

SUPPLY CHAIN MANAGEMENT INNOVATION

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Abstract— *Our work has been carried out in order to know the real situation of the organizations, with regard to the implementation of innovation approaches in Supply Chain Management. The objective of this paper is to mobilize works on Supply Chain Management and innovation, to describe and understand the inter-organizational dimension of innovation in Supply Chain Management (SCM).*

Keywords— **Supply Chain Management, Innovation, processes, Sustainable development, Supply Chain Management Innovation management, Corporate SCR .**

I. INTRODUCTION

One of the main value-creating activities in every company is the Supply Chain Management. It is a function that attracts the attention of managers, as its integration into the process has a direct impact on the evolution of the company. Indeed, logistics is considered as an orientation of the planning of material and immaterial flows within an activity, whereas the Supply Chain Management aims to create integration and coordination between the authors of the whole chain from the provider of the supplier to the customer of the customer. The main objective of supply chain management is the management of relations between these different stakeholders in order to achieve more profitable outcome for all parties in the chain. It's in this perspective that we will study the importance of innovation in the SCM.

At this level we will first focus on:

- The concept of SCM, its origins and definitions, its role within the company and the theories mobilized to understand it.

- The concept of innovation, its origin and its different types. This is where we will focus on a specific type of organizational innovation, namely the implementation of the concept of sustainable development in the Supply Chain Management. Thereby, to change their ways in order to improve their environmental, social and economic effects, the companies must also be creative and open-minded. In this way, the integration of sustainable development into the company's strategic planning becomes a lever and a catalyst for innovation.

Later, we will make a synthesis of the various practices of the integration of innovation in the SCM, with an attempt to model this process.

II. SUPPLY CHAIN MANAGEMENT

The concept of Supply Chain Management (SCM) is innovative insofar as it proposes a global approach.

The largest companies around the world place a great importance on the management of their Supply Chain because of its importance and the competitive advantage it could provide. This management consists in integrating all the activities of the logistics chain into a global steering approach [1], in order to get a finished product to the consumer in the best conditions. The challenge is to create a synergy between the actors of the chain and to consider it in its entirety, instead of focusing on a specific link. This concept began to emerge at the same time as the evolution of the markets of the early 1980s. As a matter of fact, the term first appeared in literature in 1982 [2], in an article discussing the potential benefits of internal functions of the company namely: buying, producing, selling and distributing. This has resulted in the cancellation of classical organizational methods (hierarchical, centralized, etc.), to move to new organizational forms, as Louart [3] points out, that are structured around the transverse management process oriented towards customer satisfaction. Hence the emergence of a new paradigm, namely the post-bureaucratic paradigm. [4] Many definitions of the concept of Supply Chain have been proposed in previous work. We can even say that there is so much literature on this subject that it is difficult to pin down its exact meaning. This is why we will try to synthesize in the following the most significant definitions, in order to be able to highlight the meaning of the SCM and its effects on the performance of companies:

TABLE I
Definitions of SCM

Ellram L. and Cooper M. [5] (1990)	The Supply Chain is an integrative philosophy to manage the total flow of a distribution channel from the supplier to the ultimate user.
Fréry [6] (2001)	Supply Chain Management is the concretization of a virtual organization defined as "an original organizational form regrouping several partners whose objective is to allow the implementation of synergies effects or the development

	of additional capacities / potentials.
Christopher [7] (2005)	Supply Chain Management is an approach to integrating key business processes whose purpose is to create value for Supply Chain customers and stakeholders.
CSCMP (2007)	The SCM is defined as "the planning and management of sourcing, procurement, transformation and all logistics management activities. It also includes coordination and cooperation with channel partners, which may be suppliers, intermediaries, logistics service providers and customers. In essence, the SCM integrates supply and demand management within and between companies "

obliged to ensure "a rapid, strategic, and operational adaptation to large-scale and unpredictable changes in the environment. Agility involves the reactivity of one end of the chain to the other. It focuses on eliminating organizational or technical brakes "(Christopher, 1999)

It is in this sense that companies are obliged to make a profound reorientation of their system and therefore of their organizational structures in passing:

- From a system in terms of functions to a system in terms of processes
- From a notion of profit to a logic of performance
- From product vision to customer management
- From a vertical logic to a virtual logic (Christopher, 1997)

The most widely cited academic works in the SCM are those of Christopher (1997, 1999, 2005), he is considered to be one of the pioneers who emphasizes the strategic and integrative role of SCM. Therefore we will take the SCM definition that he has presented, which encompasses all the aspects studied, namely: "The SCM is an approach to integrating key business processes with the purpose to create value for the Supply Chain clients and parties Suppliers "(Christopher, 2005).

According to these definitions, it is noted that the discussions on the supply chain raises several terminologies explaining the concept. We can cite that the SCM is:

- A management philosophy: As a philosophy, the SCM adopts a systemic approach which considers the logistics chain as a single entity and not as a combination of fragmented elements each with a specific function [5]. The Supply chain, which includes all the actors from the supplier to the customer, will have to be managed based on the synchronization and convergence of operational and strategic practices. The goal is to drive the strategy of the chain based on a customer orientation, in order to best meet their expectations.
- Integrated management of processes: Supply Chain Management is considered to be the management of all the processes that make up the Supply Chain as part of a global strategy. The idea of locating the coordination of a supply chain from a systemic perspective, in which each tactical activity of the distribution flows falls within a broader strategic context (the SCM seen as a management philosophy) is named more precisely by the term **Supply Chain Orientation (SCO)** [8].
- Organizational form: The SCM is considered to be the set of activities that make it possible to concretely implement the practices of the SCO.

This ambiguity in the definition suggests that people who study this phenomenon are confronted with great confusion. In order to make their Supply Chain more "agile" companies are

We can propose a definition which states that: "Supply Chain Management is a management philosophy which consists of applying a global management throughout the chain. The global approach requires profound changes in the organizational practices of the company, in order to ensure a better integration of all the processes of the Supply Chain. This organizational change manifests itself mainly through the implementation of a set of activities and practices aiming at a better orientation of the results towards the expectations of the client."

Thus, supply chain management is seen as an approach of a process management of an extended chain and which highlights the coordination between the different actors.

III. INNOVATION MANAGEMENT: A KEY OF COMPETITIVENESS

A. *The conceptual framework*:

Innovation is a current topic that is now recognized as an important and necessary for any individual or professional people in order to optimize their daily lives and have a better position compared to the competition.

But the biggest problem surrounding this concept is that of diversity and abundance of its definitions, to the point that it becomes almost impossible to give a complete and accurate definition.

It is for this that we will first focus in this section on the analysis of the different definitions that have been proposed beforehand.

Thus, the concept is defined by the economist Shumpeter as an introduction of a new good, new method of production, the opening of a new market, the conquest of a new source of

supply or raw materials, or the carrying out of the new organization of any industry [9].

The concept was later presented by Van de Ven (1986) and Cooper (1998) as something new in a company [10],[11].

Innovation is often seen as an invention [11] [12] and a creativity [13],[14],[15], that it can be technological [16],[17] or business orientated [18] ,[19],[20].

The innovation process has been also identified for radical, incremental, really new, discontinuous, and imitative innovations, as well as for architectural, modular, improving, and evolutionary innovations [21].

But in 2003, Allen says that innovation is different from invention. According to him, innovation is a process that requires an invention to transform it into something usable [22].

In the same period, innovation was seen as an original idea, a new idea of organizing the adoption or the combination of existing concepts in a new way [23].

The innovation is likewise defined as a process that delivers added value and newness to an organization, suppliers and customers by the development of new processes, procedures, solutions, products and services, new methods of commercialization and/or business model by a small entrepreneurial or large established firm in an open or closed system [24].

The proposed definitions on the concept of innovation are not uncommon, their analysis and understanding are, therefore, increasingly difficult. This is why we have chosen to study the innovation process to better understand its meaning.

B. Innovation process

Previous works show that several authors define innovation as a process: a set of more or less organized active phenomena that repeat over time.

Innovation is a (non-linear) series of coherent steps between them and tending towards an identifiable result, represented by a new industrial activity and anchored in its environment [25].

Innovation is particularly suited to the notion of process, since it involves many functions and professions within organizations, sometimes on several projects in parallel.

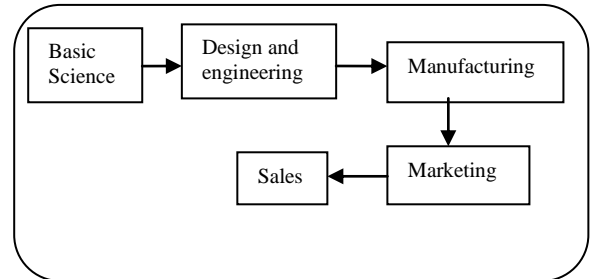
Only a consolidated view as a process can respond to such risk management related to innovation [26]

Thus, any activity managed to allow the transformation of input elements into output elements with added value can be considered as a process [27].

