

# The Impact of the implementation of an application on the digitization of the purchasing department at an OEM in the context of the automotive industry

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## **The Impact of the implementation of an application on the digitization of the purchasing department at an OEM in the context of the automotive industry**

### **Abstract**

Over the last few years, digitalization has been drawing increasing attention in the purchasing and supply management (PSM) field due to the necessity of a more connected ecosystem among businesses and in the context of the fourth industrial revolution. Since digitalizing Business processes can benefit companies by increasing the efficiency of their processes and enabling automation, by reducing the workload of administrative tasks to enabling better decision-making, digitalization represents a great business lever.

In order to keep up with the market trends, companies are increasingly being required to proceed to an in-depth transformation of their business model, through finding the best practices within and outside in order to maximize their value creation. Which can be achieved through digitalization, as purchasing being an important function of supply chain management that is in charge of procuring products and services, thus it is primarily concerned with digitalization.

Digitalization of the purchasing function aims to achieve lower costs with minimal supply chain risk; it puts into question the company's overall sourcing strategy in order to ensure that the company's requirements are being met making a disruption with the different practices that were previously spread in the purchasing field.

In a competitive industry that is the automotive one, companies are constantly being challenged in order to keep up with the highly changing environment that they are operating in. since digitalization does no longer represent an advantage but more of an industry standard.

This study aims to measure and assess the effect that the implementation of an application called TEM had on the purchasing department of an OEM company in its different sites in France and Morocco.

**Keywords:** digitization, purchasing, the automotive industry

**Classification JEL:** D23, D33, F14

**Paper type:** Empirical research

## **1. Introduction**

Currently, companies are undergoing a disruption in progress assignable to how digitalization is quickly changing the technological landscape as a result of the fourth industrial revolution. (Kagermann, Helbig, Hellinger, & Wahlster, 2013; Müller, Buliga, & Voigt, 2018).

Relationships between organizations (businesses, government al agencies, and others) and customers are being transformed in this more digital age, and new business models are being established. Companies in all industries now require agility, speed, flexibility, and the capacity to pivot quickly in order to seek new business possibilities and keep up with a rapidly changing global business environment. Digitalization emphasizes the significance of integrating advanced technology into all processes, products, and services. However, much of digitalization's promised value for business and society has yet to be realized. (V.Parida ,2018).

(VanWeele and Van Raaij, 2014) state that as organizations' reliance on suppliers' inputs and contributions has increased, the Purchasing and Supply Management (PSM) function's prominence as the interface controlling these inputs has risen. Thus, Purchasing and Supply Management (PSM) is under intense pressure to develop new ways to contribute to business goals. Purchasing and Supply Organizations strive to improve performance in line with expectations (L Bals, J Laine & G Mugurusi ,2018). PSM are more than ever essential for the effective and efficient functioning of manufacturing firms. The PSM function has progressed from routine and mechanical to one that can provide actual competitive advantage (Fine 1998) such as cost savings (Ellram 1996) and many more.

In light of the deployment of its purchasing department's digitalization strategy (PO) invested in an application called TEM, the aim of this investment is to revolutionize the practices formerly spread in the department such as the exchange of informations through excel sheets that are manually filled, managing supplier's accounts using platforms such as docshare

The purpose of this study is to add to the literature on PSM digitalization, also to provide an assessment of the application's performance and most importantly its impact on the digitalization of the purchasing departmenet.

The research conducted aims to find answers to the following research question:

RQ: How does the implementation of the team application affect the organizational effectiveness of the purchasing department?

The objective of this research work is to assess and determine the impact of the implementation of the application, on the organizational performance of the company in the context of the automotive industry. Human factor and buyer's performance, rules of procedure, workflow efficiency are taken as independent variables, and the implementation of the application is taken as the dependent variable.

