



ASSESSMENT COVER PAGE AND DECLARATION

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Abstract

Purpose : Due to globalization nature of manufacturing activities, the arena of competition and competitiveness advantage is moving from organizations towards SCs and networks. In addition, organizations are more integrating into the world market for the global nature of sourcing, manufacturing and distribution. But in spite of the huge economic opportunities presented by growing consumer markets in developing countries (DC), there are many organizations which remain unable to do business successfully because one of the major challenges they face is supply chains (SCs) problem. Therefore, the objectives of this research paper was to help develop one of the Africa's developing countries manufacturing industries through supply chain management (SCM), specifically textile industries in Mali Republic by directing actions towards improving their productivity and competitiveness.

Methodology : A mixed methodology (quantitative and qualitative method) was used to survey the SCs of the manufacturing industries under investigation in this study.

Findings : Findings not only showed a low level of SCs implementation at the level of the studied industries but also some external factors hindering their development and competitiveness. Accordingly, such issues required much attention while developing the chains.

Research limitations : This research paper focused on the SCs of three textile industries in Mali as an example of developing countries, so the interpretation of the results of findings should be taken with prudence.

Value : Textile industries continue to growth in Mali, nevertheless, they remain inefficient, and far from being competitive. So to help them be competitive/performant, were made some recommendations intended to not only bring positive impacts and benefits to their SCs but also to other manufacturing industries if adopted properly.

Keywords : Developing countries, SCM, manufacturing industries.

Chapter 1

1. Background of the study

Recently, the fierce competition of the global market, the fast introduction of new products with shorter life cycle, the growing customer satisfaction, the ongoing development of information and communication technologies (ICT), and transportation infrastructure have forced organizations to invest in and direct actions towards their supply chains development. As such, there is a high pressure on them to decrease costs and improve customer satisfaction level in order to remain in a competitive position. Also SCM is becoming a strategic tools for improving the organizations performance and competitiveness because organizations versus organizations have replaced with supply chains versus supply chain competitiveness. However, the number of organizations having truly implemented the SCs to take advantage of today's opportunities is still small (Ozdemir and Aslan, 2011).

In addition, developing countries have participated in global SC for years mainly as supplier of raw material, but in recent years as suppliers of basic consumer goods. However, unlike the developed countries that have employed different approaches to collaborate, share benefits and risks in the form of partnership, the developing countries did not consider these efforts, and consequently, the entire SC of their organizations has been unsuccessful. The Republic of Mali is not an exception to this rule, in fact, this country manufacturing industries remain comparatively unimportant, having declined throughout the 1980s and accounting for an average of 3 percent of the GDP towards the end of the century. From the 1960s, inefficient parastatals produced basic consumer goods, and the private sector preferred to invest in trade. Moreover, the country manufacturing sector was further handicapped by intensified competition from Cote d'Ivoire and by a flood of cheap smuggled consumer goods from Guinea and Nigeria in the years preceding the devaluation of the CFA franc in 1994. Since that period, efforts to attract manufacturing sector investment have had little success, although there have been signs

of move towards this sector among the leading local commercial families. For example, the textile industries have shown signs of revival, but still faces stiff competition from neighboring countries' industries, and this in spite of the country being the West africa's leading cotton producer and Africa's second largest producer after Egygt. Indeed, cotton has not only become an agricultural export product par excellence in Mali, but also for the sub-region. In terms of value, it is the third product exported from West Africa, behind cacao and coffee. In fact, cotton exports are devoted almost entirely to Asia : 90% of production is devoted there, 60% of which goes to China. The rest, namely 8% goes to Europe, and only 2% is processed locally. A significant drawback of developing textile industries in Mali Republic, is due to a certain number of factors which undermine their performance.

Therefore, this paper was as said previously, to improve the performance of the textile industries in Mali through suggesting actions when helping them operate an excellent SC.

2. