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Master of science program in Industrial Production and Technological Innovation Enginnering

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Analysis and optimization of costs in a company to improve the performance of the supply chain ?

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Summary

List of acronyms and abbreviations

ABC	Activity Based Cost
EBI	Earnings before interest
EVA	Economic Value Added
ROE	Return On Equity
ROI	Return On Investment
NP	Net Profit
SC	Supply Chain
SCM	Supply Chain Management
MC	Management Control
PnL	profit and loss
TMS	Transport Management System
WMS	Warehouse Management System

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Introduction

According to the functional logic, which is complemented by the economic approach, the company is an autonomous body with several functions, both different and interdependent on the quality of its functions and their synergy. Which is increasingly marked and important with the emergence of Supply Chain Management (SCM), which has led to many changes in the management systems, particularly in the management control systems. Based on a new managerial practice, supply chain management is more in line with an interorganizational transversality approach. This allows companies to have services forming a united whole and no longer as a fragment of juxtaposed services.

Faced with increasing competition and globalization, companies must constantly improve their operational competitiveness and make better use of their financial, human, and technological resources. They do so, with the implementation of the "management control" function. This function was created in the United States in the 1960s, and since, then it has become increasingly precise, dependable, and rigorous. Therefore, business leaders have taken an increasing interest in this function, which is a means of establishing a link between all the components of the company, to optimize their efficiency and effectiveness in achieving their objectives.

Over the past thirty years, companies have realized that competitiveness cannot be achieved solely by controlling intraorganizational processes, but that it is necessary to find other areas of improvement to be more competitive. It is the "supply chain" which was the new axis of improvement. The latter participates upstream and downstream of the various processes and activities that allow a company to create value in the form of products and services brought to the consumer.

The supply chain function is a convergence of complex collaborations and coordination, with many stakeholders (manufacturers, suppliers, transporters, distributors) that are highly interconnected to optimize the flow of goods, information, and finances along the supply chain.

These activities are surrounded by multifaceted risks and obstacles, making supply chains more complex to develop and vulnerable to political and health instabilities. Therefore, companies, to reduce the risks of instability of the supply chain and to lose their competitive advantage, call upon the function of supply chain management control which calls upon skills that are oriented towards the optimization of resources and customer satisfaction. For companies, the stakes are improved productivity, cost reduction, high stock rotation avoiding fixed assets and an excellent quality of services for customer satisfaction which represents the value that the customer gets from the product through all the logistic services.

The supply chain is the final element of customer satisfaction. This has led to an increase in awareness of company managers, resulting in an increase in resources to provide efficiency and customization of products and delivery. Today, the supply chain has become a true function dedicated to creating value for the customer. With the changes in the supply chain and in the management control, we can wonder about the way to measure the quality and to establish relations between the quality and the financial performances and the way to pilot the activities and to know their performance, which leads us to the object of our research: Analysis and optimization of costs in a company to improve the performance of the supply chain?

To answer our problem, we will start by developing a first part on management control which aims to define and explain its missions as well as the tools that management control uses to conduct their missions.

Secondly, we will start by defining the supply chain and its place in the company's competitive strategy, then we will explain and demonstrate how the supply chain is implemented in companies and how the supply chain has an impact on value creation.

In the third part, we will develop and explain the different tools and software that management control has put in place to measure and improve the performance of the supply chain in the Stokomani company.

Chapter 1: General information on management control

In this chapter, we will introduce the origin and definition of management control and the several control managements tools.

I. History and definitions

A. History

Management control is recent compared to other functions within the company, its origins are linked to the appearance of the accounting system set up with the development of international trade. This required the creation of a double-entry accounting system invented by the monk Luca Pacioli in 1493.

Several centuries later, the function of management control made a reappearance in the United States, the official date of the first controls is in 1931.

In France, the implementation of management control was made with the general accounting plan of 1947, which distinguished for the first time between general accounting and cost accounting, the latter being considered as one of the tools of management control.

At the beginning of the 20th century, management control was first practiced in large American industrial companies such as General Motors in 1921 with a typical Sloan and Brown model, but at this stage the missions were to identify and correct errors. It was not until the 1960s that management control was imposed in large industrial companies to improve production performance.

The role currently assigned to management control is to assist company decision-makers in their organizational choices, for which management control makes it possible to set up a global process. It helps the general management to control in time the various internet and external flows by bringing him the necessary information for the decision-making.

B. Definitions

Management control is now a widespread practice in many organizations, before being able to define it is important to start by defining its components: control / management

1. Definition of control

There are several definitions of control, we will propose these two definitions that relate to our problem:

- It is the proficiency in information and situations by applying domination to lead it towards a desired direction.

- According to **P. Drücker:** "The word control is ambiguous. It means the ability to direct oneself and one's work. It can also mean the domination of one person by another." (1)

- According to **Henry Fayol**: "Control consists in verifying whether everything occurs in conformity, is with the plans adopted, the instructions issued, and principles established. It has for its object to point out weaknesses and errors to rectify them and prevent recurrence." (2)

2. Definition of management

- **Management**: Is defined as the use of available means to achieve the set objectives.

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[1] Françoise GIRAUD, Olivier SAULPIC, Gérard NAULLEAU, Marie-Hélène DELMOND, Pierre-Laurent BESCOS, "Contrôle de Gestion et Pilotage de la Performance", edition: Gualino, Paris, 2004, P 21

[2] Venkatesh, "Control: Definition, Characteristics, Importance and Limitations", YourArticleLibrary, P.1

3. Definition of management control

There are several definitions of management control, we will mention some of them:

- According to **Robert Anthony** (1965): “Management control is the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives”. [3]

- According to the 1982 General chart of Accounts: “Management control is the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives”. [4]

- According to **Abdellatif Khemakhhem** (1984): "The management control is the process implemented within an economic entity to ensure an effective and permanent mobilization of energies and resources to achieve the objective that aims this entity”. [5]

- According to Robert Anthony (1988): “Management control is the process by which managers influence other members of the organization to implement the organization’s strategies”. [6]

- “Management control is the process by which managers influence other members of the organization to implement the organization’s strategies.” [7]

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[3] R. N. Anthony, “Planning and Control Systems: a Framework for Analysis”, Harvard University, 1965

[4] Claude ALAZARD, Sabine SEPARI, “contrôle de gestion”, edition: Dunod, Paris, 2018, P 6.

[5] Hervé ARNOUD; “Le contrôle de gestion en action”; edition: Liaisons, 2001

[6] R. N. Anthony, “Management Control Function”, Harvard University, 1988, P.10

II. Missions of management control.

In management control, we recognize the need for interaction between three essential components of each company. The purpose of management control is to finalize the objectives set, but it also relies on two other elements, resources and results.

A. Objectives

The objectives of the management control are similar for all the companies whatever its size and its structure, among the objectives we can find.

- **Improvement of the organization**

  The organization of a company is structured by a set of processes allowing to promote the dynamics of the teams and the transversality on the one hand and on the other hand it must allow a continuous improvement of the services and the company. It is a question of dividing the organization into processes:

  - Management process that is used to transcribe the strategy, the objectives, and the quality approach.
  - Operational process corresponding to the realization of a product or a service.
  - Support processes that provide material and immaterial resources to other processes.

  The division into three processes makes it possible to modify and improve what is not performing well.

  Management control helps to formalize and measure the costs of the processes to determine the levers of improvement of each of them to improve their performance and profitability.

- **Company performance measures**

The company evolves continuously in an uncertain environment, which forces it to constantly analyze their objectives and necessary actions to maintain consistency between the external and organizational environment and to allocate skills and resources to the most effective.

For the allocation of skills and resources, the management control is called upon, because it must optimize costs, deadlines and quality by using the tools it possesses such as cost and process analysis.

This helps the company to manage and plan the actions to be taken over time to achieve the objective.

B. Resources

Resources are all the means of the company, whether human, financial or technological, that must be put in place over time to achieve the objectives.

Between resources and objectives, one rule applies: relevance.

C. Results

The results are the products of the actions conducted by the company given the resources allocated to the task to achieve the objectives previously set.

For this pole, we can find two rules:

- The first one is the efficiency, which is defined in relation to a given objective and indicates the extent to which the objective is achieved. It is completely independent of production and management costs.
- The second, efficiency, represents the ability to minimize the resources used to achieve the objective.

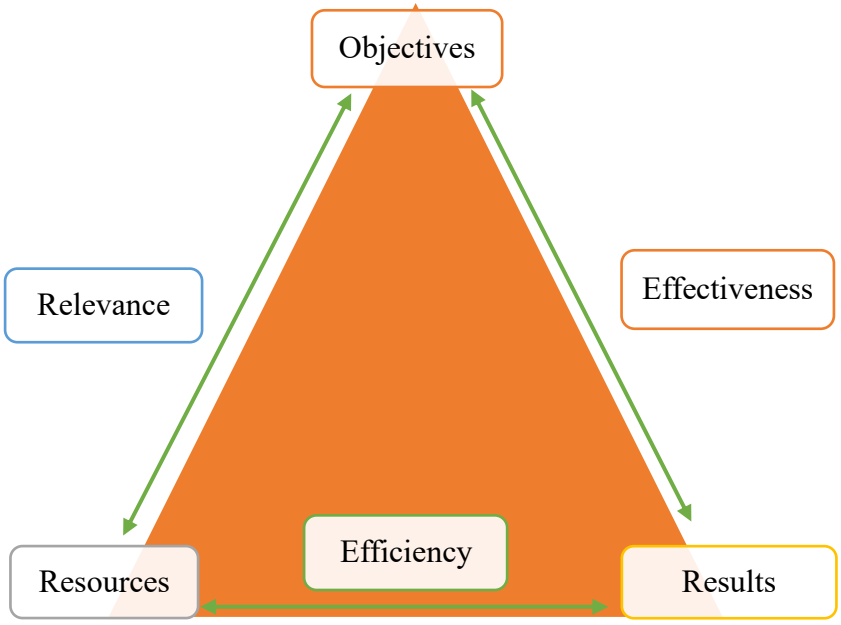

Figure 1: The management control triangle

III. The tools of management control.

Management control has several tools for collecting and processing information to measure the company's performance and detect discrepancies. There are three main categories of tools used in management control:

- Forecasting tools: to develop a sales strategy and forecast.
- General accounting and cost accounting management tools: used to measure and analyze results to ensure that they meet objectives.
- Communication tools: allow you to send information to managers and propose actions to be taken.

A. Forecasting tools

These tools make it possible to foresee and rule out difficulties that the company could encounter.

They consist in recovering the historical data to be used as a basis for the elaboration of future forecasts. It will be used in the production to determine the necessary quantities to be manufactured as well as the workloads and the means to short, medium and long terms which result from it. The forecasts will also allow to

know the quantities that will be sold according to the periods and thus to determine a forecasted turnover.

B. General accounting

General accounting, also called financial accounting, is a legal obligation in which the exchanges between a company and its economic environment are recorded. It is the primary source of data for business management.

However, this tool allows to have a global vision on the profitability. General accounting analyzes the company's assets and liabilities without reference to the company's various activities.

Moreover, it is a very heavy tool, not very comprehensible for the whole company with an often-long periodicity (from 3 months to 1 year).

C. Cost accounting

In opposition to general accounting, it is not a legal obligation, but a tool with high added value for the information provided on the details of activities and costs.

Cost accounting uses different calculation methods for costs which are:

- Full costs
- Partial costs

1. Full costs

The complete costs are calculated by adding up all the direct and indirect costs of a product (or a service), from its manufacture to its sale. This makes it possible to determine the cost of a product (or service) to be able to fix its price, to be, on the one hand profitable, but also to be competitive on the market.

To calculate the complete costs, there are several methods of calculation of which two principals:

- The activity-based cost method
- The method of the centers of analysis.

a) The ABC method (Activity Based Cost)

This method was first used in large American companies in the 1950s, but only became known in the 1980s from a research program conducted by the two professors Robert Kaplan and Robin Cooper.

- **The basics of the ABC method**

The method studies the piloting of costs by activity with the aim of modeling the expenses by activities and processes. To do this, it sets up activity and cost indicators.

- Activity indicator: Allows to measure the resources consumed by an activity (electricity, raw material, etc...)

- Cost indicator: Allows to measure the costs of the implementation of the activity. (Depreciation of machines, research, etc...)

