Supply Chain Performance Measurement: A Case Study about Applicability of SCOR[®] Model in Automotive Industry Firm

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Abstract. The evaluation of a supply chain is a major priority of companies; it is a task that remains difficult due to the complexity of these systems [1]. This evaluation involves a selection of performance measurement indicators, which are appropriate to the management of this chain. It is then necessary to have a structured approach and adequate methodological tools [2]. Indeed, we propose in this paper a practical method that will model in the first place a Moroccan automotive supply chain, according to the SCOR[®] model (Supply Chain Operations Reference), proposed by the Supply Chain Council. This method will also identify at each level the appropriate indicators for the performance evaluation depending on the strategic vision. In this context our research problem is made, it is interested in the contribution of the business modelling to improve logistics performance. To the best knowledge of the authors, this is the first work that proposes a case study believed to be easy to understand, practical and suitable for the automotive sector. In short, this study is a real application leap to resolve the problematic unanswered of practical SCOR[®] model using an industrial application in the Moroccan automotive sector.

1 Introduction

Over the past ten years, logistics sector in Morocco went through a strong growth. A development has been reflected in the improvement of the performance of the Logistics Performance Index (LPI) established annually by the World Bank. Thus, Morocco is currently at the 86th place worldwide in logistics performance after being at 94th in 2007 [3]. A national strategy has been implemented in Morocco to improve logistics performance and develop the competitiveness of Moroccan businesses. Indeed, the supply chain is a well-understood function and successfully deployed in large enterprises, this function remains misunderstood and underexploited in Moroccan automotive companies. The main assumption is that automotive firm requires tools specifically designed and tailored on their characteristics and needs [4]. The automotive industry is a highly globalized sector, where for many actors there is competition from around the world. Faced with the increase in supply and the strong pressure on prices, reinforced by the power of Asian groups (Toyota, Hyundai, etc.) and the arrival of new players from emerging countries (Geely, Tata Group, etc.), many companies seek to optimize their value chain in order to remain competitive [5]. In the supply chain of the automotive industry, many factories are working together to manufacture a product (car, motor, etc.). To meet customer needs, they must be designed and organized appropriately [6].

Logistics can be considered a key competitive factor in the automotive industry due to the increasing number of variants and options of the model. With the growing importance of logistics [7], the evaluation of logistics effectiveness and efficiency is gaining increased attention [4]. For this reason, the automotive sector characteristics and current performance measurement practice have been reviewed and analyzed to derive the main characteristics of an effective model for an automotive firm [4,7]. Moreover, there are many continuous improvement tools such as total quality management, six sigma, continuous process improvement and others that are available for companies to improve their operations. However, none of these improvements programs is dedicated to the logistics chain [8]. The SCOR[®] model was utilized because of its process orientation and growing use among professionals and academics who are directly involved with supply chains [9]. SCOR[®] is also becoming the common language for benchmarking and comparing supply chains and supply chain management practices [9].

Thus, in order to improve business systems, the return on investment, to deal with competitiveness and optimize the efficiency of their supply chain, some global companies apply the SCOR[®] model. In this context and for the same reasons, our company planned to model its supply chain based on the same model since it already has a quality management system based on the process approach. To meet these expectations, we followed the SCOR[®] methodology, which is based on

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performance measurement, benchmarking and implementation of best practices. Currently, our company should first seek to make a diagnosis of the performance of its supply chain to identify critical performance and improve their processes.

2 literature review

2.1 The Supply Chain Operations Reference (SCOR) model

In SCOR®, the integrated processes of PLAN, SOURCE, MAKE, DELIVER, RETURN and ENABLE from the supplier's supplier to the customer's customer represent supply chain management. Elements of business process engineering, metrics, benchmarking, leading practices, and people skills into a single framework are combined with SCOR® [10]. The version 4 was the first to include return process in the supply chain. The Revisions of the model are made by the members of the Council when it is determined that modifications need to be made to facilitate the use of the model in practice [11]. The release of version 11 for access, as well as the incorporation of the new material into all SCOR® training and certification programs, are announced by the Supply-Chain Council (SCC), the global not-for-profit organization supporting supply chain professionals and educators [12]. This major update includes Enable Process, Best Practices, and Redesign Costs. These updates bring the current model with the way these processes, practices, and measures are needed to practitioners of the supply chain that implement the model [12].

