of the products or services to be supplied correspond to the characteristics declared by the supplier in the evaluation questionnaire;
- identification of strengths, non-compliant situations and possibilities to improve the collaboration relations with the evaluated supplier/subcontractor;
- assessment of the degree of compliance with the requirements of a certain reference standard by the supplier, customer specific requirements and legal requirements;

The audit is performed based on the audit plan according to the agenda established by mutual agreement with the audited company.

7. Submission of the audit report and informing the supplier about the audit conclusions;
8. Fill in the list of accepted suppliers with the audited supplier.

The selection of suppliers for audit is made according to the following criteria:

1. new suppliers;
2. accepted key suppliers that do not prove quality performance and delivery performance, do not comply with the requirements agreed by both parties;
3. supplier's for which there is a requirement from the company's customers or regulators.

After agreeing on the audit period, the Audit Plan and an Audit Questionnaire, adapted to the audited product/service, are sent to the supplier. Suppliers are required to complete and submit the questionnaire before the arrival of the audit team. Depending on the answers in the questionnaire, the audit is performed at the supplier's sites. After completing the audit, the audit team issues the audit report. This report is shared with the staff involved in the monitoring of suppliers in order to update the audit classes. In case that during the audit was identified some non-conformities, which are included in the audit report the monitoring of the implementation of the corrective/preventive actions is the responsibility of the audit team leader who may request reports or evidence of implementation. At the request of customers or authorities there the audit report and the evidence of the implementation of the corrective actions are shared in order to confirm that all agreed actions were implemented or in progress.

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4.1 Supplier process audit

The process audit serves to assess the compliance of a process with the client's requirements or with the applicable regulatory requirements (authorizations and authorities). The purpose is to evaluate a process with the customer-specific requirements with the requirements specified in the reference documents (procedures, work instructions, technical specifications of the products made by that process) or with applicable legal requirements.

The process audit could be performed based on a questionnaire containing the following main points:

1. Project management;
2. Product realization planning;
3. Design and development;
4. Provision of resources;
5. Production - Carrying out the process;
6. Customers.

Each of the six elements comprises a series of questions, which the supplier must answer.

4.2 Classification of supplier taking into account the evaluation, monitoring and audit results

Using the process described above the suppliers are classified according to the following points:

1. If the three classes are A, supply orders are issued, monitoring and audit are carried out according to schedule.
2. If a supplier has assessment class A, supply orders are issued and its performance is monitored. If after monitoring it has monitoring class B, an improvement plan must be drawn up and submitted.
3. If a supplier has monitoring class C, an audit is planned at the supplier's premises. The supplier will be classified in the list of suppliers with the class obtained at the audit.

The correspondence or the evaluation, monitoring and audit classes is presented in Table 3.

Table 3. Correspondence of evaluation, monitoring and audit classes

Evaluation				Monitoring			Audit		
Class	Interval	Decision	Action	Class	Interval	Decision	Class	Interval	Decision
A	91-100	Orders are issued.	Orders are monitored.	A	91-100	The audit is performed according to the annual planning.	A	91-100	Orders are issued.
B	81-90	Orders are issued. Improvement plans are required.	Orders are monitored.	B	81-90	An improvement plan is required. The audit is performed according to the annual planning.	B	81-90	Orders are issued and monitored.
C	70-80	Orders are issued. Improvement plans are required to be included in an development plan by customer. Customer visits are performed in order to verify the development plan status.	Orders are monitored.	C	70-80	Customer visits are performed in order to verify the development plan status. The audit is planned over the annual planning.	C	70-80	Marked in the list "Supplier under development plan" until non-compliances are resolved and the results are confirmed thru the audit.
D	<70	No orders are issued.	-	D	<70	Is being blocked.	D	<70	Removes from list.

5. AUDIT REPORT ANALYSIS

After the audit report issued by the audit team, it is received by the auditee there a multidisciplinary team analysis is performed in order to identify all weaknesses and improvement opportunities.

Usually, when a non-compliance is detected the auditor informs the auditee about the identified non-compliance its content, the evidence proving the non-compliance considering as reference the standard, legal or customer requirements.

At the closing meeting, the non-conformities are presented by the lead auditor and the follow-up plan it is agreed upon by both parties.

5.1 Identification of non-conformities

Non-compliance is a failure to meet a requirement of the audit reference.

The stages of the process of defining the corrective actions following the audit are:

1. The auditee analyzes each non-compliance and establishes the corrective actions. In order to define the appropriate improvement action the auditee team performed a root cause analysis using one of the following methods – Method Five Whys – 5W?; Method A3 and Ishikawa diagram – agreed with the audit team. The actions identified for each root cause are included in an action plan. Then, the action plan completed is provided to the auditor in order to evaluate the corrective actions initiated and the correlation with the identified nonconformity.
2. The auditor analyses the received proposed action plan and gives to the auditee team the feedback consisting of acceptance of the proposed action plan or request of supplementary analysis/actions.
3. Depending on actions plan content, in order to check the status of the defined actions the auditor team establishes on-site verification or the verification of the submitted evidence could be performed in online mode. The audit team may also define certain verification deadlines or may plan in agreement with the auditee the performance of documentation visits and evaluation of the implementation stage of the defined actions.

6. CASE STUDY

In this chapter, a case study is developed with the purpose to present the application of the described steps related to supplier qualification process.

In this study, 10 companies participated. The name of each company has been renamed with letters A to J, to ensure the rules of protection of data security and confidentiality. The main fields of activity of the participating companies are design, production and sales of spare parts for the automotive industry and other industrial applications.

The case study presents the audit activities performed by Company A in order to qualify a supplier Company B by client - company A.