The ABC method is based on Pareto's Law (or 80-20 Law), which states that 20% of the effort causes 80% of the results. If we apply this logic to the warehouse ecosystem, 20% of the items account for 80% of the goods movements, while the remaining 80% generate 20% of the movements. This divides the repository into three groups:

- Group A is made up of references that make up 80% of the releases (representing 20% of the references)

- Group B is made up of references constituting 15% of the releases (representing 30% of the references)

- Group C is made up of references constituting 5% of the releases (representing 50% of the references)

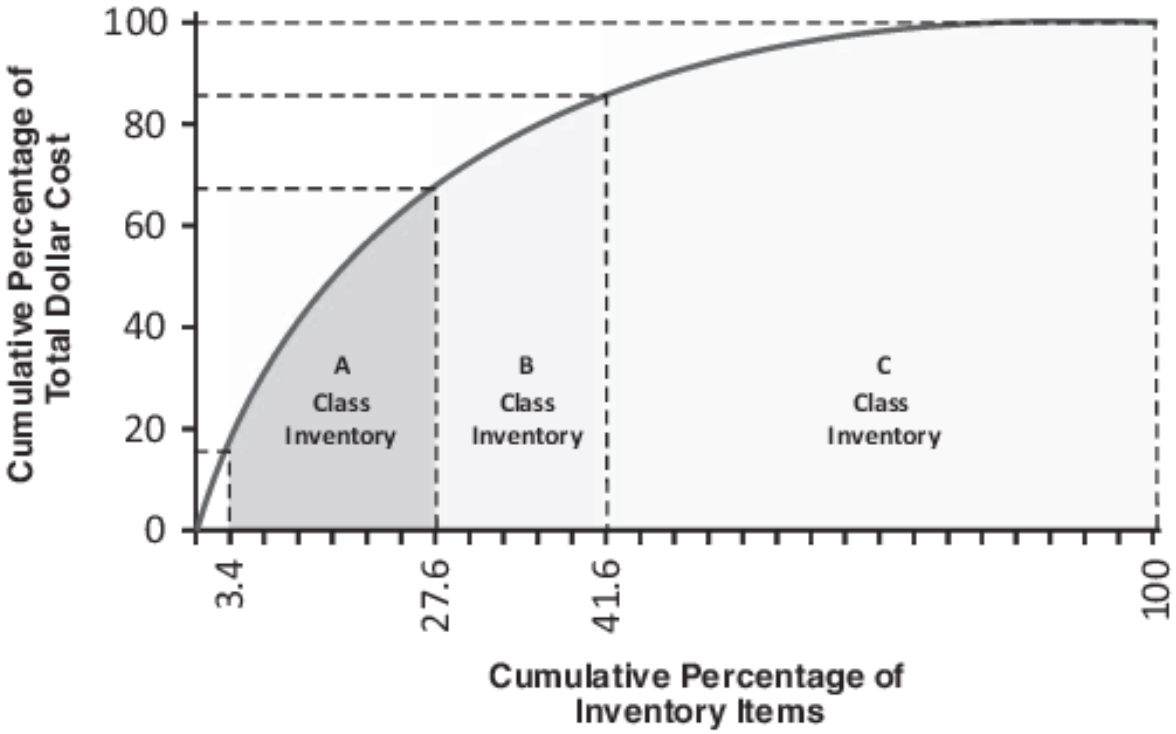

Figure 2: Pareto chart of ABC classification

Source: [https://www.researchgate.net/figure/Pareto-chart-of-ABC-classification-of-coagulation-and-hematology-reagents_fig1_256852552]

- **The steps of implementation**

  - Identification of activities: the production process is deconstructed to identify the input [1] and output [2] activities.
    Input: "*Financial, human, material and information resources used to produce outputs through activities to achieve."* (7)
    Output: *"A direct product or service resulting from the activities of an organization, policy, program or project."* (8)

  - Allocation of resources to activities: operating resources are allocated to each activity.

[7] Government of Canada, "Glossary of results-based management terms", Input

[8] Government of Canada, "Glossary of results-based management terms", Output

- Determination of indicators: For each activity, the corresponding performance indicator is determined.

- Grouping of activities: The activities will be grouped according to the common indicators.

- Costing: Calculated by adding the direct and indirect costs from the grouping centers.

- **The objectives of the ABC method**

  - **To have more precise costs**

    The allocation of indirect costs in a precise way will avoid underestimating the costs of products in small series compared to products of a large series.

  - **Make hidden activities visible**

    This more precise breakdown allows the costs of so-called ancillary activities to be made visible. These are secondary activities of the main production process that are sometimes costly for the added value they bring.

  - **Set up an operational functioning model**

    Allows to follow the process in a coherent way with the objectives of quality and delay. Moreover, the determination of costs closer to reality facilitates the construction of budgets.

b) The analysis center method

The analysis center method was standardized in the general chart of accounts in 1947 under the name of homogeneous sections method and became the analysis center method in 1982 in the general chart of accounts.

- **Objectives of the method**
  - Measure the consumption of resources
  - To control the formation of costs at each stage of the production process
  - Contribute to the decision-making process and to the management of the resource transformation process
  - The ability to track the direct and indirect costs of a product
  - throughout its manufacturing process until sale. Which is the notion of cost traceability

2. Partial costs

This method allows to determine the margin of each product and its contribution to the coverage of the fixed costs of a company. It is one of the methods that can be used by the company to know the profitability by product (or service) in a precise way.

There are five methods of calculation which are:

a) Variable costing

Definition: *"The variable cost method includes only variable expenses, whether direct or indirect, in the cost of products."* [9]

The objective is to calculate a margin on variable cost to analyze the profitability of a product and its ability to cover fixed costs.

- Allows to judge the performance and profitability of the product to the company
- Allows you to see which product is more profitable than another and to rank them,

[9] Romaric Duparc, Sabine Sépari, "DCG 11 Contrôle de gestion", 2e edition, P 214

- Allows you to determine the profitability thresholds according to the size of the series and to set the minimum price according to the size of the series.

b) The specific cost method

Definition: *"The specific cost method extends the variable cost approach. It allocates to each product the direct fixed costs that are specific to it. It thus makes it possible to obtain a margin on specific costs (of the product) which must allow the coverage of the indirect fixed expenses considered as common expenses to the company." (10)*

Principle of the method:

- To allocate in the costs of a product the specific fixed charges and to add the variable costs.
- It is necessary to retain only the direct charges and to eliminate the indirect charges which are not related to the product.

c) The direct cost method

Definition: *"The direct costing method integrates in the costs only the charges that can be unambiguously assigned to the products, whether they are variable charges or fixed charges." (11)*

Instead of measuring a real, unit, complete cost, we put aside the fixed charges, known as structural charges with a strong impact on the product.

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10 Romaric Duparc, Sabine Sépari, "DCG 11 Contrôle de gestion", 2e edition, P 162
11 Romaric Duparc, Sabine Sépari, "DCG 11 Contrôle de gestion", 2e edition, P 214

d) The marginal cost method

Definition: *According to the Chart of Accounts, the marginal cost is "the difference between all the operating expenses necessary for a given production and all those necessary for this same production increased or decreased by one unit." (12)*

It is composed of the variable charges as well as the fixed charges necessary to produce the last unit produced.

e) The target costing method

Definition by Robin Cooper: *"The purpose of the method is to identify the cost of producing a proposed product so that when the product is sold it will provide the desired profit margin."* (13)

The purpose of the approach is to optimize future profits on the product over its entire life cycle.

D. Budgetary management

1. Definition of budget management

- According to Hamini, "Budget management is a management method that encompasses all aspects of the company's activity in a coherent set of quantified budget forecasts." (14)

- According to Jack Forget, "Budget management is the set of techniques implemented to establish forecasts applicable to the management of a company and to compare them to the results actually observed." (15)

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[12] Romaric Duparc, Sabine Sépari, "DCG 11 Contrôle de gestion", 2e edition, P 214

[13] Florence DUCREAU, Michel BOUTRY, "Target Costing", P 4

[14] A. Hamini, "gestion budgétaire et comptabilité prévisionnelle", édition BERTI, Alger, Algérie, 2001, P 5.

[15] Jack Forget, "gestion budgétaire: prévoir et contrôler les activités de l'entreprise, édition d'organisation", Paris, France, 2005, P 9.

- According to Adel Mohamed El-Amine “Budgetary management is a management technique that consists of an objective forecast of internal and external operating conditions, to set an objective for the company for a defined period, as well as the means necessary to achieve it.” (16)

- According to Abdenacer Kherri “Budgetary management is the set of measures that aim to establish quantified forecasts, to note the differences between them and the results actually obtained and to decide on the means to be implemented to achieve the objectives set, for a given period.” (17)

2. Objectives of budget management

- Establish objectives
- Establish simulations to assist in decision making
- Used for motivation and conflict management
- Management of the company's costs
- Establish forecasts of expenses and results.
- Measure and control departmental performance

[16] Adel Mohamed El-Amine, “cours de la gestion budgétaire, office de la formation professionnelle et de la promotion du travail”, Royaume du Maroc, Janvier 2005, P 9

[17] Abdenacer KHERRI, “Cours: gestion budgétaire”, Ecole des hautes études commerciales 2011-2012, P 2.

E. Dashboard

The dashboard allows the organization to be steered through indicators and the communication of results to managers. The dashboard is the key tool to measure performance and help in decision making.

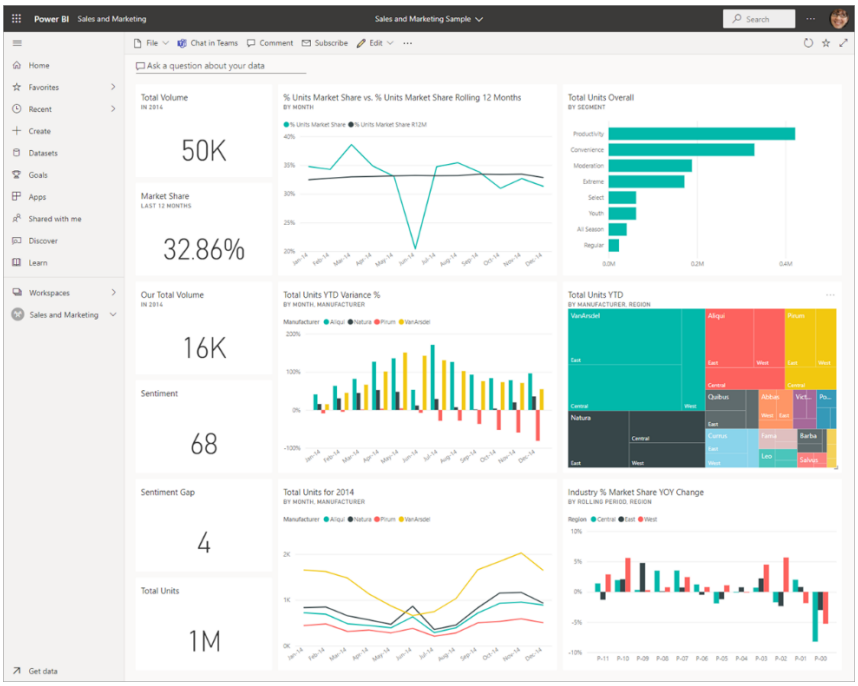

Figure 3: Example of a dashboard on power BI

Source: [https://docs.microsoft.com/fr-fr/power-bi/consumer/end-user-dashboards]

At the management control level, there are three types of dashboards:

- The strategic dashboard
- The tactical dashboard
- The operational dashboard

1. Definition of dashboard

According to Claude Alazard and Sabine Separi: *"A dashboard is a document that brings together, in a clear and synthetic manner, a set of information organized on selected variables to help decide, coordinate and control the actions of a department, a function or a team."* [18]

[18] Claude ALAZARD, Sabine SEPARI, « Contrôle de gestion » DCG 11, DUNOD, p552

2. The strategic dashboard

The strategic dashboard is intended for managers and gives a synthetic view of the company's performance in relation to the achievement of strategic objectives.

a) Definition of the strategic dashboard

Designed by Thomas Kaplan and David Norton, it translates the company's mission and strategy into a set of performance indicators that form the basis of a strategic management system. It measures the company's performance along four balanced axes:

- Performance towards customers
- Financial results
- Internal processes
- Organizational learning

b) Objectives of the strategic dashboard

The strategic dashboard first allows to clarify the strategic vision of a company and to identify action levers for performance improvement.

It allows to follow the adopted strategy and to be able to make feedbacks on the good follow-up of the strategy to refine it progressively.

Moreover, this dashboard allows you to translate long-term objectives into short-term objectives.

3. The tactical dashboard

The tactical dashboard is a decision support tool for medium-term management. It provides a vision of the performance of the actions of the different teams in a company.

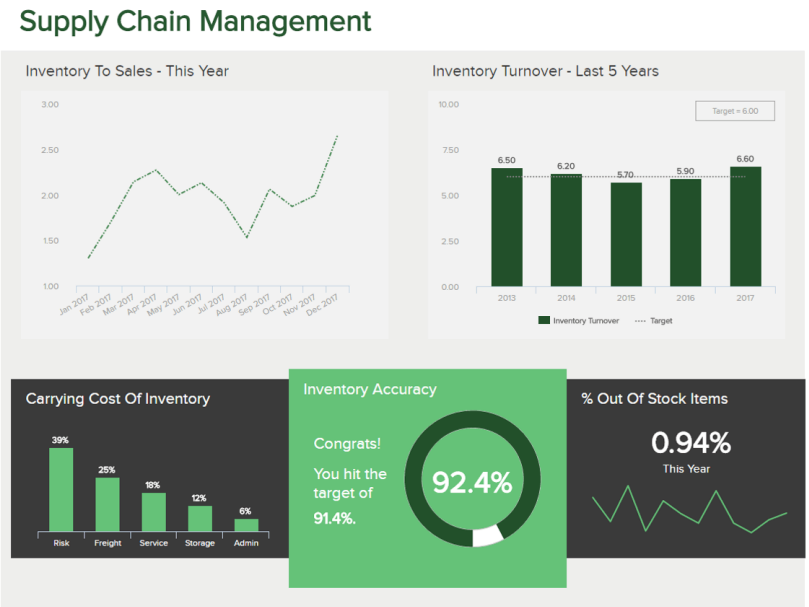

Figure 4: Example of tactical dashboard

Source: [https://www.datapine.com/blog/strategic-operational-analytical-tactical-dashboards/]

a) Definition

The tactical dashboard is a tool that reports on the performance of the management of a company in relation to past and future events. It consists of determining indicators, setting forecasts and observing and analyzing their variation over time, over a defined interval. All deviations must be justified and actions implemented accordingly.

b) Objectives

- It is a management tool: it allows to analyze the results of the management of a company and to compare them with the forecasts which had been established.

- It is a tool for anticipation: It allows to prevent financial difficulties and thus to anticipate them.

- It is also a decision-making tool: it enables decisions to be made when the results deviate from the forecasts and thus to implement corrective measures.