SCOR® describes the business activities related to all phases of the satisfaction of a customer request. The model itself is structured around primary management processes, and on SCOR® version 11, ENABLE is advanced to one of these processes, so there are six: PLAN, MAKE, SOURCE, DELIVER, RETURN, and ENABLE. Using these process definition blocks, SCOR® can be used to model supply chains that are very simple or very complex using a common set of definitions in disparate industries. In fact, public and private organizations and companies around the world use the model as a basis for projects to improve the global supply chain [12].

These processes focus on performance management, information, politics, the inventory strategy, capital, transportation, physical logistics network, regulatory and other management processes to enable Planning and execution of supply chain activities. SCOR® covers all customer relationships, product and market surrounding customer orders, purchase orders, work orders, return authorizations, forecasting and replenishment orders. It also includes physical movement of raw materials, work in progress, finished goods and merchandise return [10].

The SCOR® model has three levels of process detail. In practice, Level 1 describes the number of supply chains, how their performance is measured, and necessary competitive requirements. Level 2 presents the configuration of the planning and execution strategies in the material flow, involving standard categories such as "make-to-stock", "make-to-order" and "engineer-to-

order". Level 3 considers the business processes and system functionality used to process sales orders, purchase orders, work orders, return authorizations, replenishment orders, and forecasts. Level 4 process details are not contained in SCOR® but must be defined to implement improvements and manage processes. Advanced users of the framework have defined process detail as far as Level 5, software configuration detail [10].

Organizations using the model SCOR® performance metrics can compare their performance levels compared to other organizations in the supply chain using a benchmarking tool called SCORmark. The SCORmark database contains historical data from over 1000 companies and 2000 supply chains. The benchmarking process using the SCORmark can be performed by the following steps: (1) defining the supply channels to be compared; (2) measuring the internal and external performances; (3) compares the performance to relevant industrial companies; (4) establish competitive demands; (5) calculate the opportunity value of improvement [18,19]. To facilitate the comparison, the SCORmark stratifies the process performance according to three points [14]:

- "Superior": is the performance (median value) on a specific indicator attained by 10% of the best classified SC's comparing to the total of the supply chains surveyed;
- "Advantage": is the performance (median value) among the top 10 companies and the median of all the supply chains considered;
- "Parity": is the performance (median value) of all the supply chains considered.

The APICS^a the association announced the launch of the SCOR model version 12.0. Developed by a panel of international supply chain experts, this latest version of SCOR incorporates Omni-channel, metadata, blockchain and other emerging engines that supply chain professionals are using today. SCOR has been the global inter-sectorial standard for supply chain excellence over the last 20 years and, with this update, will continue to support ways to measure, improve and communicate the supply chain's business performance [15].

2.2 The performance measurement in the automotive industry

Lebas (1995) considers that performance is built by the management system and by managers. Performance management precedes performance measurement and makes sense of it. He says that performance measurement and performance management cannot be separated. In his opinion, all those who have focused exclusively on measurement, without understanding that the measures only speak of the consequences of the decisions that created the context of performance, have missed the opportunity to take control and master the process of creation of performance and success for the company or organizational unit examined [16].

^a APICS is the association for supply chain management and the leading provider of research, education and certification programs that elevate supply chain excellence, innovation, and resilience.

The measurement mechanisms and performance evaluation have been incorporated into the commercial atmosphere since the start of mass production. The need to measure performance has augmented since the creation and evolution of large companies [17]. As said by Neely et al. (1995) the performance measurement process implicates three central concepts: (1) performance measurement: it can be described as the process of quantifying the efficiency and the effectiveness of the actions; (2) performance measured: metric used to measure the efficiency and/or the effectiveness of the action and (3) system of performance measurement: it is the unity of metric used to measure effectiveness and efficiency of actions at the same time. The performance measurement is one of the essential elements in the management systems, and the performance involves the result of decisions taken [18].

