

Evaluation of suppliers using digitalization

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Abstract: *The article discusses the evaluation of suppliers in a selected international food company, maps the current state of evaluation and describes the upcoming benefits of possible digitalization. This section is a comparison of original and new solutions and subsequent recommendations in the field of digitalization. It deals with the choice of criteria for supplier evaluation and the choice of suitable software that will allow us to digitize processes. However, traditional purchasing and its functions are constantly evolving, for instance. Recently, we may come across concepts such as Digital Purchase 4.0. It is important to respond to the upcoming changes and think about new opportunities and possibilities for companies and the development of purchasing towards digitalization. Procurement 4.0 contributes to the goal of productivity collaboration within Industry 4.0 and improves the organizational supply chain set up to meet tailored and innovative requirements as efficiently as possible. There is a need for companies to have an effective supplier evaluation system in place, which is constantly being improved and digitized as extensively. The next part is based on Dickens' evaluation of suppliers.*

Based on questionnaires, this study defined 23 factors for supplier evaluation. Purchasing managers were interviewed, there were 273 respondents. Based on their answers, the factors and their importance were determined, on the basis of which the author interprets possible transitions to digitize and automate processes. This section analyses all 23 factors and recommendations on their suitability to digitalization or not. The study finds that in general cases digitalization assessment is possible and a personal approach to obtaining accurate data is still better, yet for many factors it is already possible to use full scale digitalization and use the saved time for strategic decisions.

Keywords: *Procurement, Suppliers, Evaluation, Digitalization, Quality*

JEL Classification: L15, L19, L66

Introduction

Companies should have an effective supplier evaluation system in place to build effective relationships with suppliers. When setting up this system, it should be ensured that the performance of existing and potential suppliers is continuously evaluated and monitored. Supplier evaluation is a very important step for companies; in some organizations, it is still not given such importance. If we have well-functioning suppliers, we increase product quality, reduce costs and increase profits. In the case of malfunctioning suppliers, there are some risks, such as the cessation of production in the event of late delivery. Poor quality delivered goods can negatively affect the quality of the final product, thus reduce sales, and increase the negative view of the brand. The research examines the factors for supplier evaluation and their impact on process improvement, focusing in particular on the food production company, which is engaged in the production of alcohol. It analyzes the existing method introduced in the company and creates an evaluation of suppliers using digitalization and then compares these methods and determines the advantages and disadvantages of the change.

In recent years, one of the main topics in the field of corporate purchasing has been the issue of cost reduction. Purchasing is one of the basic pillars for cost reduction (Krampf, 2014) and cost reduction in the procurement process can have a major impact on a company's profit (T. Klünder, 2019). However, traditional purchasing and its functions are constantly evolving. Recently, we may come across concepts such as Digital Purchase 4.0. It is important to respond to the upcoming changes and think about new opportunities and possibilities for companies and the development of purchasing towards digitalization. Procurement 4.0 contributes to the goal of productivity collaboration within Industry 4.0 and improves the organizational supply chain set up to meet tailored and innovative requirements as efficiently as possible. Thanks to new Procurement 4.0 technologies, it connects companies with its suppliers and enables dynamic cooperation and coordination of the procurement process (Glass et.al., 2016). Digitalization contributes to increasing the transparency of information between partners in the supply chain. Process automation can help reduce purchasing time and optimize resource utilization (Telukdarie et al., 2018). There are a huge number of ways to take advantage of digital procurement.

Based on today's requirements, it is primarily a matter of approving various work procedures. Whether it's contracts or order approvals.

The aim of the paper is to identify the changing function of purchasing and possible opportunities for digitalization for the development of purchasing and its role in the organization, especially in the field of supplier evaluation.

1. Supplier evaluation

The supplier evaluation process becomes a very complicated task because many factors need to be taken into account (Dickson, 1966) suggested 23 factors for supplier evaluation that must be taken into account by purchasing managers or strategic buyers in the supplier evaluation process. The most important criterion was the quality criterion, then the criterion of deadlines, method of delivered inputs and previous experience with the supplier. When choosing a supplier, we must choose an appropriate compromise between all the criteria, it cannot be assumed that the supplier will meet all requirements. The product can be high quality, but its acquisition costs are high. The delivery date is realized in a short time, but at a high price.