4. The operational dashboard

The operational dashboard processes data in the short term. It represents a diagnostic, steering and decision-making tool. It can only be established after the company's strategy and action plans have been clearly defined.

a) Definition

The operational dashboard is a tool that consists in controlling the performance of previously defined action plans thanks to the construction and monitoring of different performance and steering indicators.

b) Objectives of operational dashboard

Its main objectives are to measure the progress of action plans and to evaluate the level of performance of departments within the company.

F. Reporting

Reporting is a control tool, it gives the management the possibility to have a global vision on a product, an activity, a department, or even on the whole company at a given time. The data is provided here in a "raw" way, or with analyses made by the different departments. The reporting can concern various aspects such as:

- Activity reporting, which reports on the activities of the various departments.
- Financial reporting, which reports on the balance of the cash flow.
- Sales reporting, which reflects, among other things, the results of the sales force or the number of new prospects.

Chapter 2: The implementation of the supply chain management within the company

I. History and definitions

A. History of supply chain

The term supply chain can be translated as logistics in French from the Greek Logistikos ("related to reasoning") or Logisteuo ("to administer"). Many universities and researchers report those military institutions have always used the term supply chain to define the activity that combines two necessary factors in the management of flows: space and time.

If we go back to the time of Julius Caesar, we notice that he integrated the "Logista" function within his legions. This was represented by an officer whose mission was to take care of the movements of the army to organize the camp and the food supply.

The first time the term was used in writing was in the 19th century, in 1836, when General Antoine-Henri de Jomini, the great thinker of military strategy in the 19th century, defined logistics as "the art of combining transport, supply and accommodation of troops". Until 1960, the term supply chain was used for military purposes. It is from this date that companies took up the supply chain to improve their operational actions.

B. Definitions of supply chain

- The American Marketing Association proposed in 1935, one of the first definitions of logistics: "Logistics includes the various activities performed by a company, including service activities, during the transfer of a product from the production site to the consumption site". (19)

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[19] Rémy LE MOIGNE, “Supply chain management”, edition: Dunod, P 18

- According to the Council of Supply Chain Management Professionals (2004): "The process of planning, executing, and controlling the effective and efficient transportation and storage of goods (and services), and associated information, from the point of origin to the point of consumption to meet customer needs." [20]

- According to the United Nations Economic and Social Council, the supply chain is "the process of designing and managing the supply chain in the broadest sense. This chain can include the supply of raw materials needed for manufacturing, through the management of materials at the point of manufacture, delivery to warehouses and distribution centers, sorting, handling and final distribution to the point of consumption." [21]

C. Definition of supply chain management

- According to Rotta Franz (2001), "SCM means integrating all internal and external resources to meet customer demand. The objective is to optimize all logistics processes simultaneously, rather than sequentially." [22]

- According to Dominguez and lashkari (2004): "The purpose of Supply Chain Management (SCM) is to facilitate sales by correctly positioning products in the right quantity, at the right place, at the right time and at the lowest possible cost. The main objective of SCM is to efficiently allocate production, distribution, transportation and information resources, in the presence of conflicting objectives, to achieve the level of service required by customers at the lowest cost." [23]

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[20] Rémy LE MOIGNE, "Supply chain management", edition: Dunod, P 18
[21] Rémy LE MOIGNE, "Supply chain management", edition: Dunod, P 20
[22] ROTTA-FRANZ, Thierry et Bel, "Gestion des flux dans les chaînes logistiques", Hermès, 2001, 186p.
[23] Dominguez et Lashkari, 2004: H. Dominguez, R. S. Lashkari. "Model for integrating the supply chain of an appliance company: a value of information approach." International Journal of Production Research, 01 June 2004, Vol. 42, No 11, pp 2113-2140.

- According to Stadtler and Kilger (2005) supply chain management is: "The task of integrating organizational units along the supply chain and coordinating physical and information flows with the aim of satisfying customer (end) demand with the goal of improving the competitiveness of the chain as a whole." [24]

- The council of supply chain management professionals defines « Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. Supply chain management integrates supply and demand management within and across companies." [25]

II. The place of the supply chain in the strategy

A. The challenges of the modern supply chain

1. What is the fourth industrial revolution?

We must go back to 1769, with the invention of the coal engine by James Watt, which marked the beginning of the first industrial revolution. This revolution allowed for a shift from artisanal production to faster mechanical production in factories.

The second great industrial revolution took place between 1890 and 1910 with the appearance of oil extraction and the invention of electricity. It allowed the adaptation of materials such as steel and aluminum to high-tech industries such as the automobile. It marks the beginning of Taylorism and the mass production line of the same product.

[24] STADTLER et KILGER, Supply Chain Management and Advanced Planning, Springer, 2005, 512 p.

[25] CSCMP Supply Chain Management Definitions and Glossary

The third revolution took place in 1950 with the appearance of added information and communication technologies with electronics, computers and telecommunications.

These allowed the birth of mass production with autonomous production systems.

Today, we are at the beginning of the fourth industrial evolution, it aims to optimize the activity of the company and to return the modes of production more intelligent to establish a link between the needs of the customers and the organizations of production. The goal is to produce fully customized products that meet the needs of each customer.

2. Definition of modern supply chain

Modern supply chain is also called supply chain 4.0 which comes from the word "industry 4.0" which was first used at the World Industrial Forum in Hannover in 2011. Industry 4.0 refers to the fourth industrial revolution which is based on the new generation of intelligent autonomous factories, mechanical humanization with artificial intelligence. The digital revolution, which aims to reduce the boundaries between the digital and physical world, allows new connectivity and evolution of the entire industrial process.

The concept of Industry 4.0 is a new way of organizing the means of production by automatically linking suppliers, factories and customers.

For the industry 4.0 concept to be implemented, it requires the digitization of the supply chain. This one already integrates digital networks linking suppliers, factories, warehouses, logistics, transport and customers.

3. The digitalization of the supply chain

Today, the internet plays an increasingly significant role in the daily lives of the five billion people who have access to the internet. That's why the network has become indispensable in companies. To face the competition, companies need access to communication and information technologies to have an unparalleled level of agility, which is essential for survival.

Information tools offer the understanding of the past, the present and the ability to forecast the future with demand and supply planning to optimize operating costs.

However, simply adopting modern solutions deployed in the cloud is not enough to completely digitize a supply chain and bring real added value. To do this, the processes as well as the manual invoicing systems and spreadsheets must adapt to the solutions implemented or they will become obsolete, if the company's objective is to make the processes visible from end to end of the process chain.

These new systems allow companies to produce digital data that are part of what is called "big data", it represents all the digital data produced by means of innovative technologies. This data can be processed manually or automatically by computer to be followed, analyzed and used in the decision-making process. This is where the management controller comes in.

Companies must implement the digitalization of the supply chain with the implementation of a digitalization strategy with tools capable of detecting and responding to the changing needs of the supply chain in competitive markets. While integrating data, processes, systems and visibility across procurement, warehouse and distribution operations, end-to-end supply chain.

4. The advantages of supply chain 4.0

The sustainability of a company in a competitive environment depends on its performance and management. At the supply chain level, the organization of activities is one of the main factors that influence its performance and its interest.

a. Forecasting demand and customer needs

In the field of supply chain, many data help to forecast demand and customer needs, which gives the company a major advantage in forecasting its future needs.

The new supply chain 4.0 tools allow to collect and analyze user data on a wide spectrum ranging from purchase history, regional news, to users' posts on social networks. These tools allow us to better understand consumer expectations.

b. Forecasting supplier requirements

The new tools allow us to determine with more reliability the customer forecasts by period, which allows us to forecast the raw material needs of the company to meet the sales forecasts. They also allow us to define the functional stock and the safety stock to avoid any shortage.

c. Reduction of production and delivery times

Today's customers want to receive their order within 24/48 hours with a product that is 100% compliant with their expectations. This forces companies to perfect their production and delivery management processes to meet consumer needs, without compromising delivery time and product quality.

Therefore, the integration of supply chain 4.0 in the daily operation of the industry helps to remedy this problem.

d. Product traceability and cost management

The improvement of the supply chain also requires the traceability of products throughout the supply chain. The new tools offer to the company the possibility of tracing the goods with the use of a bar code. This way, the location and the path of each merchandise in the supply chain is known and can be traced if necessary.

This knowledge allows the optimization of the costs by the suppression of the internal and external useless costs related to the immobilization of the products.

e. Human risk management

The supply chain aims at setting up interdependent production systems that allow the reduction of human risks in the industry. This results in the avoidance of legal liabilities and the preservation of the company's reputation.

5. The objectives of supply chain 4.0

The main objectives of supply chain 4.0 are:

- The customization of products according to customers.
- Production in small batches while keeping the advantages of mass production
- Improvement of the manufacturing process
- Optimization of the storage of goods and products
- Improvement of the precision of the quantity to be produced with the reliability of the data and a more precise exploration of the data
- Decrease in production costs
- Improvement and innovation of products according to customer needs.

6. Limiting factors

There are many factors that slow down the transition of companies to full operationalization of 4.0 tools.

- Legal regulations
- The lack of professionals with a sufficient level of training in the field of high digital technologies.
- The lack of financial resources for the deployment of modern technologies

B. The supply chain as a key element of the company's strategy

With globalization, innovative technologies and the integration of more sophisticated, otherwise neglected tasks have led to heavy changes in supply chain management.

A 2019 study showed that 65% of companies believe that supply chain management plays a key role in competitive advantage. With the goal of improving their competitive advantage by gaining market share in their industry while meeting increasing consumer demand and lofty expectations in the availability of products and services. Companies are realizing the importance of investing in process improvement with the development of a supply chain strategy.

The supply chain covers a wide range of activities from product research and development, raw material procurement and manufacturing to packaging, logistics and delivery. It also includes information systems and business coordination.

Each link in the chain corresponds to a different stage in the process of developing, producing and delivering products and services to customers. However, the modern supply chain makes the management of the chain more complex and allows companies to work in different time zones, which makes them more prone to external disruptions.

According to the Business Continuity Institute, 62% of companies affected by supply chain disruptions suffer financially, and 54% suffer losses to both their logistics capabilities and their reputation.

To avoid disruption and protect supply chain operations, it is important to have a supply chain strategy in place to define contingency plans and to define the structure of activities at each stage of the process.

Two strategic directions are identified:

- **The process strategy**

  The aim of the process strategy is to control costs by managing flows, by integrating supply chain management systems with, for example, autonomous forklifts, autonomous guided vehicles, and the implementation of stock, warehouse and transport management software. This software allows the company to have a complete vision of all their operations, equipment and to allow predictions on potential malfunctions of machines or processes.

- **The customer strategy**

  This strategy focuses on customer needs. It consists of analyzing past sales and social networks to identify demand trends to forecast sales and build inventory to ensure excellent customer service, resulting in improved overall financial performance.

Developing a supply chain strategy that is consistent with the business strategy allows the company to be able to respond to fluctuations in demand with less imbalance in production cycles. Ensuring stable delivery times for the customer is essential to the company's perception of quality. Eliminating or reducing the variation in production cycles allows the company to reduce inventories, which are financial assets that are extremely costly over time. A good strategy creates value for the company.

C. Value creation in the supply chain

1. The place of the supply chain in the value chain

The supply chain aims to have the best performance in the different activities. It is important to know that the supply chain is made up of three main flows, each of which has an impact on value creation:

a. Physical flows

Physical flows include the functions of procurement, maintenance, inventory management and warehousing, as well as transportation. In short, they constitute the movement of goods from raw materials to finished products. It also includes the various stages of semi-finished products until the right products are delivered to the right place, at the right time, in the right quantities and in the right condition. The analysis of the physical flows is aimed at minimizing the costs for the final recipient.

b. Information flows

The notion of information flow is associated with that of Big Data, which represents all the data transfers or exchanges between the various players in the supply chain. This is primarily commercial information, in particular orders placed between customers and suppliers. But companies also exchange more technical information: physical parameters of the product, operating ranges, production capacities, transport and stock level monitoring information. However, a problem remains: the quality of the data. Indeed, decisions based on the information transmitted can turn into errors if the reliability of the data is not verified.

Moreover, the information flow is a critical function for the good functioning of the supply chain, namely that any failure in its execution will have an impact on the good realization of the physical flows. Therefore, companies as well as the supply chain management controller continually seek to make the data transmitted by the

information flow more dependable to avoid any bad decisions that could impact the physical flow chain.

c. Financial flows

Financial flows correspond to all the documents that circulate between the different actors of the supply chain. This means the purchase of components or raw materials, production tools, employee salaries and sales to consumers.

2. Porter's Value Chain

Michael Porter's value chain represents the supply chain as a core business.

The objective of the value chain is to locate the sources of differentiation of the organization and to identify where value is created within the company. This allows the allocation of resources to be determined to develop competitive advantages.