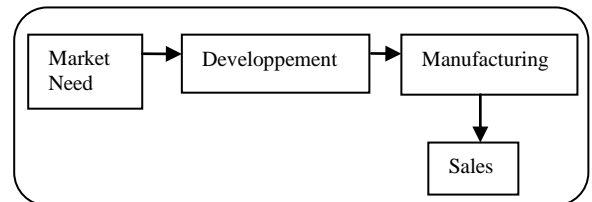
The British sociologist Roy Rothwell was considered as one of the pioneers in industrial innovation with his significant contributions in innovation management.

He established five generations of the innovation process which are as follows [28]:

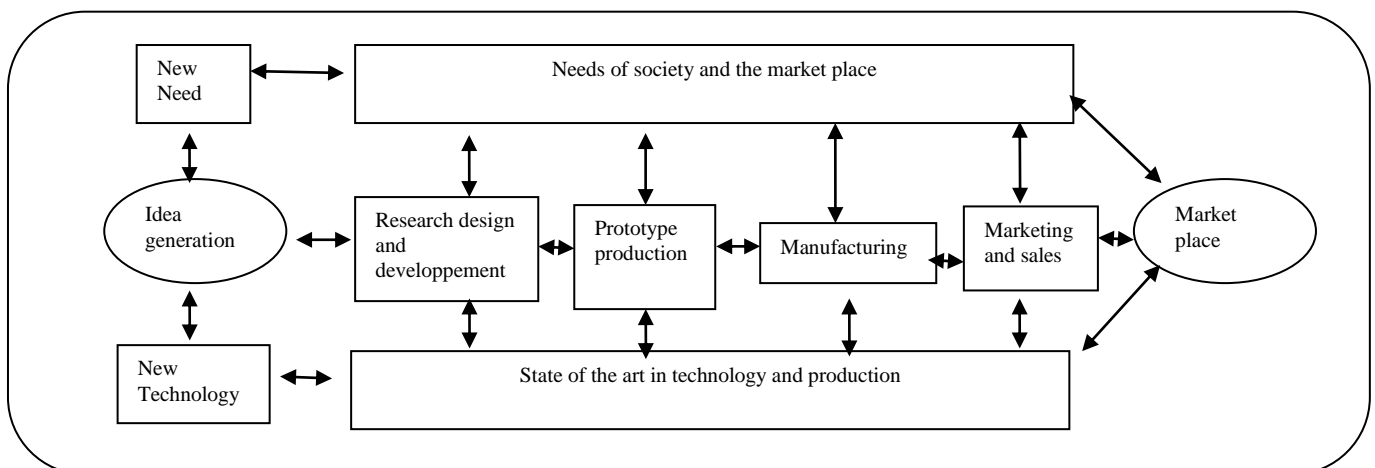
- First generation (50's - Mid- 60's): economic growth largely through rapid industrial expansion & new technological opportunities. The first generation, or technology push concept of innovation assumed that "more R&D in" resulted in "more successful new products out".



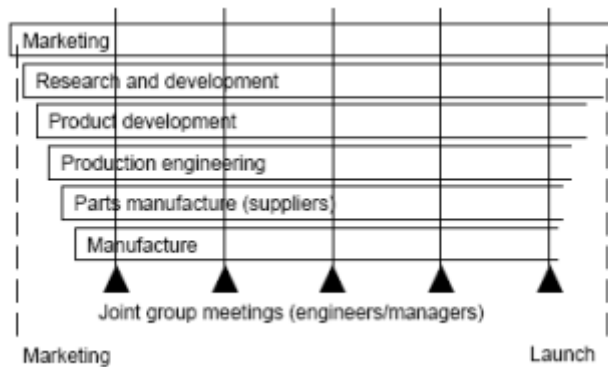
- Second-generation (Mid 60's – Early 70's): Manufacturing employment was static, while manufacturing productivity increased. Industrial concentration increased. New products were introduced, mainly based on existing technologies. Supply & demand were in balance. "marketpull" let large and highly efficient companies fight for market share.



- Third-generation (Early 70's – Mid 80's): High rates of inflation and demand saturation (stagflation). Growing structural unemployment. Companies were forced to adopt strategies of consolidation & rationalization, with growing emphasis on scale & experience benefits. Successful innovation process on the basis of a portfolio of wide-ranging and systematic studies covering many sectors and countries ("coupling", model of innovation).



- Fourth-generation (Early 80's -Early 90's): Companies were initially concentrating on core businesses and core technologies. Growing awareness of the strategic importance of evolving generic technologies, with increased strategic emphasis on technological accumulation. New focus on manufacturing strategy. Rapid growth in the number of strategic alliances between companies. Shortening product life cycles led to time-based strategies. integration and parallel development was important (integrated model).



- Fifth-generation (From mid 90's): Companies remain committed to technological accumulation, strategic networking continues, speed to market remains of importance; firms are striving towards increasingly better integrated product and manufacturing strategies, greater flexibility and adaptability. "Fast innovation" is an important factor determining a company's competitiveness. The ability to control product development speed can be seen as an important core competence. The process 5G is essentially a development of the 4G (parallel, integrated) processes in which the technology of technological change is itself changing (networking process).

C. The innovation in the Supply Chain Management:

1) Type of innovation in Supply Chain:

According to Wang Y. (2006), the types of innovation that can be applied to the management of a logistics chain are [29]:

- **Organizational innovation:** which refers to both new forms of work organization, knowledge management systems, methods of mobilizing workers' creativity, and new forms of relationships between firms and their economic environment.
- **Managerial innovation:** which is a new combination of existing and / or new means, material and / or conceptual, compared to the state of the art of

management at the moment when it appears for the first time and which allows to implement a management technique that may be perceived as more or less new by the individual or other unit of analysis that considers it [30].

- **The innovative project:** which is the process that drives the transformation of the object that has a beginning and an end. It starts with an impulse (idea, strategic decision, customer request ...) and ends with the launch of the new activity. The project is characterized by phases (unit tasks to be assumed: creativity, market research, technical study, tests ...), methodologies (functional analysis, brainstorming ...) and tools.

2) The advantages of an innovative Supply Chain:

Due to the importance of a good Supply Chain Management in achieving the performance of the company, the implementation of an innovative logistics is considered a competitive advantage in an increasingly demanding environment. These advantages are manifested as follows [31]:

- The reactivity in term of time: with a logistics allowing greater speed of circulation of the products or provision of the service.
- the quality of service: particularly in terms of customization.
- Low cost: of the service to the customer and realization of the function for the company.

It will therefore be necessary to ensure two main elements:

- The first element of the logistics innovation strategy is evaluating the effort required in this area compared to other components of the "supply chain" and even the "value chain" in general [32]. Based on the relative competitive advantages that the different levels of the supply chain can bring with regard to innovation.
- The second element of the logistics innovation strategy is the choice of the contents of the innovation policy between equipment innovation, versus organizational innovation [33], and the choice of coherent information system.

IV. SUSTAINABLE DEVELOPMENT

In this section, the concept of Sustainable Development will be overviewed where its effect as an Innovation in the Supply Chain Management will be highlighted.

A. Sustainable development: from concept to paradigm:

The concept is defined in the Brundtland Report (1987) as "a development that satisfy the needs of present generations without compromising the ability of future generations to satisfy their own needs"

In order to grasp the subtleties of the concept, it is important, in the first part, to understand the notion of development, often assimilated to growth, and sustainability, referring to a long-term element.

In a second part, the idea is to transpose the concept to the business world through previous research and then in the last part, to describe the interface between innovation and sustainable development in order to consolidate the problematic of this research.

1) *Definition of sustainable development:*

The word "development" used in ordinary language sometimes designates a state, sometimes a process, sometimes an objective, connoted by notions of well-being, progress, social justice, economic growth, personal fulfillment, ecological balance.

It is "the combination of the mental and social changes of a population that make it capable of increasing, cumulatively and sustainably, its overall real product". [34]

Harribey (2004) defines development as "the evolution of a society that uses its productivity gains not to indefinitely increase production that generate environmental degradation, dissatisfaction, repressed desire, inequality and injustice, but to decrease the work of all by sharing more equitably the income of the activity".

Sustainability, for its part, finds two schools of thought.

- The "weak sustainability" first, which is based on the precepts of economists like Solow, which postulates the possible replacement of exhausted natural resources by substitution capital.
- The "strong sustainability", then, for which it is imperative to transmit to future generations a stock of non-degraded natural resources : the use of resources must be below the replacement level and the precautionary principle prevails over on the principle of the polluter pays. Managing natural goods must be collective and not left solely to the market.