## **2. Literature review:**

### **2.1. PSM and industry 4.0:**

According to research, technologies that comprise a new industrial paradigm growing around the usage of digitalization, connectivity, and automation have been identified. 3D printing (Meyer, Glas, & Eßig, 2020) is an example of a maturing and emerging technology, cloud computing (Manuel Maqueira, Moyano-Fuentes, & Bruque, 2019), blockchain technology (Kurpjuweit, Schmidt, Klöckner, & Wagner, 2021; Schmidt &

Wagner, 2019), big data analytics (Chen, Preston, & Swink, 2015; Kache & Seuring, 2017), machine learning (Bohanec, Kljajić Borštnar, & Robnik-Šikonja, 2017), and artificial intelligence (Baryannis, Validi, Dani, & Antoniou, 2019; Toorajipour, Sohrabpour, Nazarpour, Oghazi, & Fischl, 2021)

E-procurement systems are evolving and can have a substantial impact on operational ordering of products and services (Johnson, Klassen, Leenders, & Awaysheh, 2007). The requirement for human interaction is decreased by smart supporting technology, which manages operational ordering or payments (Hawking et al., 2004). As a result, there is no need for human interaction to identify demand requirements. Advanced sourcing software systems, also known as e-sourcing solutions, allow the analysis of previous requests for quotation (RFQs), which helps improve future quotations and identify a large list of suppliers (Schiele & Torn, 2020).

In practice, identifying new roles can lead to an unmanageable inflation of roles within a department, so it is critical to view their development as dynamic, as noted in studies in other organizational functions, such as information and communications technology (Malandri, Mercurio, Mezzanzanica, & Nobani, 2021), human resource management (Ulrich, Younger, Brockbank, & Ulrich, 2013), and supply chain management (Liboni et al., 2019). First, current positions may need to be eliminated and new roles created based on organizational needs; second, existing roles' task or skill requirements may alter.

## **2.2. Organizational performance:**

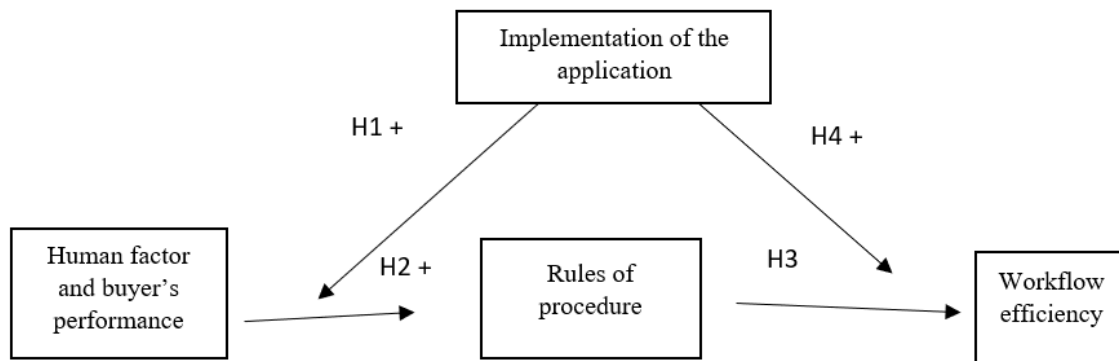
Organizational performance is the most important topic for every firm, both for commercial and non-profit objectives. Managers must understand which elements influence organizational performance. Nonetheless, describing, conceptualizing, and evaluating performance is not a very difficult task. As a result, organizational performance is defined as the extent to which a corporation can satisfy the needs and survival requirements of its owners. As a result, performance is not fairly correlated with a given level of turnover, a sizable market share, or supplying the greatest goods. Because it can also be accomplished concurrently via a performance description. Organizational performance can be influenced by a variety of elements that, when combined in uncommon ways, either increase or decrease production (Aluko, 2003; Ramayah et al., 2011). Companies may employ digital marketing to prosper in the digital age.

## **3. Hypothesis and research objectives:**

### ➤ Research question:

What is the impact of the implementation of the application TEMPO on the digitalization of the purchasing function's efficiency in the company?

**Figure 1: Conceptual model of research**



*Source: authors*

Our method of investigation on the field part, is based on a questionnaire. It consists of different types of questions evaluating the different aspects of the factors affecting our assumptions, and which is intended for the group of buyers from the host company. The idea being to help the interviewee to position himself the most in his daily life with the various repetitive tasks of his work with the new digitized mode.

We will allocate the questions in the form of parts, according to our research hypotheses H1+: The implementation of the application TEM will moderate the relationship between the buyer's performance and the application of the rules of procedure.