Distribution is described along two dimensions:

- Primary activities
- Support activities

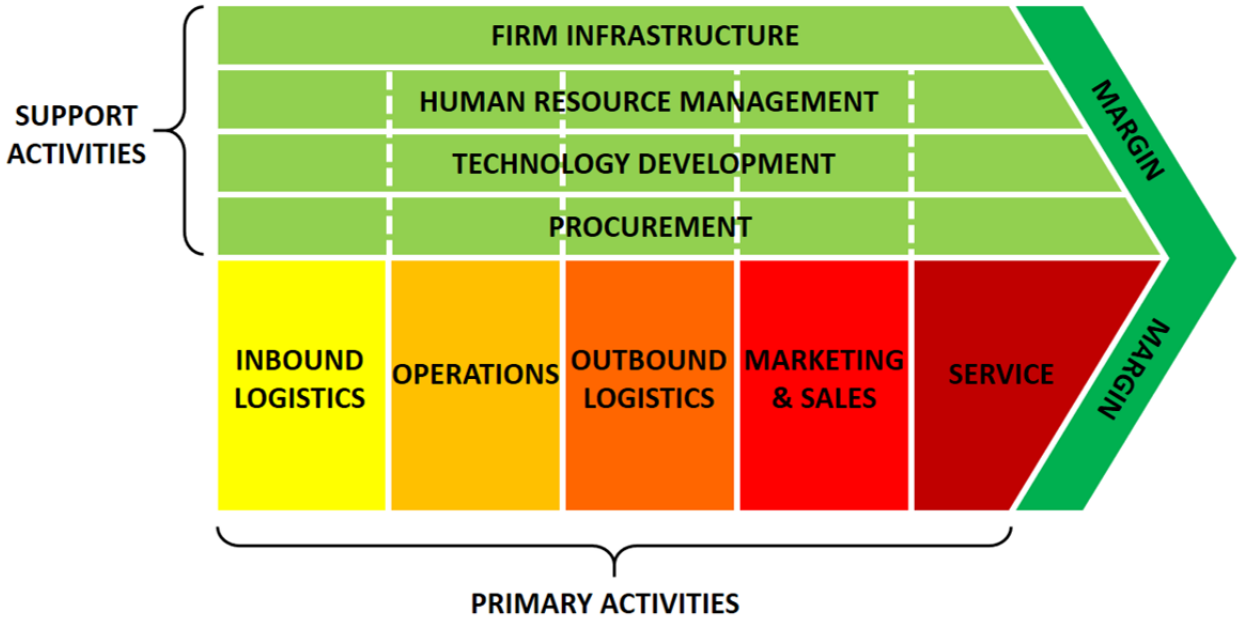


Figure 5: Porter's Value Chain

Source: [https://www.business-to-you.com/value-chain/]

a. Primary activities

The basic activities of Porter's chain have a physical and financial dimension. In these activities we can find the following ones:

- **Inbound logistics:**

  This refers to all activities to receive and store raw materials (or goods) from suppliers.

  Examples: handling, warehousing, inventory control, vehicle scheduling and returns to suppliers.

- **Operations**

  These are all the activities that allow the transformation of raw materials into finished products or the realization of the service for companies in the service field.

  Examples: Machining, assembly, testing, packaging, equipment maintenance.

- **Outbound logistics**

  These are all activities related to the delivery of the good or service to distributors and customers.

  Example: processing and preparation of orders, transportation, deadlines.

- **Marketing and Sales**

  These are all the activities that make the offer known and encourage customers to buy.

  Example: marketing, promotional offers, advertising, choice of distributors, pricing.

  This activity is not linked to the supply chain, however, as seen previously, the marketing or company strategy and the supply chain strategy must agree. We can give as an example a marketing campaign that guarantees the customer a fast order with a delivery in 24 hours but that the supply chain is not able to guarantee. The failure to deliver within 24 hours will cause the company to lose customers.

- **Service**

In today's economy, after-sales service is just as important as promotional activities. Complaints from dissatisfied customers are easily spread and shared through the Internet and the consequences on the company's reputation can be considerable.

It is therefore especially important to implement an excellent quality after-sales service. The activities associated with it allow to maintain or increase the value of the product/service after the purchase.

Example: after-sales service, installation, repair, maintenance, user training.

b. Support activities

The supporting activities go beyond the primary activities and aim at coordinating and supporting their functions as well as possible with each other, it gives a dimension of quality. These activities can be divided into 4:

- **Firm Infrastructure**

These are all the administrative activities that allow the company to run smoothly.

Example: management, planning, finance, legal, public relations, quality department, accounting.

The infrastructure supports the entire value chain, not individual activities. In controlling, lot of activities related to the company's infrastructure are analyzed as "overhead". However, these activities should not be underestimated because they can be one of the most powerful sources of competitive advantage. The wrong decision or strategy can result in poor employee performance and therefore greatly impact the business.

- **Human Resource Management**

Human Resource Management includes activities related to recruiting, hiring, firing, training, developing and compensating all types of personnel. It affects the competitive advantage of any company because of its role in determining the skills, motivation of employees and the cost of their training.

As developed earlier, companies are implementing high-tech tools that require excellent skills in these new areas. Therefore, increased companies are setting up a department specialized in the search for employees with high technology skills to recruit and train them.

But also, to maintain and improve their performance. These talents are still too few on the job market considering the recent development of these technologies.

- **Technology development**

This refers to everything related to innovation and improvement of products and processes.

We can give as an example: software for the automation of machines, accounting, storage, research on product design and customer service procedures.

- **Procurement**

Procurement refers to the function of purchasing the inputs used in the company's value chain. Purchased inputs are required for each value activity, including support activities. Examples of purchased inputs are: raw materials, supplies, services, office equipment and buildings.

Procurement is therefore necessary to support all activities in the value chain.

c. The links in the value chain

Although all the activities allow for the building of a competitive advantage, the value chain is not a sequence of independent activities. It is a system of interdependent activities that are connected by links within the value chain. Decisions made in one value activity such as procurement can affect another activity such as operations. Since procurement is responsible for the quality of the inputs purchased, it will affect production costs, inspection costs, and product quality.

Therefore, accurate communication and coordination between the activities in the value chain is as important as the activities themselves. Improving the value chain is the responsibility of management controllers, in particular supply chain management

controllers, who are responsible for analyzing the links and making and proposing decisions to be implemented to obtain an ever-greater competitive advantage.

We can conclude that Porter's value chain allows to structure the internal organization and to give data on the areas where value is created or costs can be reduced to increase the margins on the finished products. Moreover, it allows to see the links between the departments and therefore not to allow the improvement of the communication between this department to gain in coordination and speed of execution.

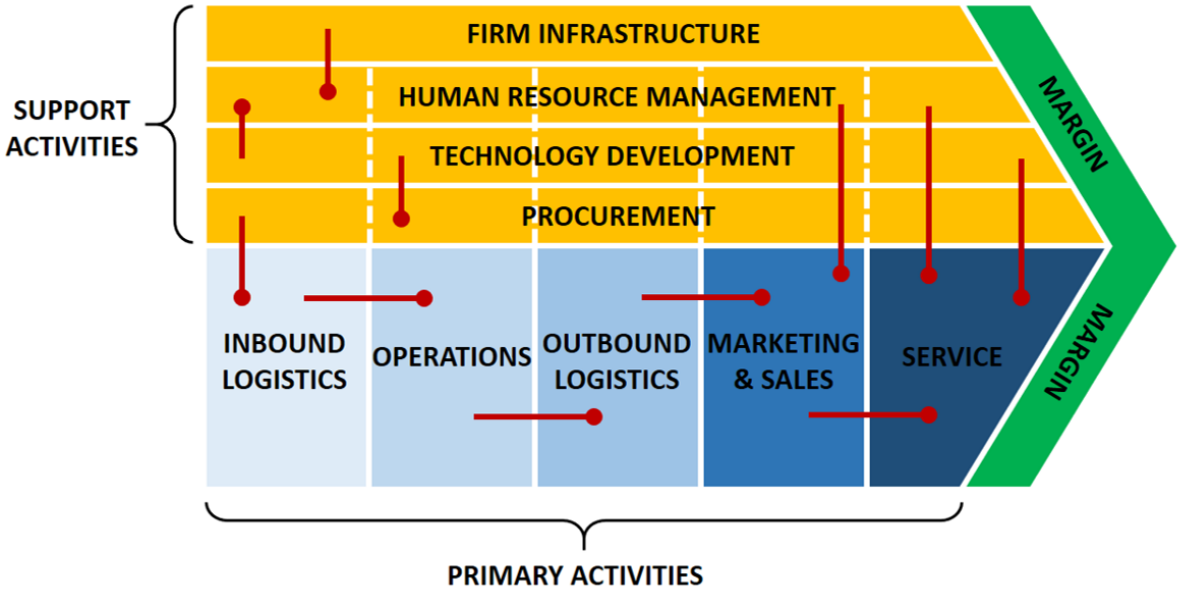


Figure 6: Porter's Value Chain Linkages

Source: [https://www.business-to-you.com/value-chain/]

3. The importance of human capital

Human capital is a concept from economic theory that appeared in the 1960s. According to the Organization for Economic Co-operation and Development (OECD), it refers to "all the knowledge, skills, competencies and individual characteristics that facilitate the creation of personal, social and economic well-being". The result of this definition is a correlation between the capabilities of the human being and development in all its dimensions.

Companies could not perform without the contribution of people. We can therefore affirm that human capital is the first vector of value creation.

Today the measurement of human capital performance has become even more difficult with the changes in the supply chain with the arrival of many tools requiring increased knowledge to be used to its full potential. But this measurement is important to value and improve the human capital of the company.

In the supply chain, we, the supply chain management controllers, oversee measuring the performance of employees with the help of human resources. To measure the human capital, we use tools and methods of performance evaluation such as the calculation of the return on investment.

$$ROI\ of\ HC = \frac{Operationg\ income - (\ Operating\ expenses - Labor\ cost\ )}{Labor\ cost}$$

This indicator establishes the link between investment in human capital and profit. That is, the level of productivity of employees compared to the investment made in them. For the ROI to be conclusive, it must be greater than 1.

We can give as an example: a company realizes a rate of 1,4 that indicates for each 1$ invested in the human capital, it comes out with 1,4$. Moreover, this indicator can be compared between the interior years to give a vision in time.

It is possible to keep a register of the skills, abilities, qualifications, training and certifications of the employees with the human resources department. The main purpose of this register is not to calculate the human capital but to have a database of the resources of each employee to have a more efficient management. For example, to be able to easily sort employees according to the skills needed for a position.

As said before, human capital is the engine of the company, that's why it is important to invest in training and even more nowadays with the new systems that are implemented in companies. A company can have an incredibly good return of investment one year but implement too quickly high technology tools without having planned the training to acquire the necessary skills to use them could have a result contrary to what it was expected.

Therefore, communication is important between the supply chain department and the human resources department to find the training and to plan a schedule for the employees to be operational in the use of the new supply technologies. Making

training one of the biggest challenges of the organizational and cultural change, accompanied by the reengineering of the logistic processes.

4. The contribution of the supply chain to value creation

First, as we have seen previously, the supply chain strategy is an essential element in the creation of value for the company. The supply chain as we know it today will contribute to the creation of value for the customer and for the company.

a. Creating value for the customer

The supply chain creates value for the customer when the customer's expectations on customization, flexibility, innovation and responsiveness of products are met. It is only when the customer is satisfied that we bring value to the customer. But to succeed in bringing satisfaction to the customer it is necessary to understand his needs and how the products and services of a company can be applied to meet his needs to create value for him.

b. Value creation for the company

The supply chain creates value for the company when the invested capital is one less than the return capital.

In every part of the supply chain there is value creation. For example, a high stock rotation allows to have less stock tied up and consequently to reduce the expenses which generates value for the company.

We can also give the employees who create value, the delivery in time create reciprocally value.

To measure the value, we use the indicator EVA which means Economic Value Added is an indicator of profitability and a measure of financial performance, based on residual wealth.

It is calculated as follows:

$$EVA = NOPAT - (\,WACC * Invest\ capital\,)$$

When we cannot use the invested capital, we modify the formula as follows:

$$EVA = NOPAT - WACC * (TA - CL)$$

NOPAT: net operating income after tax

WACC: the Weighted Average Cost of Capital

Invested Capital: corresponds to shareholders' equity plus the opening balance of any long-term debt.

TA: represents the total assets of the balance sheet

CL: represents the current liabilities of the balance sheet.

A positive EVA means that the business or project is earning more than the minimum required return. EVA looks at companies from the perspective that a company or project is only profitable when it creates wealth and returns for shareholders.

Chapter 3: Measuring and improving supply chain performance

I. Introduction:

After having exposed theoretical references in the two preceding parts; on the concepts of control of management, on the function supply chain and the performances. That we illustrate by practical cases conducted in companies such as Stokomani specialized in the sale of destocking.

In this chapter we will first make a presentation of the organization. Then, we will analyze the tools and the existing method as regards control of management supply chain and piloting of the performance of the supply chain.

II. Presentation of Stokomani

A. History

The history of the company began in 1961 with Maurice Namani, a shepherd of Corsican origin, who founded the company "Les Soldes na.ma.ni" in Paris.

Then in 1971, the company opened its first point of sale in Creil (Oise) and a second one in La Seyne-sur-Mer (Var) in 1980. Despite the opening of two sales outlets, the trading activity remains the main activity. It is thereafter that the company will decide to widen its sector of activity by adding to that of the textile, the sector of hygiene-beauty and the toy.

It was only in 1995 that the company changed its name from "Les soldes na.ma.ni" to the name we know today "Stokomani".

The company Stokomani is positioned on the market as a buyer of end of series to manufacturers of major brands of toys, textiles, care, beauty and home.

In 2012, Stokomani completes a third LBO with the Sagard fund, which signs the takeover of 70.6% of the specialist in the destocking of major brands, for an amount of 200 million euros, which succeeds the Alpha fund, which entered in 2003 for a valuation of 50 million, and Advent, buyer in 2007 for 150 million.

For 20 years Stokomani has experienced robust growth that continues to increase year after year. The company has seen its turnover of 83 million in 2006 propelled to a turnover of over 500 million in 2019.

Since July 07, 2021, Stokomani launched its online trade and click and collect. This robust growth has enabled the company to become the leader in the French destocking sector.