By sweeping the literature on this topic of performance measurement in the automotive industry, it is clear that there are not many articles that deal with methods on this subject. Indeed, the most relevant articles will be quoted below with a summary of the results of each article, and this after filtering the search results in the following academic databases: Science Direct (www.sciencedirect.com), Scopus (www.scopus.com) and Springer (www.springer.com). An additional search was conducted using the Google Scholar search engine (scholar.google.com). The chain "performance measurement in automotive industries" was used to search for documents on databases, which followed the described criteria. Below, the most relevant works for our study are presented:

Dornhofer et al. (2016) have developed a modular performance measurement system for the automotive logistics chain. A process perspective is included in the performance measurement system to increase specificity and facilitate continuous improvement initiatives. Furthermore, by integrating the lean logistics principles, an alignment of their approach with the latest developments in logistics concepts in the industry is reached and lean implementation is maintained applying a consistent performance measurement system. To ensure standardization and, at the same time, the flexibility to adapt the performance measurement system to specific logistics processes within a specific company or even manufacturing site, they suggested a new, modular set-up of the performance measurement system, break down the logistics objectives identified at each stage of the process into the supply chain, from a supplier to the customer. The proposed modular performance measurement system can be designed in line with the processes, resulting in a consistent performance measurement system for the whole logistics chain and offering the potential for a supply chain-wide roll-out while, at the same time, covering site-specific processes in a standardized way. Additionally, the comparability of the performance measurement system in terms of benchmarking is ensured throughout the stages of the logistics process, as well as in the overarching performance measurement system [19].

Gaiardelli et al. (2007) proposed an integrated framework for measuring the performance of the aftermarket network and provided an empirical application to two automobile record companies and their official service network. The cases in this study

show that performance measurement systems of different actors in the supply chain need to be aligned to achieve strategic coherence. Especially, the performance of different actors at the process level of the framework concurs in determining the after-sales service overall performance concerning the final customer. Furthermore, linkages at other levels (mainly the business and activity ones) may be needed or helpful in ensuring uniformity between strategic and operational objectives, inside the organizations and thus for the whole supply chain. The after-sales activities are currently acknowledged as a pertinent source of revenue, profit and competitive advantage in most manufacturing industries. Top and middle management, therefore, should concentrate on the definition of a structured business performance measurement system for the after-sales business. In addition, from the time when many actors are involved along the after-sale service supply chain, an integrated and multi-attribute set of measures requests to be designed consistently at every level of the supply chain [20].

Saad and Patel (2006) have studied the relevance of the concept of supply chain performance in developing countries. They have also tried to identify performance measure sets for supply chain performance in the context of a developing nation. Their research emphasizes on supply chain practices in the Indian automobile sector. It classifies and discusses the main motives and determinants for the adoption and implementation of supply chain management concepts. Their research is built on a combination of qualitative and quantitative methods. Primary data were collected by semi-structured interviews and an exploratory investigation [21].

Sanchez and Perez (2005) have explored the link between the dimensions of supply chain flexibility and firm performance in a sample of automotive suppliers. They have found in this research an optimistic relation between a superior performance in flexibility capabilities and firm performance, although flexibility dimensions are not equally important for firm performance. On the other hand, the results indicate that firms are developing more basic flexibility capabilities (at the shop floor level) than overall flexibility capabilities (at the client-supplier level). Nevertheless, aggregate flexibility capabilities are more positively connected to firm performance than basic flexibility capabilities. Therefore, companies might miss opportunities to increase competitiveness by underestimating customer-supplier flexibility capabilities. Finally, the results of this research show that flexibility capabilities are enhanced in supply chains with higher environmental doubt, technological complexity, and mutual understanding, but with lower interdependence among the agents involved in the supply chain [22].

Han et al. (2017) explored a performance measurement system for a dynamic supply chain partnership in an intercultural context. They built an initial framework by examining the existing literature, and then they concretize this framework through an in-depth case study in the Chinese auto industry. Afterward, a performance measurement system, including relational strategy and operational measurement criteria for a supply chain partnership, was developed. In fact, and according to them, the relational strategy contains elements of strategic orientation, management style,

interdependence, mutual organizational characteristics and common objectives. Operational measurement criteria are a commitment, trust, communication behavior, information sharing, decision to participate, quality, production performance, delivery, cost, vendor strength, attitude, compromise, and loyalty. The last three operational measurement criteria are particularly relevant for the intercultural characteristic [23].