These examples show that it is necessary to proceed cautiously and systematically when choosing a supplier (Štěrba, 2007). The evaluation itself gives us an overview of the services provided, price levels in individual years, the quality achieved, whether the supplier is involved in risk management, what corrective measures it introduces for the improvement itself. According to (Kaerney, 2020), procurement will focus more on working with external partners to create new business models. The evaluation of suppliers itself and the subsequent work to improve relations between suppliers and customers is a step leading to the fulfillment of these goals.

At the beginning, the mentioned food company had to choose criteria suitable for the evaluation of suppliers and to choose a circle of evaluators from among other departments. For the purposes of such evaluation, the categories quality, price, logistics, management were selected, which are divided into other evaluation subcategories. This is the current state without the use of digitalization, the evaluation takes place manually across individual departments and is then completed by a separate purchase. The whole evaluation is therefore very time consuming and the digitalization of the whole process saves time that stakeholders can spend on strategic decisions in other areas. The current state of evaluation is shown in (Fig. 1) and the criteria to be changed are shown in (Fig. 2)

Fig. 1: Example of supplier evaluation in a selected company

Supplier SAP:							Fiscal year:					
Supplier name:							Evaluated period					
Rank							Category					
Total points		0										
Items	Evaluation points (best is 5)					Given points	Dept. in charge of evaluation	With weight x	Final Evaluation points (after with weight)	max final points	min final points	Note
	5	4	3	2	1							
QUALITY	[1] Conformance to specification											
	[2] Quality of documentation/ certification					0	Quality	0,25	0	3,75	0,75	
	[3] Claims and credit return											
COST	[1] Cost competitiveness					0	Procurement	0,35	0	3,5	0,7	
	[2] Payment terms/Currency											
LOGISTIC	[1] Conformance to orders (OTIF)					0	Call off	0,25	0	2,5	0,5	
	[2] Response to emergencies											
MANAGEMENT	[1] Risk Management											
	[2] Mutual agreements					0	Procurement	0,15	0	2,25	0,45	
	[3] NPD & Innovation approach											
Total FINAL points									0	12,00	2,4	

Source: Internal source of the company

Fig. 2: Example of determining criteria in a selected company

Criteria to be evaluated		
Quality	[1] Conformance to specification	Ability of supplier to meet Stock specification YES = 5 points NO = 1 points
	[2] Quality of documentation/ certification	Supplier has certification /ISO, HACCP, etc. YES certified = 5 points YES implemented = 3 points NO system = 1 point
	[3] Claims and credit return	Ability to react on time to our justified claims with the recovery deliveries / credit notes / [Number of deliveries non-conforming to specification (pcs)/Number of completed deliveries (pcs)] below 1% = 5 points 1% - 3% = 3 points above 3% = 0 points
Cost	[1] Cost competitiveness	Comparison of price towards average price in the category - competitors, evolution of price trend (source: SAP data) Lower than competitors' = 5 points The same as competitors' = 3 points Higher than competitors' = 1 point
	[2] Payment terms/Currency	Ability to use local currency. Payment term: above 46 days = 5 points 30 - 45 days = 3 points below 29 days = 1 point
Call off	[1] Conformance to orders (OTIF)	OTIF (On Time, In Full) delivery according to a confirmed delivery schedule: 71-100% = 5 points 41% - 70% = 3 points below 40% = 1 point
	[2] Response to emergencies	Suppliers ability and attitude to our urgent requests Yes = 5 points No = 1 point
Management	[1] Risk Management	Quality of risk management system in place (e.g. alternative lines/locations). Financial strenght High = 5 points Low = 1 points
	[2] Mutual agreements	Suppliers signed our Contracts, General conditions (T&C), Code of Business Conduct (CoC) Yes = 5 points No = 1 point
	[3] NPD & Innovation approach	Suppliers is capable to meet Stock NPD requirements, Supplier is willing to implement new technology, deliver samples, etc. yes = 5 points no = 1 point

Source: Internal source of the company

2. Methodology

We will first focus on the analysis of the development of supplier evaluation, then we will discuss its transformation through digitalization. Attention will also be focused on the necessary technical solutions. The analysis of the results of published studies and research will be widely used to identify the evaluation of suppliers that digitalization brings in this area. Subsequent synthesis of knowledge will lead to the identification of these trends.