B. Legal information and key figures

STOKOMANI is a simplified joint stock company with a single shareholder (SASU). Located at 3 Avenue des Charmes, CREIL (60100), Stokomani's business sector is retail trade of clothing in specialized stores (4771Z). The company was registered with the INSEE on 01 January 1980 and has a share capital of €25,000,000.00.

Stokomani has 125 stores throughout France and 4 logistics warehouses of more than 50,000 m² in the Île de France region. It has achieved a turnover of 449312400,00 € for the year 2020. The company employs more than 3,200 people.

In October 2020, Nicolas Bertrand, formerly vice-president of the Gamestop Europe group, will replace Delphine Mathez as president of Stokomani.

C. Organizational Chart

Figure 7: Organizational Chart

D. Description of the activity

Stokomani's business model meets a double need:

- The first is to allow the major brands to be able to make use of unsold products at the end of the series. Stokomani negotiates with the different partners to get their stocks of unsold products and then repackages them on their logistics platforms. These products are then put back on sale in Stokomani stores at more advantageous prices for consumers.

- The second objective is to satisfy consumers who are looking for quality brand name products at low prices.

E. Description of the products and services sold

Stokomani offers the consumer more than 20,000 product references with new arrivals every week, all divided into six principal areas:

1st Universe: Beauty & Hygiene (shower gel, shampoo, razor)

2nd Universe: Fashion (pants, dress, t-shirt)

3rd Universe: Leisure (toys)

4th Universe: Home (decorations)

5th Universe: Foodstuffs

6th Universe: Seasonal, which is a universe that varies according to the periods of the year for Easter (chocolate), back to school (supplies), Christmas (decorations)

F. Geographical location and points of sale

Stokomani groups most of its activity in the Hauts-de-France region:

- Its head office is located in Creil at 3 Avenue des Charmes, 60100
- Stokomani has three warehouses:
    - Alata: Located in the industrial zone of the Alata park, it is adjacent to the Stokomani head office. It has a floor area of 36,000 m² divided into two parts: production and logistics. These two parts are divided into cells which allows Stokomani to have multiple activities on the same logistic site.

      In the production part, there are 10 cells called:
        - Alata1 to Alata8 which are used for textile production,
        - The cell Alata9 allows the production of non-textile products
        - The last cell Atala 10 will be dedicated to the finishing of the products, the labeling, the packaging of the products.

      The logistics part will be divided into two cells, one used for the storage of fashion and food products. The other one will be used for the

storage of ICPE products (dangerous products) which requires a particular infrastructure, unique in the Alata warehouse.

- Venette: The Venette warehouse is located in the industrial zone of Bois de Plaisance in Venette. Its construction was finished at the beginning of 2021. It has a surface area of 72,000 m² dedicated solely to logistics and storage of food, home, leisure, beauty & hygiene and seasonal products.

  This warehouse has been equipped with automatic machines such as a sorter (figure 8) which is a system that diverts packages to ramps that define one to two stores.

Figure 8: Sorter in the Venette warehouse

Within the warehouses, AGVs (Automatic guided vehicles), which are robots that move autonomously without human intervention (figure 9), have been set up for the autonomous storage and movement of pallets.

Figure 9: Example of automatic guided vehicles

Source: [https://bm-manutention.com/hangcha/vehicules-guidage-automatique/]

- LSM (Longueuil Saint Marie): Located in the industrial zone of Longueuil Sainte-Marie in the Oise department. The LSM warehouse has a surface area of 50,000 m² dedicated solely to logistics activities. LSM receives and ships only products from the leisure, home and seasonal worlds.

- Stokomani has 118 stores in France. These stores are in commercial areas.

III. The supply chain at the center of the strategy

Since many years Stokomani has oriented its strategy by modernizing the stores and by proposing always more products of big brands at small prices.
By improving the quality of its services and modernizing the supply chain to make it more efficient at lower costs.

A. General overview

In 2022, the range of products and services offered by Stokomani has become increasingly wide over time. The increase in the number of stores, the number of product references, with the consumer policy of "everything in stock" the storage becomes increasingly difficult. This approach obliges the company to always have products available, with customers perceiving shortages in an extremely negative way.

In the company, the supply chain represents the third highest expense of the company. With the creation of a new warehouse equipped with new autonomous technology, the company shows its willingness to have an efficient supply chain, less costly in the long term, and even more efficient.

Nowadays, customers have new expectations, they don’t necessarily want to go to the stores to make their purchases, they prefer to order directly on the site and then be delivered to them or go to the store to collect their order with the click on collect that Stokomani has set up in 2021 for a specified product reference.

Currently Stokomani is the leader of the destocking in France but it isn’t alone on the market. The competition of the destockers is important, in France they are already numerous, with major competitors like Foir'fouille, Centrakor, Gifi. To face the competition, each retailer must differentiate itself by the products it offers, but especially by the cost of the products, the first thing that customers look for in a retailer.

Stokomani has 118 stores in France which are subdivided into regional departments, to allow better communication but also to have follow-ups on the whole operations of each

store. The operational structure has a local intermediate level between the store and the general management.

B. Objective

- One of the first objectives is to remain the market leader while increasing sales.

- Reduce costs through the supply chain, with the objectives of reducing stocks, better anticipating customer demand, optimizing store delivery and return flows.

- To propose to customers more references of big brands at low prices

IV. Proposal and implementation of piloting tools

A. Transport

Transport is the third highest expense of the supply chain with an annual expense of nearly 12,000,000 €, which shows how important the analysis of transport and the search for solutions to reduce costs are.

The file of transport costs is made monthly, it will allow to follow and analyze those of the month N-1. The creation of the file is done from an extraction of the TMS (Transport Management System) software, which allows to obtain an Excel file of monthly transport data. Unfortunately, the file is unstructured and impossible to analyze. It is therefore necessary to start by reorganizing it to facilitate its processing.

To do this, using Excel with formulas such as (VLOOKUP ()), if () ... with closely defined parameters will make it possible to easily retrieve and reorganize the entire TMS file according to the yellow model in annex 1. This will easily facilitate the creation of pivot tables to get out the data necessary for the construction of tables and summary graphs of the transport activity.

The implementation of summary tables makes it possible to synthesize the 6,000 monthly trips into a few graphs, to be able to analyze them and see the evolution.
The double entry tables (annex 2) will allow the information to be cross-referenced to make it more relevant, as in annex 3, where it will be possible to detail the type of flow (transport, XDock, ICPE, Inter-sites, purchase, move from Venette, etc. ....). This will allow the total transport cost to be calculated and compared with the turnover excluding tax to produce a ratio (transport cost / turnover) which is a good efficiency indicator, and to highlight the impact of transport on the monthly turnover.

It remains very important to show the indicators graphically, they are always more meaningful and allow an instant visualization of the trend.
As on this graph which is the follow-up of the transport cost for the first 6 months of 2021.

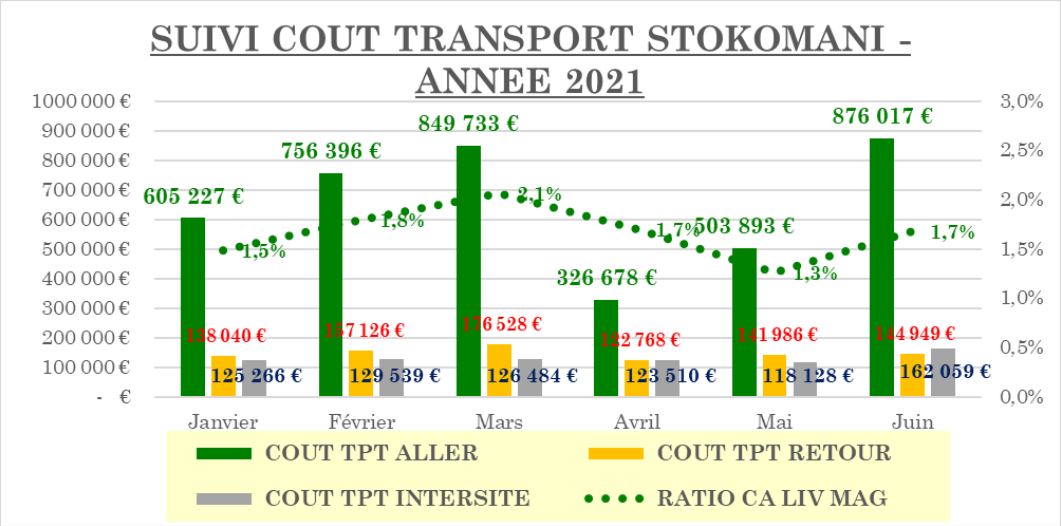


Figure 10: Transport Cost in 2021

On the graph above, we observe:
A sharp decline in April and May, due to store closures. The month of June cannot be compared to May, but rather to February and March, which are months of high activity.

This indicator allows us to see the impact of transport costs and to look for solutions to reduce them. It also allows us to monitor the impact of actions taken to reduce transport costs.

1. Return Transport

At Stokomani, there are three types of return flows:

- Empty pallet flows
- Waste flows
- Returned goods flows

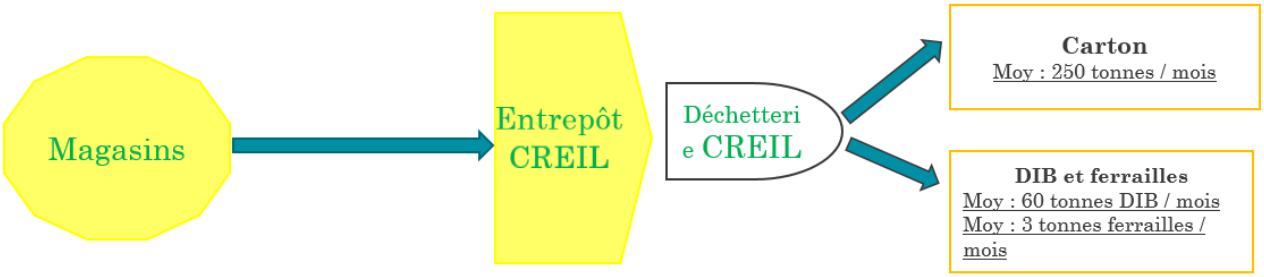


Figure 11: Return Flow Mapping

The returns are made, generally, by a truck which delivers the stores. On the return journey, it collects waste, pallets and defective goods from the stores. The "return" trucks have a fill rate of 48% (which is very low), the fill rate of the delivery trucks is 83% but a little low. A rate of 90-95% should be achievable quite easily with a better forecast of needs and improved planning.

On the other hand, the "return" fill rate can be greatly improved and thus reduce the "return" transport cost which represents 17% of the total transport cost, which isn't negligible and requires a rethink of the organization.

For this purpose, a project called "reverse" has been discussed and described below.

2. Reverse Project

The project was defined in June 2021. It consists in reducing the number of return trips, which automatically increases the filling rate. The return journeys were direct from stores to warehouses.

The idea of the project is a regional grouping to avoid systematically going back to the warehouse by creating.

- Regional waste processing areas

- Regional zones for pallet deposit
- Areas for the regrouping of return products and rental pallets

The transport between the regional zone and the warehouse will be done by full trucks for the rental pallets and the return products.

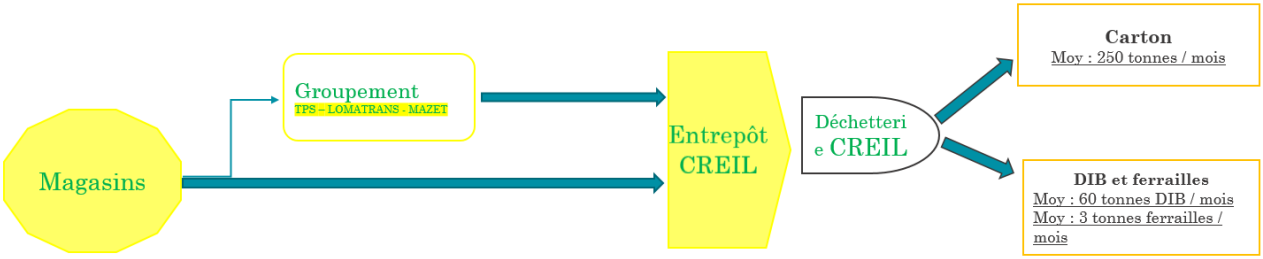


Figure 12: Reverse Project Mapping

It was important to start by grouping the stores in zones according to the carriers to define the regional agencies which are materialized on the following map of France by a yellow star.

The transport is no longer a round trip from the warehouses to the stores but a one-way trip which obliges to have recourse to independent carriers according to the geographical zones to ensure the filling of the return truck. The same applies to regional transport.

As far as empty pallets are concerned, they will be collected directly from the by other stores such as Carrefour, Leroy Merlin thanks to an exchange facilitator called Magic Pallet.

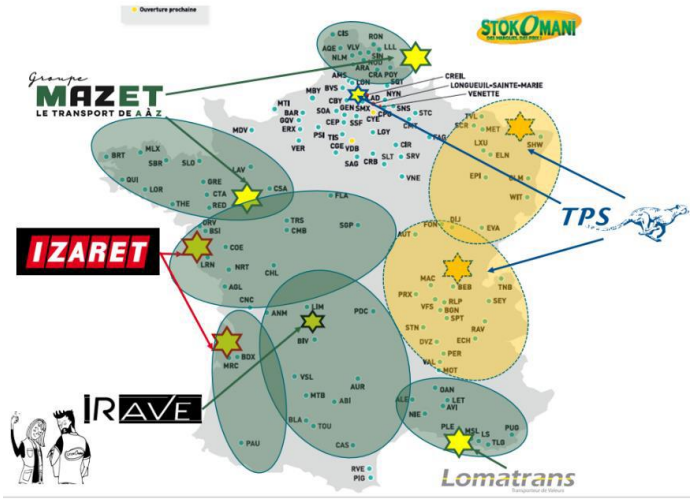


Figure 13: Regionalization map

We can give as an example of probable case of exchange, Stokomani deposits 100 pallets at the regional agency located near Marseille, the company Carrefour comes to recover them and in exchange Carrefour deposits 100 pallets at the agency near Paris. This exchange of pallets allows Stokomani and Carrefour to avoid having to return 100 pallets from Marseille to Paris. This is a gain corresponding to the immobilization of the truck, the mileage expenses, the driver's salary for both companies but also a reduction of their carbon impact and its cost.