**Table 1: the relationship between the buyer's performance and the application of the rules of procedure**

Items	Research objectives
Degree of adaptability to change	To determine the buyer's ability to change and to accept change.
Degree of involvement in the deployment of the department's digital strategy	To measure the implication of the buyers' in the digitalization strategy of the department.
To what extent has the implementation of the TEMPO application improved the user's performance	To evaluate the applications effect on the performance of the buyers.

*Source: authors*

The performance of buyers is linked to the functioning of the company. Users are the most concerned by the improvement initiatives and their opinion is the most important insofar as they are the ones who master the flaws in the system. The operational team must have absolute mastery of the application, to ensure the function runs smoothly.

H2+: The human factor and the buyer's performance have a strong relationship with the application of the rules of procedure.

**Table 2: The degree of adaptation to the digitization**

<b>Items</b>	<b>Research objectives</b>
The degree of adaptation of the internal regulations to the supplier creation procedure	To identify whether the application of the creation procedures and the internal regulations do match.
The degree of adaptation of the internal regulations to the modification procedure?	To identify whether the application of the modification procedures and the internal regulations do match.
The degree of adaptation of the internal regulations to the contracting procedures	To identify whether the application of the contracting procedures and the internal regulations do match.

*Source: authors*

The human factor is a very essential element. Consideration of the regulation of work activity imposes a specific way of approaching human performance, compared to that suggested by Taylorism and the school of human relations. This way implies a change of perspective on the measurement of the human cost, because the latter directly affects work performance and directly the service rate.

The openness of man to new workflow to improve his daily life in the short and long term is very important in the success or failure of any approach envisaged. The principle of long-term thinking considers that it is necessary to invest in the training of employees even at the expense of short-term financial objectives.

H3+: The application of rules of procedure will positively impact the workflow's efficiency.

**Table 3: The impact of digitization on the workflow's efficiency**

<b>Items</b>	<b>Research objectives</b>
Does TEMPO helps reducing the work time and the workload	To examine the application's effect on the work time/load.
How well does TEMPO ensure confidentiality of information per user	To point out TEMPO's role in the protection of confidentiality of the users.
How much does TEMPO allow to keep track of (change, validation, modification...) of suppliers' accounts	To identify the level of the application TEMPO in keeping track alongside the workflow.

*Source: authors*

The objective of this hypothesis is to see the perception of users in relation to the installed application, does it indeed contribute to the reduction of their working time, if this application ensures a certain degree of confidentiality and traceability. The objective in general is to see if the strategic objectives go in the same direction of the operational results  
 H4+: The implementation of the application TEMPO will moderate the relationship between the application of the rules of procedure and the workflow's efficiency.

Rigid procedures are a major obstacle in any change process, certainly companies must have a certain number of procedures to follow and respect. But when it comes to change, shouldn't we ask ourselves if this current functioning is not in line with the change approach that the company wishes to adopt? Hence the interest of our hypothesis.

## 4. Methods:

### 4.1. Study area

The automotive industry was chosen as the target sector, with the target population being composed buyers and senior level managers from the company. The data were collected through a matrix-based survey questionnaire.

The purchasing manager of the host company accompanied us to get closer to his counterparts in order to obtain a maximum of quick answers. The Purchasing community is made up of around 300 buyers, assistants and purchasing managers... reaching half of its workforce has not been easy, especially with the workload they have.

First of all, we need to evaluate the response rate, also called the return rate, this indicator has long been considered the indicator of excellence for measuring and assessing the quality of return during an administration process. of a questionnaire. The response rate is calculated by the ratio between the number of individuals who responded to the questionnaire and the total number of individuals contacted during the survey.

*Equation 1 response rate calculation*

$$\text{The response rate} = \frac{\text{Number of individuals answered the questionnaire}}{\text{Total number of individuals contacted}}$$

Then we will proceed to assessing reliability by comparing the amount of shared variance, or covariance, among the items making up an instrument to the amount of overall variance. Thanks to the Cronbach's alpha

*Equation 2 Cronbach's alpha calculation*

$$\alpha = \frac{k}{k-1} \left( 1 - \frac{\sum_{i=1}^k \sigma_{Y_i}^2}{\sigma_X^2} \right)$$

*Source: Making sense of Cronbach's alpha*

In general, it is considered that this coefficient is acceptable from 0.7 even if a value greater than 0.9 is often desirable. Indeed, Cortina, J.M. (1993) defined a commonly accepted rule to describe internal consistency using Cronbach's alpha depending on the value found:

*Table 4: Cronbach's alpha calculation*

Interpretation	
Cronbach's alpha	internal consistency
$0,9 \leq \alpha < 1$	Excellente
$0,8 \leq \alpha < 0,9$	Good
$0,7 \leq \alpha < 0,8$	Acceptable
$0,6 \leq \alpha < 0,7$	Questionable
$0,5 \leq \alpha < 0,6$	Poor
$0 \leq \alpha < 0,5$	Unacceptable

*Source: Making sense of Cronbach's alpha*

## 4.2. Sampling method

The work by Comrey and Lee (2013) demonstrates that the acceptable size of a sample should be more than 200 respondents. Drawing on their work, Haque et al. (2017) highlight that any sample size of more than 200 is adequate in social science research to reach a reasonable inference. Accordingly, 300 survey questionnaires were sent out to the respondents, with adequate instructions on how to fill out the survey questionnaires properly, as well as the purpose of the research, which proved to be efficient. The online methods of questionnaire distribution included Microsoft forms and e-mail. After sending out the survey questionnaire, 230 responses were collected, with a 76.66% response rate. The sampling method used for the subsequent research work was representative sampling, in order to ensure that only those participants are targeted who truly represent the larger population, which, as a result, helps improve the overall accuracy of the research work to be carried out.

## 5. Results and discussion:

### 5.1. Results:

IBM SPSS Statistics was used for the data analysis. The reliability of the research instrument was tested using Cronbach's alpha.

*Table 5: Cronbach's alpha results*

Variables	No. of items	Cronbach's alpha
Implementation of the application	5	0.930
Human factor and buyer's performance	8	0.951
Rules of procedure	7	0.943
Workflow efficiency	7	0.950

*Source: Our study research*

The table shows that each variable of the research instrument had a Cronbach's alpha value greater than 0.7. Therefore, the reliability test was successfully passed by the research instrument.

The purpose of this study was to examine and determine the influence of the implementation of the application on the department's performance, which is one of the world's fastest-growing retail marketplaces.

*Table 6: statistical significance test*

Variables	$\beta$	t	Sig
Implementation of the application	0.421	10.0.040	0.00
Human factor and buyer's performance	0.433	10.375	0.00
Rules of procedure	0.438	10.527	0.00
Workflow efficiency	0.427	10.2194	0.00

*Source: Our study research*

The results collected provided compelling proof of a significant link between the implementation of the application and the department's performance.



## **5.2. Discussion:**

H1+: The implementation of the application TEM will moderate the relationship between the buyer's performance and the application of the rules of procedure.

In this kind of situation, it is necessary that the user appreciates his work tools, since it directly impacts his performance. The performance evaluation of employees consists in making a judgment on the work activities carried out by the latter during a determined period. In order to avoid frustrations, confusion or disputes, this judgment must be based on explicit, objective criteria known to employees.

It is highly recommended to identify the strengths and weaknesses of the employees of an organization in terms of knowledge, know-how and interpersonal skills. In order to accompany them on each step of change, which of standardization in our case.

H2+: The human factor and the buyer's performance have a strong relationship with the application of the rules of procedure.

During our study, we noted several reactions by launching that there will be a change in working methods, starting with people over the age of 40, a change for them implies that they will bury a daily d ten years of experience, which is actually not a bad thing. What generated a certain refusal at the beginning and complications to convince the users to adopt the new approach and to adhere to it.

For some employees, standardization was seen as an enemy, while it is an improvement system. Among the feedback we received: "these tasks do not suit us. Why will we be forced to do something we don't like? There are potentially other people who like to do it, but not us" while other employees were very motivated by the idea of standardization.

H3+: The application of rules of procedure will positively impact the workflow's efficiency.

Change management is organized around a process that must be mastered and which requires knowledge of the existing situation, management of the process, action and acceptance of the risks.

The host company has several standards to be respected and enforced by all the teams of the company, interdepartmental relations are regulated by procedures invented by the top management of the group division. As these are two different levels, operational and strategic. There are well-existing difficulties at the level of operations management but unfortunately not perceived by top management. Despite the different reassembled.

H4+: The implementation of the application TEM will moderate the relationship between the application of the rules of procedure and the workflow's efficiency.