Last but not least, a case study of the implementation of a new IT system in a selected multinational company will be presented. The case study will complement the paper as an example of a solution for evaluating suppliers in purchasing, which allows digitalization and subsequent evaluation of possible solutions and the determination or exclusion of digitalization in the Dickens criteria.

3. Suppliers evaluation criteria and their digitalization

Interpretation of measures or factors for the evaluation itself is the first step. Dickson discovered 23 factors for supplier evaluation. It was based on a questionnaire of 273 American and Canadian purchasing managers and agents (Imeri, 2013). Various arrangements for supplier evaluation have emerged, including quality, price, supply and supplier relationships. Ellram and Cooper (1990) also discovered quality, cost, and the relationship with the supplier as factors for the supplier evaluation process and applied a hierarchical framework. In this research, all 23 factors were evaluated using a questionnaire and significant factors were recorded, an evaluation was created on which the author bases the evaluation of digitalization possibilities (Tab. 1), and a confirmatory factor analysis was performed to analyze exploratory factors (1999 Fabrigar et al.).

Tab. 1 - Evaluation factors and their digitalization

Rank	Factor	Mean rating	Evolution	Digitalization possible	Notes
1	Quality	3.508	Extreme importance	Partially yes	Number of complaints / Number of deliveries
2	Delivery	3.417		Partially yes	The delivery report must be uploaded to the system manually.
3	Warranties and claim policies	2.998		Yes	The delivery report must be uploaded to the system manually.
4	Performance history	2.849		Yes	It is possible to compare in the system
5	Production facilities and capacity	2.775		Yes	It should be taken into account when new supplier is establish.
6	Price	2.758	Considerable importance	Partially yes	It must be decided which price should be optimal. It is better to decide and enter manually by procurement department.
7	Technical capability	2.545		No	This should be taken into account when setting up a new supplier.
8	Financial positions	2.514		Partially yes	The financial volume within the year is recordable, the financial health of the supplier must be verified.
9	Procedural compliance	2.488		No	Suppliers audit
10	Communication	2.426		No	Personal experience
11	Reputation and Position in the industry	2.412		No	Detection eg. By reference
12	Desire for business	2.256		No	Detection
13	Management and organization	2.216		No	Detection
14	Operations controls	2.211	No	Suppliers audit	
15	Repair services	2.187	Average importance	No	Personal experience
16	Attitude	2.120		No	Personal experience
17	Impression	2.054		No	Personal experience
18	Packing ability	2.009		No	Personal experience
19	Labour relation record	2.003		No	
20	Geographical location	1.872		Yes	
21	Amount of past business	1.597	Yes	It is possible to analyze using the system.	
22	Training aids	1.537	Yes	Personal experience	
23	Reciprocal arrangements	0.610	Slight importance	Yes	Personal experience

Source: own research

entered into the system itself. The comparison of the delivered product from the specifications can be managed in a complaint procedure and again recorded on one platform.

The evaluation of the price is performed by the purchasing department on the basis of a price comparison with other suppliers and the average price of goods on the market. It is partly possible to use prices in SAP, but above all it is a comparison of prices, which were obtained through tenders and comparisons during the evaluated period. The evaluation data are entered manually for the reasons described above. Payment terms can be evaluated automatically based on set weights. The supplier's ability to invoice in the preferred currency is not much used even in the original evaluation, due to the large portfolio of foreign suppliers. However, if necessary, this can be set in the system.