Before the project is implemented it is necessary to determine the consequences of it, what will be the positive impact, is it notable in our situation. To evaluate the reduction of the costs of the return transports.

To do this, the management control department had to carry out a simulation and an analysis of the transport costs based on the reverse project concerning the returns.

For pallets, a simulation was created from the transport file. Filters were applied to show all the return journeys for each region and number of pallets transported, as shown in annex 3.

POINT DE COLLECTE REGIONAL	AVRIL			MAI			JUIN		
	Nb PAL	Nb Trajet	Cout	Nb PAL	Nb Trajet	Cout	Nb PAL	Nb Trajet	Cout
RETOUR CREIL (60)	3 239	51	15 393 €	6 539	88	24 266 €	8 917	94	24 226 €
RETOUR CHEZ TPS_60290 RANTIGNY	828	7	6 758 €	1 779	16	8 828 €	1 866	15	8 863 €
SOUS TOTAL Hors régionalisation	**4 067**	**58**	**22 151 €**	**8 318**	**104**	**33 093 €**	**10 783**	**109**	**33 089 €**
59113 SECLIN	989	18	5 146 €	1 985	27	7 116 €	2 637	25	5 737 €
13220 CHATEAUNEUF LES MARTIGUES	2 085	28	35 451 €	3 502	20	25 577 €	6 236	12	16 355 €
35131 CHARTRES DE BRETAGNE	1 382	1	10 890 €	1 036	1	16 673 €	2 266	1	13 517 €
87270 COUZEIX	1 258	20	16 556 €	2 358	25	20 999 €	2 550	31	26 015 €
LIEU A TROUVER AUTOUR DE LYON (69)	2 664	31	19 028 €	4 060	38	22 817 €	5 134	44	28 382 €
LIEU A TROUVER METZ_NANCY	1 354	10	6 414 €	1 428	14	7 524 €	1 710	19	9 915 €
IZARET VENDÉE_85150 LA MOTHE ACHARD	732	11	7 131 €	867	12	8 187 €	1 466	18	11 938 €
SOUS TOTAL avec Régionalisation	**10 464**	**119**	**100 617 €**	**15 236**	**137**	**108 892 €**	**21 999**	**150**	**111 860 €**
TOTAL GLOBAL	**14 531**	**177**	**122 768 €**	**23 554**	**241**	**141 986 €**	**32 782**	**259**	**144 949 €**

Figure 14: Return transport by region

Then the forecasted transport cost for each region and evaluate with the tariff grid of the transporters.

For the waste, it is necessary to add the treatment of a pallet of waste which is of the order of 2,3€ as well as the handling of the pallets of waste and goods by the carrier of the order of 1,7€.

Based on the grouping of stores by region, the cost of current returns is compared with the estimates from the reverse project simulations.
This comparison of the cost of returns by region reveals gains, more or less important.

For example, the groupings in Ile de France are not interesting because the cost of returns directly to the warehouse is lower than a return to the processing area. On the other hand, in the Rhone region, a return to the processing area allows to reduce the cost of the returns.

This comparison shows the interest of the reverse formula according to the distance of the warehouse, which was perceptible a priori but not quantified in relation to the distance store - warehouse.

With this simulation, it is possible to see a significant impact of the distance in kilometers on the costs. With the implementation of the project reverse to some regional area away from the warehouses. The company could obtain a cost reduction of nearly 500,000€ on the return journeys per year, approximately 30% of the total cost of

return transport. This analysis also allows to appreciate the limits of internal transport and outsourcing.

B. Forecast

First, it is good to know that a logistics forecast is a document that indicates the quantity of articles that the company thinks it will have to process in the warehouses during a given period. This document allows the company to plan its production and optimize its inventory management. The forecast allows the company to estimate its annual costs and to develop its budget for the coming year.

At Stokomani, the forecast file was created at the beginning of 2021 to forecast the production and logistics costs of the sites by universe until 2025.

The forecast is presented in the form of an Excel matrix containing links to information matrices that are given by the extraction of the WMS (Warehouse Management System) software.

The forecast is monthly, it gives the forecasts of each month and each universe until December 2025.

In the matrix, it's possible to find two types of information: the forecast data of the month and the actual data that includes the logistic data detailed in universes for a greater precision and to draw indicators specific to each universe of the current month (annex 4).

With all the forecast and actual logistic data, it's possible to establish performance indicators by universe, which will then be compared between them to be analyzed.

- One of the first important indicators to be analyzed is the internal and interim hourly cost, which makes it possible to quickly identify whether there are any parasitic hours during the month (the difference between the hours paid and the hours declared by the warehouse team leaders). The problem with these parasitic hours is that they have a positive or negative impact on the real hourly cost, resulting in an overvaluation or undervaluation of the indicators, which is

unacceptable in management control. The analyses must be dependable and real to avoid any negative action.

- The second indicator is the IN and OUT parcel cost, which is calculated from the number of IN and OUT parcels and the interim and internal wages. This indicator is interesting to know the cost of moving a package IN and OUT to the company.

- The third indicator is the IN & OUT productivity of the warehouses which gives an indication of the logistic performance of the month. This is calculated with the number of IN and OUT parcels divided by the number of hours used to process all the IN and OUT parcels.

When all the indicators are determined, it's possible to compare them with the different indicators recorded for the corresponding month of the previous year and the month of the forecast. This comparison allows to have a wider vision of the performance and to identify problems to be corrected that negatively impact the logistic performance. By making the curves of the monthly indicators and putting them in front of the indicator of the forecast and the one of the previous year N-1, we obtain the evolution of the monthly performance in time.

C. Dashboards and other measures

In supply chain management control, we often talk about Key Performance Indicators (KPIs) which allow us to assess our performance in relation to the objectives set.

At Stokomani there are daily, weekly, monthly and quarterly KPIs. These KPIs aim to close the logistic activity of the period and to produce performance indicators.

For the creation of all the KPIs it is necessary to have the following information extracted from the WMS (Warehouse Management System) software.

1st: The number of parcels entering the warehouse in a container.

2nd: The number of parcels IN & OUT by trucks in each warehouse

3rd: The number of pallets in inter-site IN & OUT, inter-site transport is the transfer of pallets from one logistics site to another.

4th: The number of cross-dock pallets, is an action that consists in moving parcels or pallets from the arrival docks directly to the departure docks without having to go through the storage area.

5th: Valued amount at PR delivered, it is the total monetary amount of the parcels received in the warehouse.

6th: Valued amount shipped, this is the total monetary amount of packages shipped from the warehouse.

7th: the number of hours

All this data will be entered into an Excel file which consists of a table in which we will be able to find the type of flow (IN and OUT) with the activities that correspond to this type of flow. The reporting will consist in transferring the values previously recovered in the activity corresponding to each of the logistic sites (LSM, LSB, Venette, Alata).

For each activity, we enter the number of parcels and pallets with the number of hours used to process them. This makes it possible to produce a productivity indicator for each activity, as well as an overall indicator for IN & OUT flows (Annex 5).

The productivity indicators obtained are compared to the productivity of the previous weeks and to the target set via the forecast file we saw earlier. In order to detect a possible variation in productivity. When a significant increase or decrease in productivity is observed, it is necessary to find out what may have had an impact. For management control, productivity reports must be able to explain the reason for the variation in productivity, whatever the origin.
Moreover, in the supply chain, a constant productivity is preferred to a sinusoidal productivity which makes it random.

We can end up with productivity indicators that are lower than the forecast (annex 6). This situation makes us understand that productivity can and must be improved in the coming weeks to reach the objectives set by the company, or to revise the forecast to obtain indicators closer to the real production capacity of the warehouses.

We can conclude that the creation of KPIs by day, week and month allows to generate trend graphs as below, which gives a quick, precise vision of the impact of productivity.

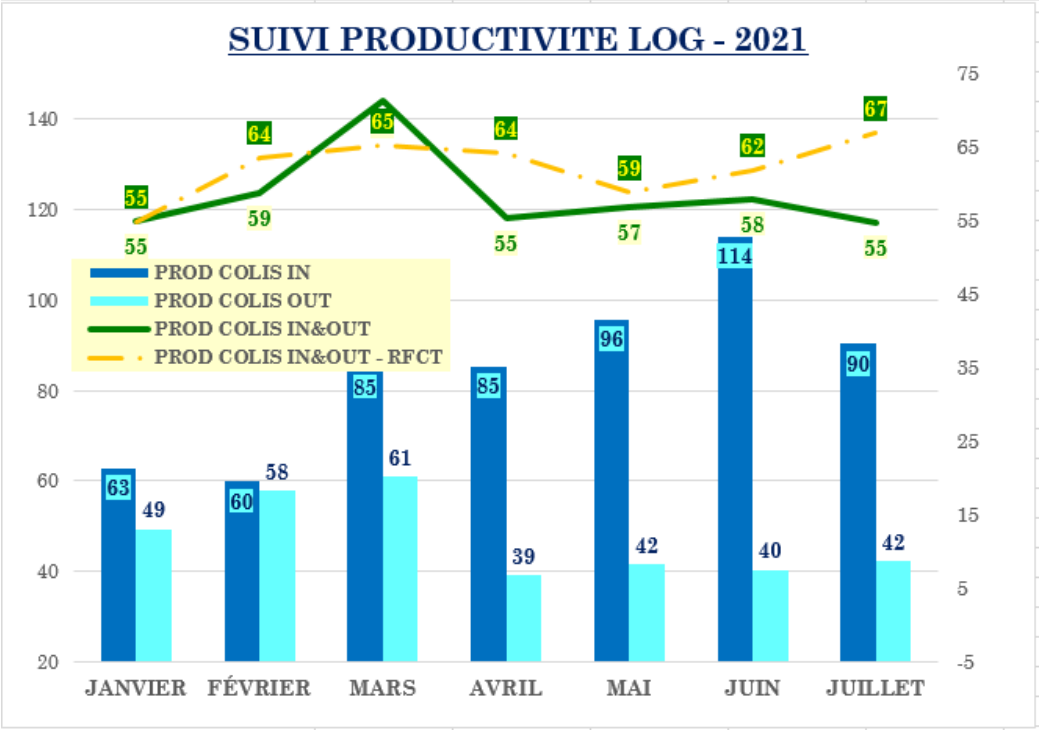


Figure 15: Monthly graph of logistics productivity

On this graph we can see that the IN & OUT productivity is generally lower than the forecasted productivity. For the month of July, we find a deviation of 12 which is high, on the other hand the deviations for the months of April, May, June can be justified by the health crisis, which caused the closure of the non-essential side of the points of sale.

Within the framework of social relations, the graph is used to inform the logistics employees about their operational performance and to maintain their motivation.

Conclusion

Nowadays, to be competitive and survive, the company must move from a logic of selling what it produces, to producing what it sells, eliminating stocks. Determining beforehand the quantity of product that will be sold to produce exactly what will be needed is the major objective. It is in this perspective, that logistics has participated in the necessary mutations of the organization models with the new generation of industry 4.0. The final objective remains the maximization of profits, but to achieve it, it is no longer enough to focus on reducing production costs. The company must integrate new challenges and new constraints, where quality of service and traceability become major conditions of success in a competitive environment increasingly international and technological.

Creating value has become the benchmark for business valuation. Improving performance means maximizing cash flows to generate a return on capital employed that exceeds the cost of capital. This implies going beyond the vertical vision of the company to apprehend the entire value creation chain involving customers, suppliers and partners.

The aim is to develop sales by satisfying the increasingly demanding customer, by constantly improving the service rate and lead times and by eliminating supply disruptions. The performance of a logistics chain is based on both costs and quality: switching to pull flows, planning production, preparing deliveries and coordinating transport. To achieve this, the links in the chain must work together. This approach, based on common sense and organization, leaves no room for improvisation.

Therefore, the place of the management controller appears clearly in the supply chain with the creation of a department specialized in the supply chain. This field has an important impact on the strategy and the operational costs of the company, its growing importance gives the will to the companies to institutionalize it. The supply chain controller intervenes throughout the supply chain with measurement tools to validate strategic choices and measure the impact. The application of multidimensional dashboards and other methods has demonstrated that it is possible and mandatory to measure the performance of each activity throughout the supply chain so that the company can develop maximum value.