The link between the company's internal procedures and digitalization is essential for its success, the two concepts must be moderated in order to achieve a common objective. The rigidity of the systems adopted by some companies, including the host company, represents a major obstacle to the digitalization process to prove its efficiency.

## **6. Conclusion**

The literature review allowed us to clarify more and more the relevant concepts and basic elements of our theme. This part concerned notions such as the Supply Chain and its jerseys, infologistic technologies, digitization... All these notions have been well delimited for the sake of better scientific clarity when defining and building our research model.

The part relating to the methodology of the research and the empirical study guided us to clearly understand the scientific approach of our thesis. The choice of the constructivist paradigm allowed us to understand and act on social behavior, in other words to a construction of reality from observations and experiences raised directly from the field, following a mainly inductive method. The latter in its role opened up different lines of thought for us, that the reality is not general and definitive our objective was to develop a different theory, which consists of either validating or refuting a conclusion made.

The digitization of processes and operating methods leads to a gradual change in overall efficiency. It is a collective effort where all stakeholders are involved. Without standard work, good ideas are not capitalized by the company, and there comes a time when it does not move forward.

Our study is only a start for another line of research, we cannot conclude that the digitalization process is not beneficial for companies based on a particular case. Or say that it positively impacts the costs of the company as well as it creates value based also on another particular case. Our research does not bear a definitive result on his theory of optimization and value creation.

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## Appendix

Facteur humain et performance					
Quelle est votre tranche d'âge ?					
Les réponses envisagés	Moins de 25 ans	Entre 25 et 35 ans	Entre 35 et 45 ans	Entre 45 et 55 ans	Plus de 55 ans
Quel est votre positionnement au sein de la direction des achats MRO ?					
Les réponses envisagés	Manager des achats		Acheteur	Assistant achat	
Quel est votre degré d'adaptabilité aux changements ?					
Les réponses envisagés	1	2	3	4	5
Quel est votre degré d'implication dans le déploiement de la stratégie digitale du département ?					
Les réponses envisagés	1	2	3	4	5
Quel est votre degré d'adaptation à la stratégie de transformation digitale du département ?					
Les réponses envisagés	1	2	3	4	5
A tel point est-ce que la mise en place de l'application TEMPO a permis l'amélioration de votre performance ?					
Les réponses envisagés	1	2	3	4	5
A quel point vous jugerez utile la formation dont vous avez pu bénéficier pour assurer votre compréhension de l'application avant sa mise en place ?					
Les réponses envisagés	1	2	3	4	5
Procédure et fonctionnement					
Selon vous, quel est le degré d'adaptation du règlement interne à la procédure de création fournisseur ?					
Les réponses envisagés	1	2	3	4	5
Selon vous, quel est le degré d'adaptation du règlement interne à la procédure de modification ?					
Les réponses envisagés	1	2	3	4	5
Selon vous, quel est le degré d'adaptation du règlement interne aux procédures de contrats ?					
Les réponses envisagés	1	2	3	4	5
A quel point vous jugerez utile la migration de la gestion des demandes d'achat vers TEM ?					
Les réponses envisagés	1	2	3	4	5
A quel point vous jugerez utile la migration de la gestion des Commandes vers TEM ?					
Les réponses envisagés	1	2	3	4	5
A quel point vous jugerez utile la formation dont vous avez pu bénéficier pour assurer votre compréhension de l'application avant sa mise en place ?					
Les réponses envisagés	1	2	3	4	5
A quel point est-ce que l'intégration des tarifs par l'acheteur directement sur TEM vous semble pratique ?					
Les réponses envisagés	1	2	3	4	5
Si cette intégration peut se faire par le fournisseur à quel point vous la jugerez pratique ?					
Les réponses envisagés	1	2	3	4	5

Workflow					
A quel point est-ce que TEM vous permet de réduire le temps de travail ?					
Les réponses envisagés	1	2	3	4	5
A quel point est-ce que TEM assure la confidentialité d'information par utilisateur ?					
Les réponses envisagés	1	2	3	4	5
Selon vous, à quel point TEM vous permet de garder une traçabilité sûre (changement, validation, modification...) ?					
Les réponses envisagés	1	2	3	4	5

*Source: Auteurs*