Evaluation Management is the responsibility of purchasing, it is divided into three categories. The first is Risk management, which addresses how the supplier works with risks, how they evaluate them and makes corrections related to them. It is currently not possible to fully automate this process, but it is possible to store this information in one system. The second criterion is agreements, such as concluded contracts, general conditions, etc. This information can be stored in the system and evaluated. NPD (New Project Development) is the development of new products, in which the purchase is always involved, whether it is packaging material or raw materials needed for the development and production of a new product according to (Hartwig, Stephanie 2020) project managers who want to make better decisions, especially for important projects that require significant resources to solve technical problems. Data-driven risk analysis can support these better decisions. Risk analytics quantifies risk and provides information to facilitate decision-making on projects with significant investment risk. The NPD process itself can also be supported by digitalization using appropriate software, but this topic is not the subject of this paper. Purchasing in this case evaluates the approach of suppliers involved in the development of new products based on direct experience during the year.

3.3. Addition and evaluation of criteria

This part of the work is based on (Tab. 1) Evaluation factors and their digitalization and determines which activities can be digitized Point 1 determines quality as the most important factor; it is possible to fully automate the number of discrepancies with the number of orders and then evaluate this data according to the set criteria. Item 2 of the delivery, we mainly check the timeliness of deliveries, whether the goods are not damaged during delivery, etc. This information must be entered into the system manually. Subsequently, however, we can evaluate it automatically. Point 3 evaluates warranties and complaints, this information can be linked to the complaint record in the system and accurate data can be used in the periodic evaluation. Point 4. Evaluation history It is possible to fully automate and compare data over the years, create graphs and observe the development of the supplier. Point 5. Production equipment and its capacity, this point is usually addressed as very important, but in the initial establishment of the supplier, it is necessary to verify whether its production capacity and technological capabilities meet our expectations, which is helped by audits or references from other companies. In point 6, the price is evaluated, the system can compare individual prices in different time periods, but this information is not very valid, the influence is played by inflation, crops, developments in the commodity market, etc. In this case, a comparison based on tenders and demands and monitoring developments in the commodity market is rather recommended. Point 7. Technical competence, will be addressed in a similar way as in point 5.

Point 8 addresses the financial position of the supplier, but especially his financial health, this can be verified with reputable companies, but this action is charged, so the company checks only strategic suppliers based on the financial volume for the year, which it sets. This information can be added to the overall evaluation, but it is not recommended to assign a criterion to it, it is rather an informative information. If it is the total financial volume with the supplier for the calendar year, then the system is able to evaluate this information.

In point 9, we then meet the adherence to procedures, again we find out more through supplier audits on site. Point 10. Communication is more based on personal experience and is not transferable for digitalization. We can only use the storage of the results of this point for the software and trace its history at any time.

Point 11. Reputation and position in the field can be found, for example, by reference.

The desire for business in point 12 indicates what development the supplier plans, what his visions, goals, etc. are. can be found only by personal contact or by watching the press releases of the supplier, which would be very difficult for the purchase and would not bring essential information for evaluation. Management, organization, and controls of the operation are again rather the subject of personal investigation and these processes cannot be fully automated.

Other points in the category of average importance and low importance are in (Tab. 1) Of these points, it is worth mentioning the geographical location and financial volume in the past, when the software allows automatic evaluation and it is therefore possible to add these points to the evaluation overview.

Purchasing digitalization appears to be an effective tool for supplier evaluation. It is thus possible to expand the number of criteria that can be evaluated automatically by the system and thus gain a better overview of the services and possibilities of suppliers. Save time for evaluators who can focus on strategic activities. Continuously improve and streamline the processes themselves. The great advantage of digitalization is the storage of evaluation data on one software platform, and their easy traceability even for cases where the process cannot be automated, although some data are entered into the system manually, but can be traced and analyzed at any time. Based on a detailed overview, we then have the opportunity to determine further steps to improve supplier-customer relationships. After the introduction of the digital transformation of purchasing, space opens up for its further optimization, especially by automating part of the purchasing processes. Supplier evaluation is one of them.

Conclusions

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