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Le rôle de la collaboration dans la supply chain de l'industrie automobile au Maroc

The role of collaboration in the supply chain of the automotive industry in Morocco

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Résumé

La compétitivité n'est plus désormais définie par le prix et la qualité seulement, mais aussi par le service ou autrement la disponibilité des produits sur le marché, un facteur essentiel qui s'ajoute aux autres facteurs de création de valeur et qui se justifie de plus en plus. Il reste néanmoins difficile de donner priorité au service au détriment de maîtrise des coûts et l'objectif se dresse alors ainsi : assurer une disponibilité des produits dans les marchés malgré leur turbulence sans impacter pour autant les coûts. Les pratiques collaboratives montrent à cet égard des résultats satisfaisants en assurant flexibilité et réactivité (performance opérationnelle) sans impacter sensiblement les coûts (performance des coûts).

Le projet de recherche que nous menons porte sur les pratiques collaboratives d'apprentissage dans l'industrie automobile au Maroc, le sujet du présent article est de nous assurer de l'effet et des résultats de ces pratiques dans ce contexte. L'étude empirique montre que les pratiques collaboratives sont plus corrélées avec la performance opérationnelle que la performance des coûts.

Mots clés : Supply chain collaboration ; Supply chain flexibility ; supply chain performance ; Marchés turbulents ; Étude d'impact.

Abstract

Competitiveness is no longer defined by price and quality alone, but also by service or otherwise the availability of products on the market, which is an essential factor in addition to the other factors of value creation and is becoming increasingly important. However, it is still difficult to give priority to service at the expense of cost control, and the objective is therefore to ensure the availability of products in the markets despite their turbulence without having a significant impact on costs. In this respect, collaborative practices show satisfying results by ensuring flexibility and responsiveness (operational performance) without significantly impacting costs (cost performance).

The research project we are conducting focuses on collaborative practices for learning in the automotive industry in Morocco, but first we want to make sure of the effect and results of these practices in this context, which is the subject of this paper. The empirical study shows that collaborative practices are more correlated with operational performance than cost performance.

Keywords : Supply chain collaboration ; Supply chain flexibility ; supply chain performance ; turbulent markets ; impact assessment.

Introduction

Despite the achievement of good levels of efficiency and cost control, supply chains may no longer retain a competitive advantage for long in turbulent markets. The search for responsiveness, flexibility and speed become paramount objectives that require an alignment of the stakeholders in the supply chain being the developed form of collaboration (Lee, 2004 ; Dwayne Whitten et al., 2012).

Numerous studies show that collaboration makes it possible to gain in terms of flexibility, improvement of product quality, speed of design, production, delivery and sensitivity to the market (Stevens, 1989 ; Lambert and Cooper, 2000 ; Pagell, 2004 ; Sadler, 2007 ; Stevens and Johnson, 2016). But many companies use it only to reduce costs by, for example, passing on inventory to their suppliers. However, competition has made markets more turbulent than ever, pushing supply chains to give more priority to operational performance (flexibility, responsiveness, quality) than cost performance (Lee, 2004 ; Vázquez- Bustelo et al., 2007 ; Dwayne Whitten et al., 2012). The question our research answers is : what impact does collaboration have on operational and cost performance in the supply chain of automotive industry in Morocco ? To answer this question, we conducted an impact study using the PLS structural equation method.

We discuss the concept and practice of collaboration and the different meanings it takes in research. The contribution of collaboration to flexibility, responsiveness and cost control in the supply chain is also clarified in the first section. The research model linking the elements of collaboration to operational and cost performance is developed in the second part. We highlight the research methodology in a third part. The evaluation of the external and internal model is then carried out. To conclude, we discuss the results obtained and future research projects.

1. Collaboration in the supply chain

Supply chains need more flexibility, on-time delivery and quality control as markets become increasingly turbulent. Otherwise, supply chains find themselves with unsold products when demand falls and take a long time to regain full speed when demand recovers (Pimor and Fender, 2008). The need for integration is becoming more pressing and was initially aimed at reducing inventory, reducing costs and improving customer service (Stevens and Johnson, 2016).

It should also be pointed out that integration is not only about information, but also about flow, process, knowledge and even strategy. This makes the concept somewhat broad and

more or less ambiguous (Stevens and Johnson, 2016). However, some authors have tried to unpack and flatten it, such as (Fabbe-Costes, 2007), who specifies dimensions of integration :

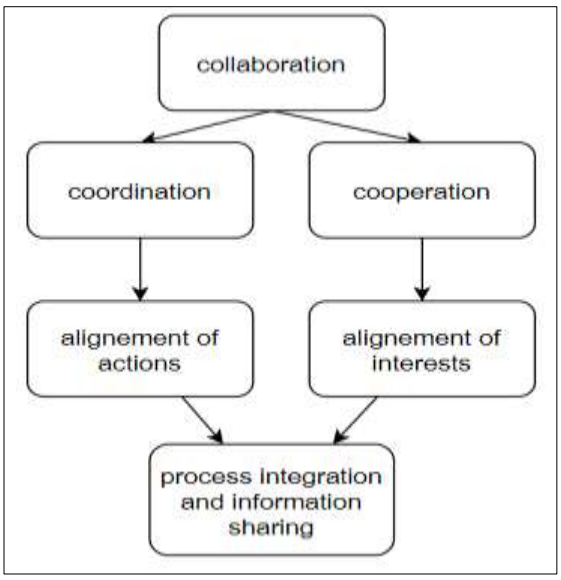
- Flows (physical, information and financial);
- Processes and activities;
- Systems and technologies, which are important components of the SCM;
- Actors (i.e. organizations) commitment of resources

However, the above dimensions are sometimes called coordination, cooperation or integration in the literature and which can all be included in collaboration.

Collaboration - a broad concept and takes the form of different variants, namely: coordination, integration, cooperation - is subject to confusion and reveals an ambiguity in the literature (Barratt, 2004 ; Gligor and Holcomb, 2012).

Some scholars and practitioners, however, clarify the terminology in order to make the concepts clearer. Gligor and Holcomb (2012) for example, argue that coordination is the alignment of actions, and cooperation is the alignment of interests. These two variants, which Barratt (2004), to distinguish them speaks of a low or very advanced level of collaboration that is achieved through integration; information sharing and coordination of processes. For this reason, we propose a figure whose purpose is to clarify even more clearly how the relationships between these concepts are:

Figure N°1 : Relationship between collaboration, co-ordination and co-operation



Source: Developed by us

Often in the literature collaboration is presented as the backbone of supply chain management considering that the basis of this field is the search for global optimization and not disjoint

and local optimizations. Collaboration as a research question gains more space as companies tend to focus on their core business and outsource everything that does not fall within their specialty. However, companies seek to develop relationships with their subcontractors obtaining resources, knowledge and know-how being beyond their control (Cohen and Roussel, 2005).

However, what hinders collaboration in its various aspects is that the supply chain perspective has redistributed inventories, hence costs in the supply chain (Ireland and Bruce, 2000). Large companies often impose on their main suppliers the costs of inventories keeping (Lee, 2004). Indeed, sharing information and coordinating processes is not enough and produces limited performance unless this coordination rises to the strategic level (Barratt, 2002).

Lee (2004), citing the example of supply chains which have succeeded in following the market trend, insists that these do not follow efficient practices which allow more cost performance. But their collaboration was based on better flexibility, responsiveness and quality control which we more properly call operational performance.

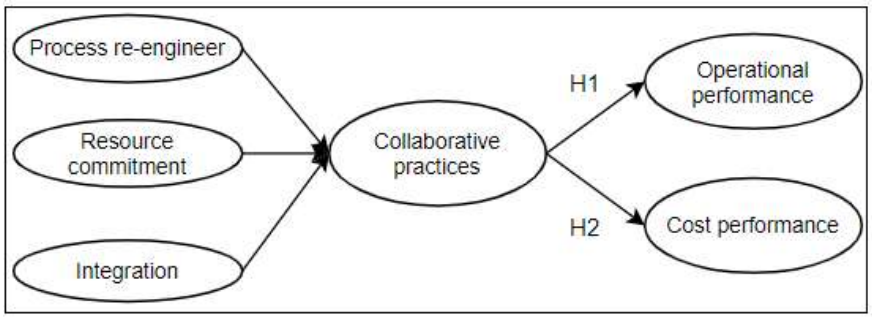
2. Development of research hypotheses

It is therefore clear that the collaborative practices that we have summarized in the commitment of resources, integration and alignment of processes through process re-engineering allows better operational performance and cost performance. The purpose of this research is to ensure this relationship in the automotive industry in Morocco and see if collaborative practices have more impact on operational performance or cost performance.

H 1: Collaborative practices have an impact on operational performance.

H 2: Collaborative practices have an impact on cost performance.

Figure N°2 : Structural model



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3. Research methodology

As this is an impact study, the quantitative methodological choice using a hypothetical-deductive approach seems the most appropriate. In order to carry out this study, we use

structural equations via the PLS (Partial Least Squares) method, which is based on a partial least squares algorithm. This second generation method makes it possible to establish the study despite the small sample size in the case where even the population is not so large, provided that the sample is ten times larger or equal to the number of structural relationships emanating from the central construct of the model (Balambo et Baz, 2014).