Velda and Dhiba (2017) have highlighted through the literature review the practices necessary for the implementation of supply chain management in the automotive sector in Morocco. They have chosen as the practice of the supply chain "the management of the supplier relationship"; they studied its impact on the performance of the automaker's suppliers. Their results using a series of equation regressions have highlighted an object of supplier influence the performance of supplier relationship management practices of the automaker in Morocco [24].

On the basis of the review of the literature and the best knowledge of the authors, the following remarks were made:

- No article on the SCOR model in the automotive industry as a model for managing the performance of the automotive supply chain.
- No articles using an industrial application of the SCOR model in automotive industries
- The frameworks proposed in the existing articles do not cover the entire global automotive supply chain
- The proposed frameworks cannot be transversalized on the various typologies of the entries of the automobile sector (OEM, Tier 1, Tier 2 ...)

The purpose of this paper is to meet these needs by applying the SCOR model to an automotive company and taking advantage of the advice of industry professionals and practitioners to assess its benefits and limitations after deployment. In the following part, the case study will be developed with the different stages of the SCOR model, modeling, benchmarking, performance indicators, gaps and best practices for the company studied.

3 Methodology

This paper aims at providing for the automotive industries a more suitable, practical and concise path for SCOR® model. To fulfill this aim, it is well documented that case studies provide the very effective approach [29,30]. This is advocated by Yin (2009) who recommended that a case study was especially appropriate when trying to answer the "how" [27]. This is perfectly useful for our case, which focuses on an industrial application about the applicability of SCOR® model in automotive industry firm. Indeed, our methodology used elements of an explanatory case study focusing on the applicability of the SCOR® model. Furthermore, it could also be called an exploratory case study [28] when it came to understanding the metrics used presently within the company, their alignment with the proposed SCOR® model and the integration of the company into our framework during the implementation step. We consequently evaluated the framework using a

case study at one manufacturing site of a Moroccan automotive industry. The company studied here is an international automotive company with more than 45 years of experience in the automotive sector, an annual turnover of approximately 3300 million EUR and 14,500 employees around the world. For evaluation purposes, we used a mixture of workshops across logistical functions and also based on interviews, documents made available and data analysis. The participants are dispersed across all levels of grading, from operative level up to logistics management of the different sites.

In the beginning, the first series of workshops was conducted with the aim of aligning the logistic objectives found in the literature with those used on the site. Founded on that, we proposed an open workshop format to collect the required performance indicators from logistics experts within the focus company. The focus was on the transparency of the performance indicators collected at the time, their relevance according to the experts' judgments, in addition to the supplementary performance indicators that were considered relevant for monitoring and improving logistics processes. Subsequently, the clustering and consolidation of all the performance indicators proposed by the SCOR® model and identified in the open workshop rounds were applied. We compared our proposed performance indicators with the ones identified in the experts' workshops. Performance indicators which were not named by the experts, but proposed in standard SCOR®, were highlighted and discussed in respect of their added value in a supplement meeting. The subsequent model was aligned in another round of workshops and additional interviews. After changing the detailed definition of the SCOR® model and each measure (alignment with data sources, adding responsibilities), the system was implemented and data evaluation started, as well as a dashboard allowing performance indicator evaluation launched. Based on that, a quantitative evaluation of each metric was started, which also emphasized initial improvement potentials.

After having implemented the model and finalized its deployment, two brainstorming sessions were conducted to compare the different experiences with this project and to capitalize on it. This allowed us to highlight the contributions of this model for the automotive industries and in return for the weaknesses that can be improved on future research.

4 Case Study

4.1 A brief description of the company

The company already present at Tunisia, chose to develop in Morocco in order to accompany its client and to have a base of production of plastic systems able to deliver the manufacturers based in Spain. The production site Metal understands about ten presses to be followed from 150 to 800 tons and transforms approximately 10000 tons of steel a year. It issues components for the body-in-white of the vehicles of a car maker. The plastic factory of production integrates approximately about ten press 350 and 2700 tons and transforms approximately 3500 tons of annual plastic. It issues components interior and external and engines for the two vehicles, but also of

the components for the equipment suppliers also established with his of the free zone.