In this respect, sustainable development emerges as a new paradigm generating breaks in the markets.

2) *Corporate sustainability:*

Sustainable development therefore implies a reflection on temporality, space, collective need, well-being and growth. At a microeconomic level, three dimensions (triple Button line) must be considered: economic efficiency (found in the notion of growth), social equity (between individuals and generations) Integrity of the environment and governance [35].

Daub and Ergenzinger thus refer to this concept as a form of management based on the principle that the increase in the value of the company is fundamentally based on reconciling

the economic objectives of the company with environmental and social issues, with an ethical dimension [36].

The concept of corporate social responsibility was introduced into the company [37].

The European Community (1999) defines corporate social responsibility as "the continuous commitment of enterprises to behave in an equitable and responsible manner while contributing to economic development and improving the quality of life of their employees and their families ". In this context, companies must, on the one hand, fulfill their legal obligations and, on the other hand, engage beyond themselves to seek the satisfaction of their present and future stakeholders. This commitment is to be responsible, that is to say to answer for one's actions and to realize the hopes one has given rise to [38].

3) *The interface between innovation and sustainable development*

The notion of innovation is an essential element of the appropriation of the concept of sustainable development because it opens the door to a real transformation of the rules of the company. Combining the idea of sustainable development with that of enterprise leads to the need to rethink its relations, its interactions with its stakeholders, around the three pillars of Elkington.

The sustainable development approach considered implies adopting a strategic reasoning based on a global and multidimensional reflection on the organization, its association with the notion of breakthrough innovation presents certain relevance. The combination of these two themes did not yet become the object of extensive research, nor of a declared interest of the companies, which can be a surprise. First, because they both arouse a growing interest in management literature. Second, because "bridges" between the two approaches can be highlighted.

B. *The sustainability in Supply chain Management:*

Beyond the economic stakes associated with the deployment of the global supply chains, there are also major energy and environmental issues that result mainly from increased demand for freight transport. Movements now occupy a prominent place in the product lifecycle, whether it is the supply phase, manufacturing or final distribution. Owing to a reduction in the size of shipments and an increased frequency of deliveries, strategies to reduce cycle times and stocks have also contributed to the growth of freight transport

The way in which logistics activities are organized and managed determine the importance of the demand for transport and the nature of the commercial relationship between the company and those who provide transport services [39].

Logistics can also contribute to sustainable development by helping to design supply chains that reduce transportation requirements; Optimal flow management can also help eliminate waste [40]. The methods of managing the flow of

returned goods and recycling (reverse logistics) also play a role in this direction.

According to the OECD, the trend towards sustainable development will have a considerable impact on the design and operation of logistics systems [41]. The economic performance of the company would not be incompatible with its environmental performance, according to the results of a large survey published by the World Economic Forum in 2009 [42]. The study shows that the best performing supply chains In terms of cost effectiveness and customer service are also twice as active as others in the effective management of their greenhouse gas production.
nate waste.