The central construct we have in this study, performance, has two structural relationships. This means that the sample must be more than 20 observations, a condition that is met in our study with a sample size of 38 observations in a population of about 100 companies. The context we have chosen to conduct this study is the automotive industry in Morocco which a sector that we consider to be fertile and full of learning, given the advanced level of customization and the complexity of the product it delivers.

Structural equation methods, also called second generation methods, allow to approach complex research models containing several explanatory and explained latent variables (Balambo et Baz, 2014). In addition, the PLS approach is more appropriate for exploratory studies based on reduced samples.

4. External measurement model evaluation

The first step in evaluating the model is to measure convergent and discriminant validity. Convergent validity consists in evaluating the quality of the items that measures the latent variable by the factor loading which must be above 0.7 as well as the quality of the latent variable itself by the average variance extracted (AVE) which must exceed 0.5 to be able to explain more than half of the variance of its items (Bagozzi et al., 1991 ; Hair et al., 2011). Items with a factor loading of less than 0.4 must be deleted. As for between 0.4 and 0.7, it is tolerable to keep them provided that the AVE is improved (Bagozzi et al., 1991 ; Hair Jr et al., 2013). Much like Cronbach's alpha, composite reliability measures the internal consistency, with a threshold of 0.7 (Netemeyer et al., 2003).

Table N°1 : RESULTS OF MEASUREMENTS MODEL – CONVERGENT VALIDITY

Constructs	Items	Loading	CR	AVE
Operational performance	C1	0,755	0,758	**0,441**
	D1	**0,572**		
	F2	**0.635**		
	Q	**0.682**		
Cost performance	SPPD	0,934	0,871	0,773
	EID	0,820		
Resource commitment	HR2	0,847	0,740	0,590
	HR3	**0,680**		
Process re-engineering	OS1	0,973	0,778	0,649
	OS6	**0,593**		
Integration	IC1	**0,579**	0,706	0,553
	IC2	0,866		

Source : Developed by us

Fornell and Larcker (1981) suggests that an AVE of 0.4 is acceptable provided that composite reliability is greater than 0,6.

After having confirmed the convergent validity we move to the discriminant validity whose object is to verify if the latent variables are represented by itself (Hair Jr et al., 2013 ; Hubley, 2014). For this reason, an indicator's outer loading on the associated construct should be greater than any of its cross-loadings. It's also necessary to assess the discriminant validity by the Fornell-Larcker criterion. It compares the square root of the AVE values with the latent variable correlations, the objective is to avoid multicollinearity issues (Hair Jr et al., 2013 ; Ab Hamid et al., 2017).

Table N°2 : LATENT VARIABLE CORRELATIONS

	Process reengineering	Resource commitment	cost performance	operational performance	system integration
Process reengineering	0.886				
Resource commitment	0.446	0.813			
cost performance	0.390	0.390	0.844		
operational performance	0.297	0.580	0.612	0.658	
system integration	0.036	-0.089	0.299	0.066	0.751

Source : Developed by us

The results in the table above show that the variables are represented by themselves.

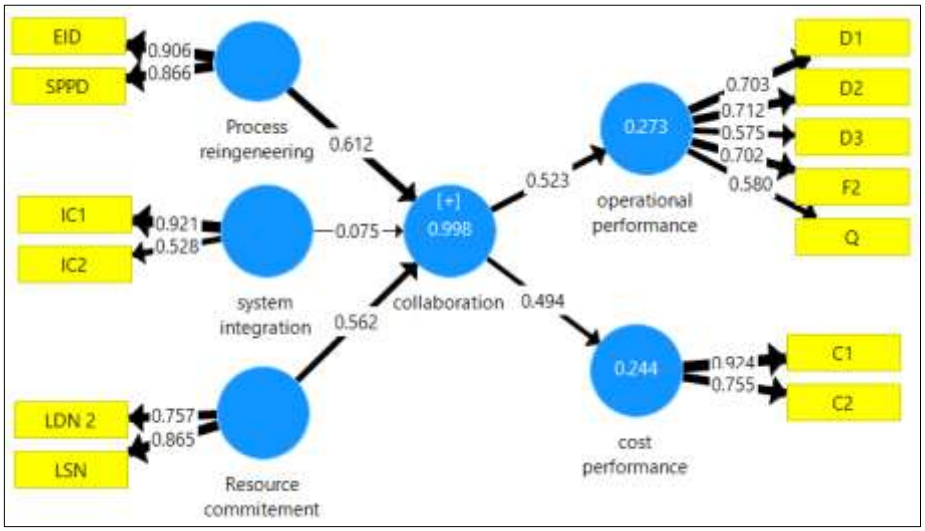
Table N°3 : DISCRIMINANT VALIDITY- CROSS LOADING