Supply and Production control: The trades of the Supply model and Production control are exerted in the factory where the role of the logistics consists in supplying the raw material, the components sub-contracted and the components necessary to the manufacturing of the components. The trades of handling interns (receipt, shipping, management of the warehouses...) are also part of this model. **Administration of the sales:** An administrator in charge of the receipt of the customer orders, imputation of the prices, the establishment of the articles client whose finality is the satisfaction of the client in terms of quantity, quality, and lead-times. **Shipping, receipt, and transport:** The trades of this model are exerted on upstream flows of supply raw material, components, and sub-contracted components

Currently, logistics is at the center of all the activities of the company, divided into 4 business families that cover all logistics activities: from the supply of raw material to the shipment of the final product. In addition, logistics is one of the services of the company that makes the most use of the computer tool: By following all the flows of the company, by anticipating these flows (forecasts, expression of needs, etc.) and overflowing beyond from the company to suppliers and customers.

For the case of our company, it uses as management tools: (1) SAP where the information is centralized (Systems, Applications, and Products, ERP), which integrates the different functions of the company (accounting, finance, production, supply, marketing, human resources, quality, maintenance, etc.). (2) EDI: for the exchange of various documents internally and externally of the company, it is indeed commercial documents or transport such as invoices. the planning process within the company that we are going to study in this paper, is managed by the planner who processes once a week his calculation of net need for finished products via SAP, checks the break dates of each part, and thanks to an Excel file it establishes the planning of all the week as well as the orders of manufacture of the parts to manufacture. These production orders are then issued to the production manager to be distributed to the production items, once the valid and closed planner has been completed and sent to the stock manager for the recorded on SAP.

4.2 Establishing performance metrics

The benchmarking of SCOR® model is done by comparing the indicators of level 1, 2 and 3, however, it is not necessary to apply the three performance levels in each axis. That is why it would be better to prioritize these axes in order to put the level indicators 1 for less important axes and up to level 3 for the most important. The prioritization of performance axes depending on the company's type of business and its management. SCOR standard set the notations for prioritizing strategic axes of the dashboard that will define for each one the objectives to be fixed during the benchmarking. Indeed, the notations S, A and P are used by the SCOR® model to prioritize the axes are:

- S: « Superior » corresponds to the 90th percentile: This means that it will line up with 10% of the best-performing companies.
- A: « Advantage » corresponds to the 70th percentile: The objective will be to reach the performance of 30% of the best companies.
- P: « Parity » corresponds to the 50th percentile: The objective is to exceed 50% of the best companies.

In order to evaluate the process performance, it will be very interesting to complete the indicators that were already in place by other indicators proposed by the SCOR® model, which correspond to its strategic axes.

According to the baseline with which to compare, there are three types of benchmarking:

- Comparison on a historical basis: monitoring indicator development.
- Internal Benchmarking: is the comparison between companies of the same group.
- External Benchmarking: The comparison is made by external organizations.

The SCOR® model proposes the external benchmarking because the more the reference database will be larger, the results will be significant. The objective here will be to line up with the best companies in the automotive sector basing on logistics activities. After defining the indicators on the dashboard, we preceded the collection of data to calculate their values. We worked depending on the importance:

- Reliability: basic information for these indicators was derived from the history of logistics rates and weekly reports.
- Management of assets: this data was collected from the Finance Department and management control. Most of them are confidential, so they will be expressed as a percentage.
- Logistics costs: this information was collected from the Accounts Department from history.
- Reactivity: This indicator corresponds to the lead-time or the time required to complete an order.
- Flexibility: only the part of the supply was held in account for this axis because it is the most important component in terms of time.