C. The practices used to implement innovation in the management of a supply chain:

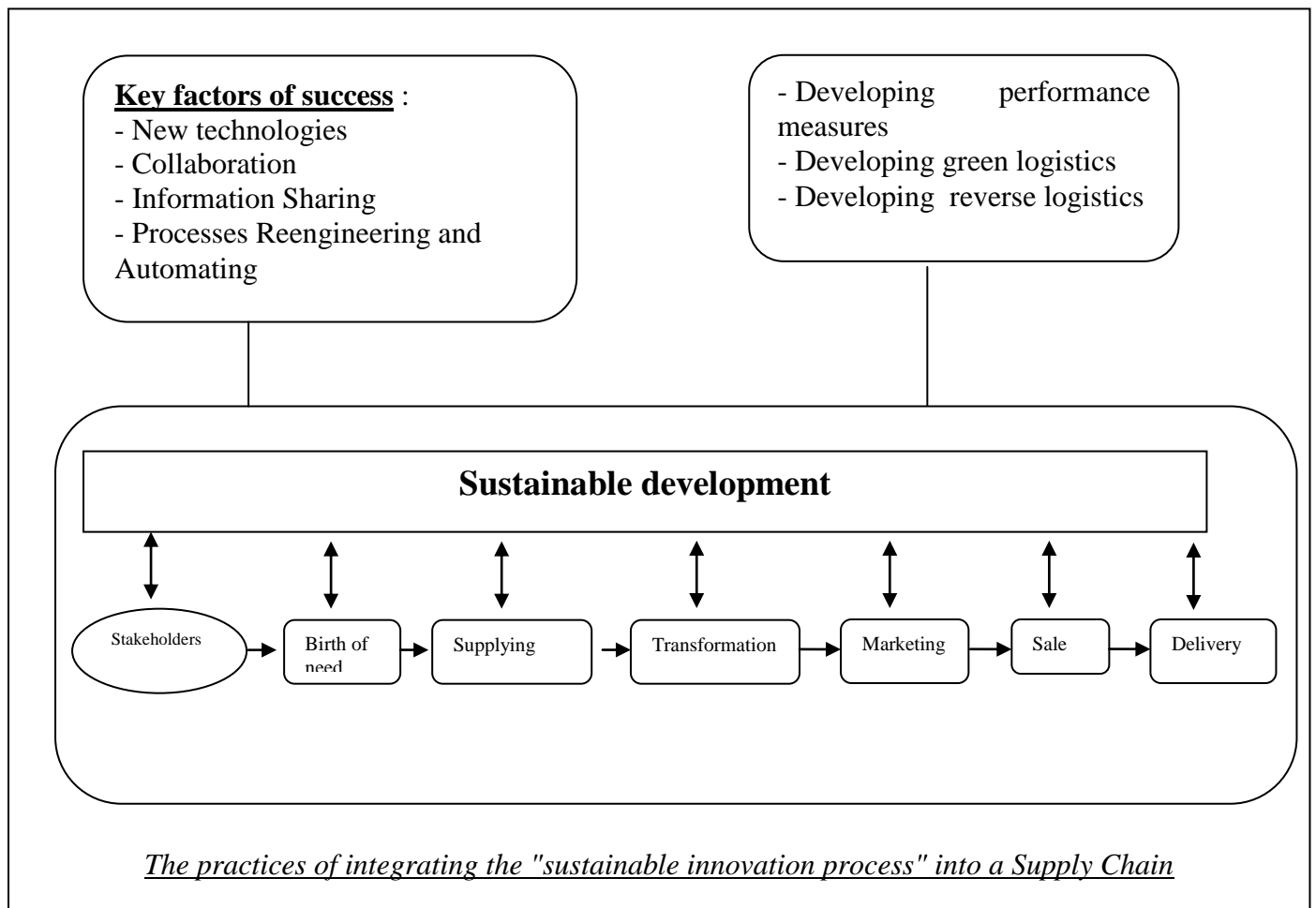
By innovating in the supply chain, many companies have benefited from a competitive advantage that allowed them to become world leaders. These innovations are based on a strategic approach to chain management. A look at the new management practices adopted [43] [44] [45] and affecting one or more elements of the chain highlights:

- more intensive use of information technology and increased e-commerce;
- active customer relationship management;
- the adoption of new technologies;
- more extensive use of logistics outsourcing;

- greater collaboration and sharing of information within the chain;
- planning and designing activities;
- process reengineering;
- strengthening resilience to risks;
- development of performance measures;
- the development of green logistics and reverse logistics.

In addition to simple cost control, these practices include optimization of supply and distribution networks, greater synchronization of the various stages of the chain, optimum use of production capacities, better response to Reduced delays, adequate risk control (delays and stock-outs), reduced discharges and environmental impacts, as well as better competition management. A study of some of the most successful companies in the world highlights process automation, the adoption of improved technologies and the use of logistics providers as key success factors [46] . For its part, AMR Research draws up every year a list of the best performing supply chains in the world. A summary review reveals that their enviable position is directly linked to the adoption of innovative practices.

D. Modeling of the Sustainable Innovation Process :



V. CONCLUSIONS

In this article, we have tried to present a literature review, focusing on the notions of innovation and Supply Chain Management, to try to understand the role of an innovative Supply Chain.

We also focused on understanding the components of sustainable development: economic, environmental and social. The study of sustainable development was carried out with the aim of proposing it, as a possible scenario of innovation to implement in the SCM.

It is with this in mind that we have tried to identify a model of a sustainable innovation process applicable to SCM.

In this modeling test, we based ourselves on the components of an SC and on the practices collected in the literature, concerning the implementation of innovation in the SCM.

For better results, the study and validation of this 'sustainable' innovation process would merit further work. This work can't be based on a simple literature review, but would involve a field survey, with the development of Mechanisms for monitoring and encouraging companies involved in such a process.

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