	cost performance	operational performance	Process reengineering	system integration	Resource commitment
C1	0.924	0.635	0.363	0.310	0.439
C2	0.755	0.342	0.291	0.168	0.159
D1	0.487	0.703	0.253	0.022	0.401
D2	0.348	0.712	0.142	0.103	0.318
D3	0.565	0.575	0.170	0.045	0.245
F2	0.296	0.702	0.212	-0.062	0.481
Q	0.362	0.580	0.176	0.138	0.403
SPPD	0.270	0.135	0.866	0.200	0.290
EID	0.410	0.372	0.906	-0.111	0.486
IC1	0.345	-0.027	0.049	0.921	-0.090
IC2	0.006	0.227	-0.016	0.528	-0.031
LDN 2	0.073	0.355	0.292	-0.018	0.757
LSN	0.508	0.566	0.421	-0.115	0.865

Source : Developed by us

Indeed, as shown in the table above, an indicator's outer loading on the associated construct are greater than any of its cross-loadings.

Figure N°3 : Conceptual model results



Source : Developed by us

As shown in figure three, the correlation between collaboration and operational performance is stronger with an r-square of 0.273 than with cost performance, with an r-square of 0.244. The analysis of these results is further discussed in the next section.

5. Internal measurement model evaluation

In order to test the research hypotheses, the first step is to calculate the standard beta, standard error, t and p value which must be less than 0.05 (Hair Jr et al., 2013).

Table N°4 : PATH COEFFICIENT OF RESEARCH HYPOTHESES

		Std. Error	T-value	P-value	Decision
H1	collaboration -> operational performance	0.128	3.858	**0.000**	**Supported ****
H2	collaboration -> cost performance	0.101	5.177	**0.000**	**Supported****

Source : Developed by us

According to the results shown in the table above, both hypotheses are accepted. Confirmation of hypotheses does not show whether collaboration is more dependent on operational performance or cost performance. The r-square will be useful in this sense.

Table N°5 : TEST OF MODEL QUALITY

Construct	R^2	Adjusted R^2
Cost performance	0.244	0.223
Operational performance	0.273	0.253

Source : Developed by us

Regarding the quality of the model, the R-squared must be greater than 0.1 (Falk and Miller, 1992). Chin (1998) suggests that the R-squared values of 0.67, 0.33, and 0.19 can be considered as substantial, moderate, and weak, respectively.

The Effect size f^2 is the degree of impact of each exogenous variable on the endogenous variable. The effect can be considered large for a value above 0.35, medium between 0.15 and 0.35 and low between 0.02 - 0.15. A value less than 0.02 indicates that there is no effect (Cohen, 2013). The impact of collaboration practices on operational performance and cost performance is 0.376 and 0.322 respectively. This means that collaborative practices have a positive impact on operational performance and cost performance. We point out that collaborative practices impact operational performance more than cost performance. The R square and the effect size of operational performance are higher than those of cost performance.

Conclusion

We conclude that collaborative practices in the supply chain of the automotive industry in Morocco respond more to operational performance (flexibility, responsiveness and quality) than cost performance. This responds to the directives of lee (2004) and shows that the lessons in supply chain management are more and more put into practice.

The results clearly show that collaborative behavior having the right influence on flexibility, responsiveness and costs is better than opportunistic behavior which can only reduce costs and in the short term. Collaboration must therefore become a common practice in the supply chain and develop further, whereas in the Moroccan context it is still limited to the simple sharing of information (MOUNIR Younes and GOUIFERDA Fatima, 2020).

The results of the present research still encourage further exploratory qualitative research to learn how collaborative practices in the automotive industry in Morocco enable good operational performance, i.e. how they lead to improved flexibility, responsiveness and quality.

Future studies can go in two directions: 1- Quantitative studies exploring other industries and other contexts and ascertain the results obtained in the present study. 2- Other qualitative studies that can investigate in depth how collaborative practices allow for better results in terms of flexibility, responsiveness and quality.

Further research can study the relationship between collaboration and supply chain performance without negative impact on the environment (Alzoubi et al., 2020).

Also, collaboration in the supply chain proves very useful in case of exposure to risks or even major forces like COVI-19 (El-Mahdad, 2020). The study of collaboration and its relationship with risk management also remains a subject to be developed.

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