The next step is the measurement of the performance indicators for the dashboard. Indeed, the formulas for calculating the different KPIs are presented below:

Service rate (SR) =

$$\frac{\text{Number of processed orders}}{\text{Number of total orders}} \quad (1)$$

$$\text{Order Fulfilment rate} = SR (\text{Quantity by reference}) \times SR (\text{deadline}) \times SR (\text{Accuracy of documents}) \quad (2)$$

$$\text{Fill rate} = \frac{\text{Delivered volume}}{\text{Capacity of the truck}} \quad (3)$$

$$\% \text{ of sales costs (COGS)} = \frac{\text{sales} - \text{Profits} - \text{administrative costs}}{\text{sales}} \quad (4)$$

$$\text{Working capital ratio} = \frac{\text{current assets}}{\text{current liabilities}} = \frac{\text{Receivables}}{\text{Payables}} \quad (5)$$

$$\text{Financial cycle delay} = \text{delay of customer debt} + \text{number of days of stock} - \text{payables delay} \quad (6)$$

$$\text{Payables delay} = \frac{\text{Payables} \times 365}{\text{Annual sales}} \quad (7)$$

$$\text{Delay of customer debt} = \frac{\text{customer debt} \times 365}{\text{Annual sales}} \quad (8)$$

$$\text{Number of days of available stock} = \frac{\text{stock value} \times 365}{\text{Annual sales}} \quad (9)$$

$$\text{Forecast reliability rate} = \frac{\sum_1^n \text{Abs}(\text{sales forecast}(i) - \text{sales}(i))}{\sum_1^n \text{sales forecast}(i)} \quad (10)$$

$$\text{Coverage rate} = \frac{\sum_1^n \text{Warehouse stock}(i) + \text{Outstanding}(i)}{\text{Week average forecasts}} \quad (11)$$

$$\text{Internal service rate} = \frac{\sum_1^n \text{Abs}(\text{planned}(i) - \text{realized}(i))}{\sum_1^n \text{planned}(i)} \quad (12)$$

$$\text{Rate of stock variance} = \frac{\sum_1^n \text{Abs}(\text{SAP stock}(i) - \text{physical stock}(i))}{\sum_1^n \text{SAP stock}(i)} \quad (13)$$

$$\text{Rotation of fixed assets in the supply chain} = \frac{\text{Sales}}{\text{Net fixed assets}} \quad (14)$$

$$\text{Customers complaints rate} = \frac{\text{Number of written complaints}}{\text{Total number of affected deliveries}} \quad (15)$$

$$\text{Service suppliers rate} = \frac{\text{Number of complete delivered orders on time}}{\text{number of orders to be delivered by suppliers}} \quad (16)$$

$$\text{Cost of an out of stock} = \frac{\text{total costs related to a cessation of customer activity}}{\text{number of days of available stock}} \quad (17)$$

$$\text{Number of days of available stock} = \frac{\text{Total outstanding TTC} \times \text{number of days}}{\text{Total turnover tax for the period}} \quad (18)$$

$$\text{Customer return rate} = \frac{\text{Number of returned deliveries}}{\text{Total number of deliveries}} \quad (19)$$

$$\text{Supplier return rate} = \frac{\text{Number of returned deliveries}}{\text{Total number of deliveries}} \quad (20)$$

The established scorecard containing the benchmarking values provided by the SCOR standard as well as the improvement objectives for each metric are presented in Appendix 1.

4.3 Best practices proposed by the SCOR® model

As presented in the dashboard set out in Appendix 1, the difference between the current situation of the company and the value of benchmarking differs from one indicator to another. It is clear that better gap analysis implies good performance improvements. So the first task to do is to know the root causes of these gaps and the processes involved. Regarding the processes mentioned above, the most performing companies have established certain practices that have reported to them tangible benefits. This is a kind of capitalization of experience that the SCOR® model offers through benchmarking. The following table lists best practices offered by SCOR® Framework, taking into account the processes previously diagnosed and the anomalies observed.

The following figure shows the best practices according to their difficulty of implementation and the impact they will have on business processes. Priority actions for this project will obviously be those who have the greatest impact and the least difficulty.

We will prioritize action plans to implement the best practices that have high impacts or benefits for the company and whose difficulty of implementation is low.