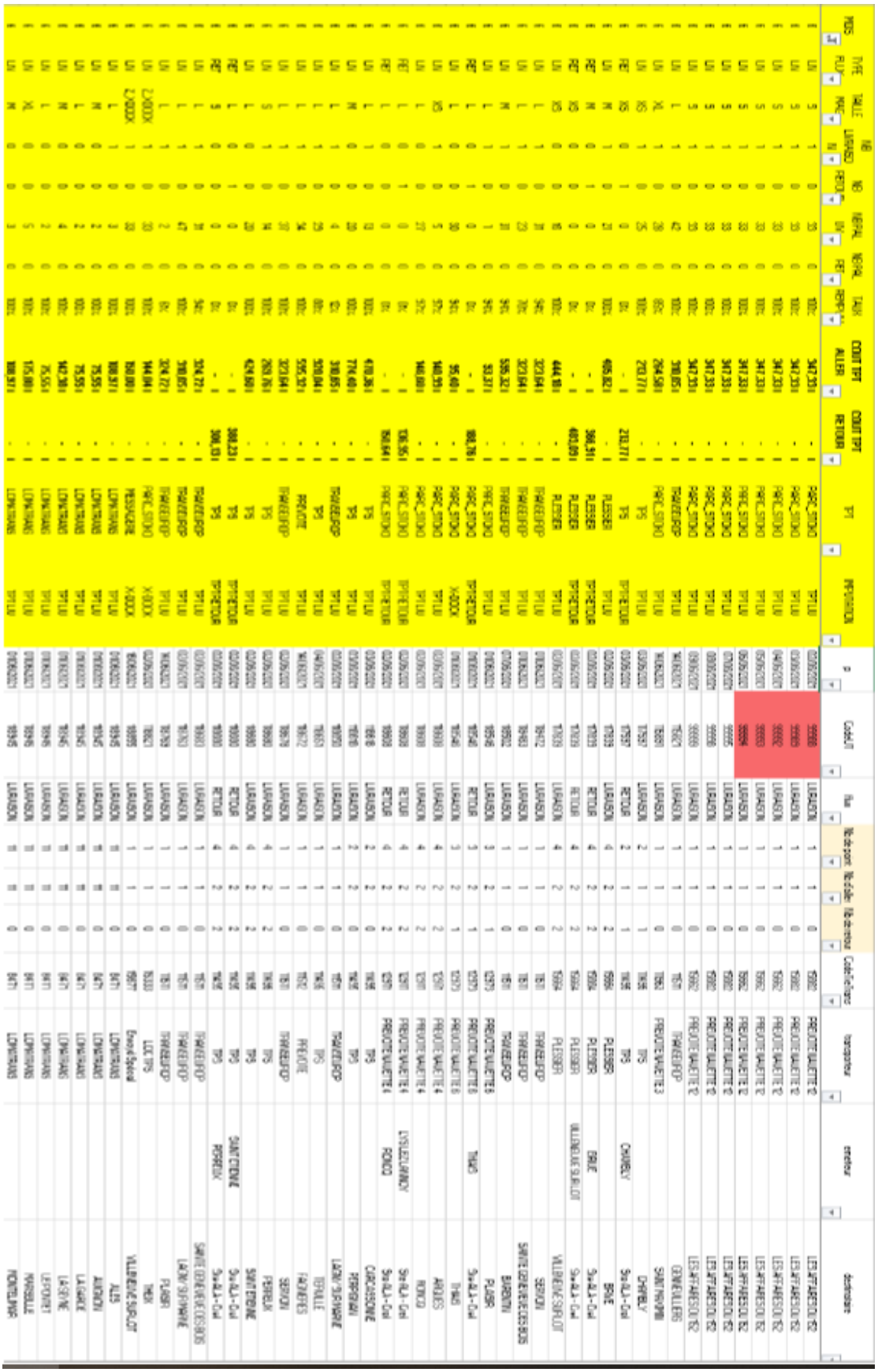
Stokomani is a leader in its sector but it must face many French and European competitors which force it to develop and improve its supply chain to make it more efficient with the

integration of new tools and methods while making it less costly in the long term. Optimizing the supply chain means gaining a competitive advantage.

Supply chain management control is an approach that plays on the strategic and operational level. Nowadays, this field is mandatory for companies to survive and perform in their environment.

Appendices

Annex 1: Follow-up of transportation costs



Annex 2: Global summary by Transport

MOIS	TRANSPORTEUR	LIVRAISON MAGASINS NB LIVRAISON	LIVRAISON MAGASINS NB PAL LIV	LIVRAISON MAGASINS COUT TPT ALLER	LIVRAISON MAGASINS TAUX REMP LIV	RETOUR MAGASINS NB PAL RET	RETOUR MAGASINS COUT TPT RETOUR	TPT INTERNE STOKO NB LIVRAISON	TPT INTERNE STOKO NB PAL LIV	TPT INTERNE STOKO COUT TPT INTERSITE	COUT TPT TOTAL STOKO	CA STOKO HT	COGS MAGASINS HT	RATIO CA TOT	MAGASINS	RETOUR	INTERNE
Total JANVIER		1 111	23 485	605 227 €	75%	557	138 040 €	554	11 781	125 266 €	868 532 €	40 723 931 €		2,1%	1,5%	0,3%	0,3%
Total FEVRIER		1 379	31 085	756 396 €	78%	712	157 126 €	623	11 649	129 539 €	1 043 061 €	42 038 131 €		2,5%	1,8%	0,4%	0,3%
Total MARS		1 433	33 508	849 733 €	79%	1 325	176 525 €	590	11 296	126 484 €	1 152 744 €	41 036 604 €		2,8%	2,1%	0,4%	0,3%
Total AVRIL		533	11 406	326 678 €	79%	787	122 768 €	535	11 769	123 510 €	572 956 €	19 200 656 €		3,0%	1,7%	0,6%	0,6%
MAI	TPT MAGASIN	880	19 264	503 893 €	80%	0	143 064 €				646 957 €						
	X-DOCK							83	4 474	27 886 €	27 886 €						
	TPS INTERSITES							90	1 716	22 339 €	22 339 €						
	DEM VENETTE							167	4 473	35 637 €	35 637 €						
	TPT PROD/MGX							59	0	23 587 €	23 587 €						
	TPT ACHAT							0	0	- €	- €						
	TPT ICPE							18	351	4 366 €	4 366 €						
Total AVRIL		880	19 264	503 893 €	80%	0	143 064 €	407	11 014	113 815 €	760 772 €	30 730 407 €		1,9%	1,3%	0,4%	0,3%
JUIN	TPT MAGASIN	1 468	32 160	874 430 €	75%	532	144 949 €				1 019 378 €						
	X-DOCK							473	15 557	81 071 €	81 071 €						
	TPS INTERSITES							171	4 293	31 498 €	31 498 €						
	DEM VENETTE							166	4 245	28 499 €	28 499 €						
	TPT PROD/MGX							31	0	14 490 €	14 490 €						
	TPT ACHAT							22	0	4 577 €	4 577 €						
	TPT ICPE							22	278	3 512 €	3 512 €						
Total JUIN		1 468	32 160	874 430 €	75%	532	144 949 €	875	24 373	163 646 €	1 183 025 €	52 257 492 €		2,3%	1,7%	12,3%	13,8%
											- €	- €	- €	-	-	-	-
YTD	TPT MAGASIN	6 804	150 908	3 916 356 €		3 913	882 474 €				4 798 830 €						
	X-DOCK							803	36 094	178 398 €	178 398 €						
	TPS INTERSITES							1 179	23 019	212 765 €	212 765 €						
	DEM VENETTE							858	21 296	171 931 €	171 931 €						
	TPT PROD/MGX							360	0	133 094 €	133 094 €						
	TPT ACHAT							219	10	57 732 €	57 732 €						
	TPT ICPE							165	1 463	28 340 €	28 340 €						
Total général		6 804	150 908	3 916 356 €		3 913	882 474 €	3 584	81 882	782 261 €	5 581 090 €	235 016 221 €	- €	2,4%	1,7%	0,4%	0,3%

Annex 3: Overview according to the regionalization of the "Reverse" project

POINT DE COLLECTE REGIONAL	AVRIL			MAI			JUIN		
	Nb PAL	Nb Trajet	Cout	Nb PAL	Nb Trajet	Cout	Nb PAL	Nb Trajet	Cout
RETOUR CREIL (60)	3 239	51	15 393 €	6 539	88	24 266 €	8 917	94	24 226 €
RETOUR CHEZ TPS_60290 RANTIGNY	828	7	6 758 €	1 779	16	8 828 €	1 866	15	8 863 €
SOUS TOTAL Hors régionalisation	**4 067**	**58**	**22 151 €**	**8 318**	**104**	**33 093 €**	**10 783**	**109**	**33 089 €**
59113 SECLIN	989	18	5 146 €	1 985	27	7 116 €	2 637	25	5 737 €
13220 CHATEAUNEUF LES MARTIGUES	2 085	28	35 451 €	3 502	20	25 577 €	6 236	12	16 355 €
35131 CHARTRES DE BRETAGNE	1 382	1	10 890 €	1 036	1	16 673 €	2 266	1	13 517 €
87270 COUZEIX	1 258	20	16 556 €	2 358	25	20 999 €	2 550	31	26 015 €
LIEU A TROUVER AUTOUR DE LYON (69)	2 664	31	19 028 €	4 060	38	22 817 €	5 134	44	28 382 €
LIEU A TROUVER METZ_NANCY	1 354	10	6 414 €	1 428	14	7 524 €	1 710	19	9 915 €
IZARET VENDÉE_85150 LA MOTHE ACHARD	732	11	7 131 €	867	12	8 187 €	1 466	18	11 938 €
SOUS TOTAL avec Régionalisation	**10 464**	**119**	**100 617 €**	**15 236**	**137**	**108 892 €**	**21 999**	**150**	**111 860 €**
TOTAL GLOBAL	**14 531**	**177**	**122 768 €**	**23 554**	**241**	**141 986 €**	**32 782**	**259**	**144 949 €**

TOTAL T1			TOTAL T2			TOTAL GLOBAL			RATIO		
Nb PAL	Nb Trajet	Cout	Nb PAL	Nb Trajet	Cout	Nb PAL	Nb Trajet	Cout	Cout Retour Pal	Cout par Trajet	
27 430	286	76 046 €	18 695	233	63 885 €	46 125 €	519 €	139 931 €	2,8 €	265,9 €	
5 917	49	29 654 €	4 473	38	24 449 €	10 390 €	87 €	54 102 €	5,0 €	605,2 €	
33 347	**335**	**105 700 €**	**23 168**	**271**	**88 334 €**	**56 515**	**606**	**194 034 €**	**3,17 €**	**316 €**	**- €**
7 862	73	17 396 €	5 611	70	17 998 €	13 473	143	35 394 €	2,21 €	238 €	
10 959	60	75 612 €	11 823	60	77 383 €	22 782	120	152 995 €	6,90 €	1 260 €	
7 862	20	57 258 €	4 684	3	41 081 €	12 546	23	98 339 €	7,28 €	2 863 €	
9 110	91	75 303 €	6 166	76	63 571 €	15 276	167	138 874 €	8,27 €	828 €	
17 892	129	79 632 €	11 858	113	70 227 €	29 750	242	149 860 €	4,45 €	617 €	
8 259	52	27 427 €	4 492	43	23 853 €	12 751	95	51 279 €	3,32 €	527 €	
4 707	52	33 364 €	3 065	41	27 256 €	7 772	93	60 621 €	7,09 €	642 €	
66 651	**477**	**365 993 €**	**47 699**	**406**	**321 369 €**	**114 350 €**	**883 €**	**687 362 €**	**5,49 €**	**767 €**	**- €**
99 998	**812**	**471 693 €**	**70 867**	**677**	**409 702 €**	**170 865 €**	**1 489 €**	**881 395 €**	**4,72 €**	**581 €**	**- €**