In the context of the development of the commercial relations between Company A and company B, unsatisfactory evolutions were observed regarding the classification of the supplier.

According to the integrated management system implemented within Company A and the applicable standard requirements to suppliers in the automotive industry, the management of the client Company A decided to carry out a process audit at the supplier's Company B.

6.1 Supplier selection for evaluation

Based on a “Supplier evaluation questionnaire”, it was possible to choose the product supplier, namely Company B (Table 4), obtaining the score 83.01 (Table 5).

Table 4. Results of the evaluation of the surveyed supplier

Table 5. The results of the evaluation of the supplier Company B

Eligibility criteria	Criterion weight	Total criteria (1)	Criterion result	Final total
AI	30%	72.92	21.88	
AII	40%	82.50	33	
AIII	40%	93.75	28.13	
Promotion condition $TF \geq 60$				83.01

6.2 Supplier evaluation

The class of the evaluated supplier is presented in Table 6.

Table 6. Class of the evaluated supplier

Supplier evaluation result	Score	83.01	The decision taken in the evaluation is to issue further orders and to visit the supplier's premises.
	Class	B	

6.3 Supplier monitoring

The results of the monitoring (see Table 7) are used to audit or reassessment the supplier after at least 3 deliveries of products. The supplier monitoring class is presented in Table 8.

Table 7. Supplier performance monitoring

Qualitative performance PQ	PQ = 74.57
Delivery performance PL	PL = 93.31
Supplier performance PF	PF = 81.13

Table 8. Supplier monitoring class

Supplier monitoring result	Score	81.13	The monitoring action is to continue to carry out orders, and the decision is to ask for improvement plan, and conduct the audit.
	Class	B	

6.4 Auditing suppliers

The process audit at the suppliers' premises is based on the audit plan, established by mutual agreement and submitted, and is performed based on the audit questionnaire.

The evidence for each audited element consists of internal working procedures and documented information or various statistical analyses or other evidence considered relevant by the audit team.

The results of the evaluation of the process elements in the audit questionnaire are summarized in Table 9.

The classification of suppliers based on audit results is presented in Table 10.

Table 9. Audit results

No. crt.	Audited element/process	Score evaluation	<p>Target 100%</p> <p>Average score obtained 77%</p> <p>Customers 60%</p> <p>Production 67%</p> <p>Provision of resources 80%</p> <p>Design and development 90%</p> <p>Product realization planning 80%</p> <p>Project management 84%</p>
1.	Project management	84%	
2.	Product realization planning	80%	
3.	Design and development	90%	
4.	Provision of resources	80%	
5.	Production	67%	
6.	Customers	60%	
Average score obtained		77%	
Target		100%	

Table 10. Classification of supplier based on audit results

Supplier audit result	Score	77%	Decision
	Class	C	Unacceptable quality supplier <ul style="list-style-type: none"> - blocked supplier; - immediate action plan; - weekly verification of the progress in the implementation of the measures; - re-audit after the implementation of the measures.

6.5 Audit report analysis

Following the process audit within company B, a number of 13 non-compliances were identified, of which 10 non-compliant.

The supplier has defined an action plan and submitted the root cause analysis by method 5 why?.

Identification of the root cause for the non-compliance *"There is no target on the client/manager"*, found in element 6.4.

Are the targets defined and known by the staff?. The audit teams accept a minimum 3W analysis (see Figure 2).

Fig. 2. Methods: 3Why (3W)

As an example of the root cause analysis (Figure 3) was considered only one nonconformity as follows:

The identified problem: No action plan defined for "Delay in delivery".

Explanation of nonconformity: At the sales office at point *"Customers"* from the audit questionnaire was identified as nonconformity related to *"analysis of customer evaluation"*.

From Company A were received info's that some deliveries were in delay and this fact leads to low delivery performance. Considering the previous info's the auditor requests action plans in order to improve the delivery performance. And no action plan was defined by the audited company.

Fig. 3. Ishikawa cause-effect diagram

Out of 13 defined actions, a number of 4 actions were implemented 100%, 5 actions are data collection and processing activities, which can be considered as continuous activities.

7. CONCLUSIONS

From the study presented in this paper, the following conclusions can be drawn:

- The purpose of the paper was to present the diagram of the supplier qualification thru all steps from first identification until process audit.
- The proposed diagram will be used to develop a future study in order to define a decision support system. Using this approach will be validated the proposed steps for industrial application on one side and on the other side the results and parameters will be used to optimize the supplier's qualification process. The DSS will be used in order to integrate supplier management in the customer management systems. For example, in the case of different suppliers in order to select which one will receive the order a selection algorithm based on the following parameters will be used: delivery performance; quantitative performance; qualitative performance; payment condition; audit results; financial parameters such as discounts or penalties used; and other specific conditions depending on the application field.
- The supplier qualification process includes the main steps as: evaluation and selection process is based on the identification and classification of potential supplier's according to the certifications they hold and the delivery capabilities of products and services by customer requirements, the monitoring process and the audit process.
- The process of monitoring, reassessment of suppliers is based on the analysis of the supplier performance which consists in quality and delivery performances.
- The audit performed at the supplier site helps both the customer and supplier to keep under control the commercial relation.
- The process audit of the suppliers and the documentation necessary to carry out a respective process audit were analyzed: the audit plan, the audit questionnaire, the internal procedures that constitute audit evidence and the audit report.
- In the case study, an analysis of a complete process of evaluation, monitoring and auditing of the supplier company B by company A was performed.
- The non-conformities identified during the audit, the root causes identified by the supplier and the defined action plans for improving the processes were presented.
- The main purpose of supplier audit is to maintain the supplier in the approved list and also to improve the management system of the supplier thru audit and action plans were applicable.

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