Table 2. The best practices proposed by SCOR® model

Processes	Best Practices
P2- supply planning	All Key Participants in the Supply Chain, Including Strategic Partners, Have Full Visibility of the Demand/Supply Plan
	VMI: Vendor-managed Inventory
	CPFR: Collaborative Planning, Forecasting, and Replenishment
P2.1 Identify prioritize product requirements	The Demand Plan is Updated Frequently to Reflect Actual Consumption or Customer Forecast Information
	Maximize Data Integrity and System Accuracy by Ensuring 99%+ Accuracy of BOM Configuration, Inventory Levels, and Schedule Requirements
P2.4 Establish procurement plans	Digital Linkage (EDI, XML, Etc.) is Used to Provide Real-Time Demand Information and Handle Routine Transactions
	Maintain Data and System Integrity by Ensuring Production Data, Inventory Levels, and Schedule Requirements Are 99+% Accurate A detailed production model that synchronizes PLAN and MAKE activities in real time
EP.7 Manages Planning Configuration	ABC Classification

S1.1 et S2.1 schedule deliveries	Electronic Kanban Pull Signals Are Used to Notify Suppliers of the Need to Deliver Product
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5 Conclusion and prospects

Being part of a complex and highly competitive field, and in order to evaluate its position in the automotive industries, the company proposed to model its supply chain and to implement a Benchmarking to improve its performance. To meet this need, we opted for the SCOR® model as a diagnostic tool. The first step was to model its supply chain, according to the SCOR® model, this model aimed to standardize the structure of the process from the existing model. The next step is to develop the dashboard. We were able to compare the company studied with the leading companies in the automotive field through the service offered by the Supply Chain Council. Moreover, based on the results of this benchmarking, we collected the axes that represent an opportunity for improvement for the company; we selected a set of best practices that can rectify the weaknesses detected at certain axes. To do this, we developed an action plan that is likely to implement these best practices. The main prospects for this project are:

- For the company: Integration of proposals for improvements in future projects and Logistics Department of the annual performance of external benchmarking, in order to validate and renew the strategic direction of the company.
- For research projects: The proposal for a model of the SCOR® methodology adapted to the structure of Moroccan SMEs.

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Appendix

The scorecard containing performance metrics measured for the company:

Table 3. The scorecard of the company

Performance metrics	Criteria	Unit	Maximize / Minimize	Frequency	Actual value	Benchmark class			The company objective	GAP
						S	A	P		
Service rate (SR)	Reliability	%	Max.	Week	92%	100%	90%	80%	S	8%
Order Fulfilment rate	Reliability	%	Max.	Week	77%	100%	90%	80%	A	13%
Fill rate	Reliability	%	Max.	Week	76%	96%	82%	75%	A	6%
% of sales costs (COGS)	Logistics costs	%	Min.	Month	5%	3%	8%	13%	S	-3%
Working capital ratio	Management of assets	Ratio	Min.	Month	2.2	1,2	1,5	2	A	-0,7
Financial cycle delay	Management of assets	Day	Min.	Annual	90	13	42	80	A	-48
Payables delay	Management of assets	Day	Min.	Annual	30	-	-	-	-	
Delay of customer debt	Management of assets	Day	Max.	Annual	45	-	-	-	-	
Number of days of available stock	Flexibility	Day	Min.	Annual	85	13	34	78	A	-55
Forecast reliability rate	Reliability	%	Max.	Annual	91%	100%	90%	80%	S	9%
Coverage rate	Flexibility	Ratio	Min.	Month	2,5	1	1,4	2	S	-1,5
Internal service rate	Reliability	%	Max.	Week	95%	100%	95%	90%	S	5%
The rate of stock variance	Flexibility	%	Max.	Week	88%	100%	95%	90%	S	12%
Rotation of fixed assets in the supply chain	Management of assets	-	-	Annual	C ^b					
Customers complaints rate	Flexibility	%	Min.	Week	6%	0%	2%	5%	A	4%
Service suppliers rate	Flexibility	%	Max.	Week	95%	100%	95%	90%	S	5%
Cost of an out of stock	Logistics costs	K€	Min.	Month	12	0	1	2	A	-12
Number of days of available stock	Logistics costs	Day	Min.	Month	15	3	5	7	A	-10
Customer return rate	Logistics costs	%	Min.	Week	2%	0%	0,5%	1%	S	-2%
Supplier return rate	Flexibility	%	Min.	Week	1%	0%	0,5%	1%	S	-1%

^b Confidential information