Annex 4: Table of the month of May of the forecast

	Réel Mai 21							Reforecast Mai 21						
LOGISTIQUE	LSM	LSB	Alata	Venette	**Total**	XPO	**Total log**	LSM	LSB	ALA 1	VEN	**Total**	XPO	**Total log**
COGS expédié	6 504 179 €	5 872 936 €	944 344 €	1 802 212 €	**15 203 671 €**	2 390 132 €	**17 593 803 €**	9 426 803 €	4 420 576 €	891 344 €	0 €	**14 738 722 €**	4 050 616 €	**18 789 338 €**
Achats PR	2 700 074 €	5 431 772 €	2 131 784 €	4 231 015 €	**14 494 646 €**	3 103 908 €	**17 598 554 €**	6 584 456 €	5 019 185 €	553 427 €	2 307 893 €	**14 464 961 €**	4 586 874 €	**19 051 835 €**
NB COLIS IN	52 299	211 300	85 211	252 380	601 190	87 066	688 256	100 195	179 736	37 792	165 199	482 922	136 496	619 418
NB COLIS OUT	254 977	214 129	69 409	114 192	652 707	44 156	696 863	275 093	159 831	64 012	145 861	644 797	112 012	756 809
TOTAL COLIS	307 276	425 429	154 620	366 572	**1 253 897**	131 222	**1 385 119**	375 287	339 567	101 804	311 061	**1 127 719**	248 508	**1 376 227**
NB HEURES INTERIM	3 733	5 496	452	1 027	10 708	0	10 708	3 206	1 045	-129	-337	3 784	0	3 784
NB HEURES INTERNE	4 834	459	1 091	6 643	13 026	0	13 026	3 137	6 576	1 595	6 111	17 420	0	17 420
TOTAL HEURE	8 567	5 954	1 543	7 670	**23 733**	0	**23 733**	6 343	7 621	1 466	5 774	**21 204**	0	**21 204**
NB HEURES entrée	1 407	6 896	769	2 499	9 569		9 569	1 212	3 015	493	1 711	6 432		6 432
NB HEURES sortie	6 778	769	617	3647	11 811		11 811	4 732	4 339	839	2 833	12 744		12 744
TOTAL HEURE	8 185	5 663	1 386	6 146	**21 380**		**21 380**	5 944	7 355	1 333	4 544	**19 176**		**19 176**
NB HEURES Formation, tests &IT	384	292	157	1 524	2 357		2 357	399	266	133	1 230	2 028		2 028
TOTAL HEURE	8 569	5 956	1 543	7 670	**23 738**	0	**23 738**	6 343	7 621	1 466	5 774	**21 204**	0	**21 204**
PRODUCTIVITE	37,5	75,1	111,6	59,6	**58,6**			63,1	46,2	76,4	68,5	**58,8**		
Prod entrée	37,2	43,2	110,8	101,0	62,8			82,6	59,6	76,6	96,6	75,1		
Prod sortie	37,6	278,5	112,5	31,3	55,3			58,1	36,8	76,3	51,5	50,6		59,4
VAL Colis E PR	51,6 €	25,7 €	25,0 €	16,8 €	**24,1 €**	35,7 €	**25,6 €**	65,7 €	27,9 €	14,6 €	14,0 €	**30,0 €**	33,6 €	**30,8 €**
VAL Colis S COGS	25,8 €	27,4 €	13,6 €	15,8 €	**23,3 €**	54,1 €	**25,2 €**	34,3 €	27,7 €	13,9 €	0,0 €	**22,9 €**	36,2 €	**24,8 €**
Salaires Chargés	138 709 €	135 826 €	59 460 €	42 866 €	376 861 €	0 €	376 861 €	77 921 €	147 402 €	62 493 €	159 712 €	446 529 €		446 529 €
Intérim	80 372 €	127 270 €	9 160 €	19 945 €	236 748 €	107 620 €	344 368 €	66 835 €	21 778 €	- 2 697 €	- 7 025 €	78 891 €	174 046 €	252 936 €
TOTAL SALAIRES	219 081 €	263 096 €	68 620 €	62 811 €	**613 609 €**	107 620 €	**721 229 €**	144 757 €	169 180 €	59 796 €	151 687 €	**525 420 €**	174 046 €	**699 465 €**
COUT COLIS	0,71 €	0,62 €	0,44 €	0,17 €	**0,49 €**	0,82 €	**0,52 €**	0,39 €	0,50 €	0,59 €	0,49 €	**0,47 €**	0,70 €	**0,51 €**
Coût colis entree	0,69 €	1,02 €	0,40 €	0,08 €	0,41 €			0,28 €	0,37 €	0,53 €	0,27 €	0,33 €		
Coût colis sortie	0,68 €	0,16 €	0,40 €	0,26 €	0,47 €			0,39 €	0,60 €	0,53 €	0,51 €	0,49 €		
COUT HORAIRE	25,6 €	44,2 €	44,5 €	8,2 €	**25,9 €**			22,8 €	22,2 €	40,8 €	26,3 €	**24,8 €**		
Coût heure interne	28,7 €	296,4 €	54,5 €	6,5 €	28,9 €			24,8 €	22,4 €	39,2 €	26,0 €	25,6 €		
Coût heure interim	21,5 €	23,2 €	20,3 €	19,4 €	22,1 €			20,8 €	20,8 €	20,8 €	20,8 €	20,8 €		

Annex 5: Week 29 of the Logistics KPIs file

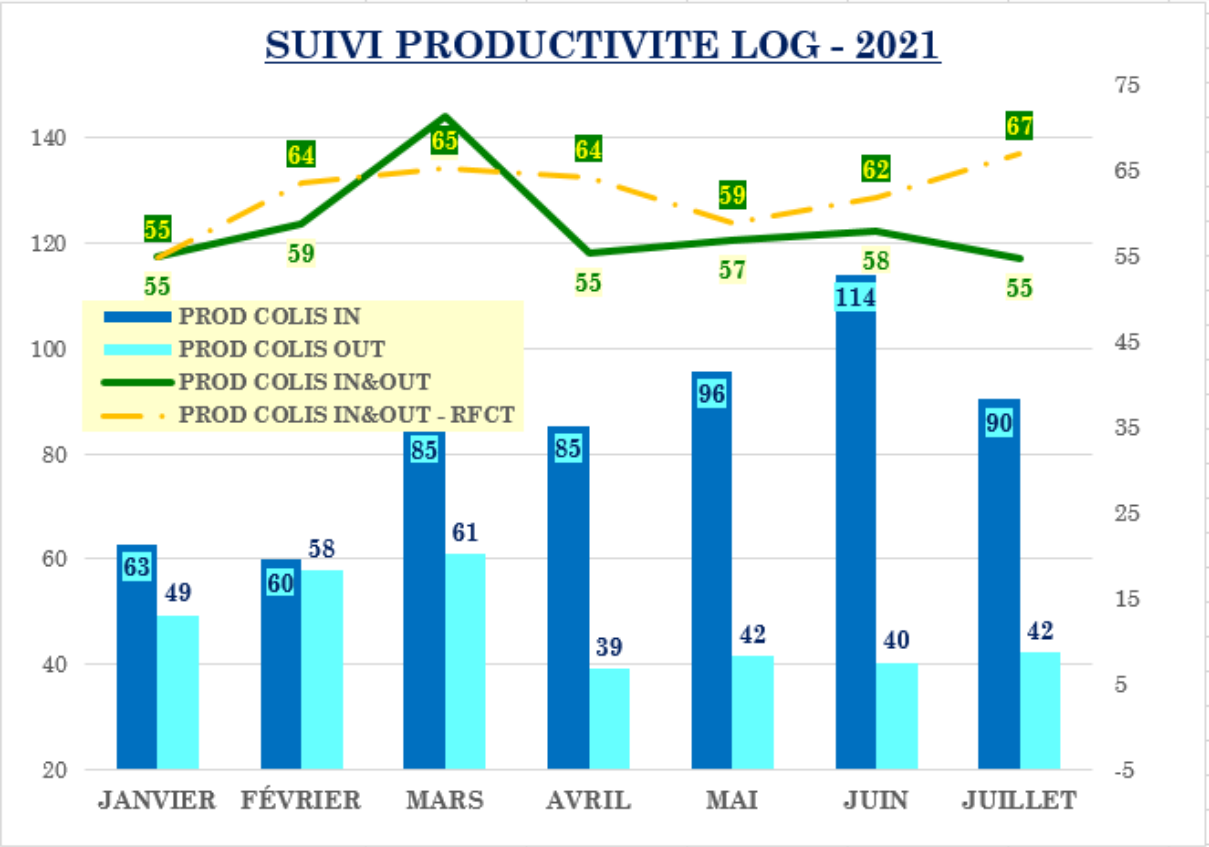
PERIODE		Semaine :	29	29	29	29	29	29
FLUX	ACTIVITE	VALEURS	LSM	LSB	VENETTE	TOTAL LS+VEN	ALA1	TOTAL LOG
FLUX IN	mdp : Stokolog1+	Valeur IN (PR)				- €		- €
	FLUX CT	NB RDV / CT				0		0
		NB COLIS CT IN				0		0
		Nb PAL IN - CT				0		0
		HEURES IN				0		0
		PRODUCTIVITE COLIS CT	0	0	0	0,0		0,0
	FLUX CAMION DDP	Nb PAL IN - FRN Ext	1 760	324	2 002	4 086	445	4 532
		NB COLIS IN - FRN EXT	46 258	12 276	124 116	182 650	47 203	229 853
		Nb PAL IN - Finition				0		0
		NB COLIS IN - FINITION				0		0
		Nb PAL IN - DDP	1 760	324	2 002	4 086	445	4 532
		HEURES IN	579	6	203	787	64	851
		PRODUCTIVITE PAL DDP	3,0	54,1	9,9	5,2	7,0	5,3
	CARISTE : ROULAGE + STOCKAGE + INTERSITES IN&OUT	Nb PAL IN - Stockage				0		0
		Nb PAL REA PICK+DALLE				0		0
		Nb PAL COMPL OUT				0		0
		Nb PAL INTERSITES IN	1 639		1 207	2 846	22	2 868
		Nb PAL INTERSITES OUT	2 084		454	2 538	207	2 745
		Nb PAL "CARISTE" TOTAL	3 723	0	1 661	5 384	229	5 613
		HEURES CARISTES+INTERSITES	612	112	397	1 121	143	1 264
		PRODUCTIVITE PAL CARISTE	6,1	0,0	4,2	4,8	1,6	4,4
	DELOTAGE	NB UV/Articles à déloter				0		0
		HEURES IN				0		0
		PRODUCTIVITE DELOTAGE/UV	0	0	0	0,0	0	0,0
	TOTAL IN	ETP IN	34,0	3,4	17,1	55,5	5,9	61,4
		NB COLIS IN - TOTAL	46 258	12 276	124 116	182 650	47 203	229 853
		Nb PAL IN - TOTAL	1 760	324	2 002	4 086	445	4 532
		NB HEURES IN - TOTAL	1 191	118	600	1 908	207	2 115
		PROD COLIS IN - TOTAL	38,9	104,0	207,0	95,7	228,0	108,7
		PROD COLIS IN - TOTAL CIBLE REFORECAST	102,5	73,1	105,0		69,3	100,1

FLUX OUT		Valeur OUT (TDB)				- €		- €
	FLUX PREPA	NB COLIS PREPA (PICK+DALLE)	76 551	6	120 848	197 405	6 345	203 750
		HEURES PREPA	1 463		2 618	4 080	92	4 172
		PRODUCTIVITE COLIS PREPA	52,3	0,0	46,2	48,4	69,0	48,8
	FLUX EXPE + X-DOCK	NB PAL X_DOCK	431	0	375	806	104	910
		Nb PAL EXPE	3 463	1 398	3 306	8 167	238	8 405
		NB PAL EXPE + X_DOCK	3 894	1 398	3 681	8 973	342	9 315
		HEURES EXPE + X_DOCK	763	125	648	1 536	8	1 544
		PRODUCTIVITE PAL EXPE + X_DOCK	5,1	11,2	5,7	5,8	42,8	6,0
	TOTAL OUT	ETP OUT	63,6	3,6	93,3	160,5	2,9	163,3
		NB COLIS OUT - TOTAL	76 551	6	120 848	197 405	6 345	203 750
		Nb PAL OUT - TOTAL	3 894	1 398	3 681	8 973	342	9 315
		NB HEURES OUT - TOTAL	2 226	125	3 266	5 616	100	5 716
		PROD COLIS OUT - TOTAL	34,4	0,0	37,0	35,2	63,5	35,6
		PROD COLIS OUT - TOTAL CIBLE REFORECAST	53,7	49,9	54,7		76,3	66,6
FLUX IN & OUT		ETP TOTAL	98,0	7,0	111,0	216,0	3,2	219,2
		NB COLIS IN&OUT - TOTAL	122 809	12 282	244 964	380 055	53 548	433 603
		Nb PAL IN&OUT - TOTAL	5 654	1 722	5 683	13 059	787	13 847
		NB HEURES IN&OUT - TOTAL	3 416	243	3 865	7 524	307	7 831
		PROD COLIS IN&OUT - TOTAL	36,0	50,5	63,4	50,5	174,4	55,4
		PROD COLIS IN&OUT - TOTAL CIBLE REFORECAST						
		Heures Formation & Test	37	25	123	185	14	199
		Heures ITS IN & OUT	73	49	245	367	24	391

Annex 6: June summary of Logistics KPIs

	MOIS	JUIN			
	SITE	LSM/B	VEN	ALA	TOTAL LOG
FLUX IN	Montant Valorisé au PR Livré	3 959 488	3 543 010	5 390 774	24 893 271
	ETP IN	22	18	7	48
	NB COLIS IN - TOTAL	225 663	588 434	130 510	944 607
	Nb PAL IN - TOTAL	8 707	9 711	1 717	20 136
	NB HEURES IN - TOTAL	3 915	3 085	1 278	8 278
	PROD COLIS IN - TOTAL	58	191	102	114
	PROD COLIS IN - TOTAL CIBLE REFORECAST	60,0	102,6	71,9	89,9
FLUX OUT	ontant Valorisé au TDB Livré en Magasin				65 442 182
	ETP OUT	81	63	7	150
	NB COLIS OUT - TOTAL	492 976	453 700	116 933	1 063 609
	Nb PAL OUT - TOTAL	25 563	13 659	3 060	42 282
	NB HEURES OUT - TOTAL	14 104	11 019	1 208	26 331
	PROD COLIS OUT - TOTAL	35	41	97	40
	PROD COLIS OUT - TOTAL CIBLE REFORECAST	45,0	54,7	76,3	62,2
FLUX ITS/FORM/DIV	ETP FORM/DIV	7	23	2	32
	NB HEURES Formation & Test	260	800	65	1 125
	ETP ITS	15	46	3	64
	Nb PAL ITS IN&OUT	7 699	4 800	1 434	13 933
	NB HEURES IST IN&OUT	515	1 605	120	2 240
	PROD PAL ITS IN&OUT - TOTAL	15	3	12	6
	PROD PAL ITS IN&OUT - TOTAL CIBLE REFORECAST				
FLUX IN+OUT	ETP TOTAL	103	81	14	199
	NB COLIS IN&OUT - TOTAL	718 639	1 042 134	247 443	2 008 216
	Nb PAL IN&OUT - TOTAL	34 270	23 370	4 777	62 418
	NB HEURES IN&OUT - TOTAL	18 018	14 104	2 487	34 609
	PROD COLIS IN&OUT - TOTAL	39,9	73,9	99,5	58,0
REFORECAST	ETP TOTAL REFOCAST	67,0	78,0	14,0	158,6
	NB COLIS IN&OUT - TOTAL	538 021	817 224	156 494	1 511 739
	NB HEURES IN&OUT - TOTAL	10 323	11 992	2 111	24 422
	PROD COLIS IN&OUT - TOTAL	52,1	68,1	74,1	61,9
	Montant Valorisé au PR Livré Reforecast	15 155 589	5 754 885	1 063 249	21 973 724
	ontant Valorisé au TDB Livré en Magasin				0

Annex 7: Monthly graph of logistics productivity



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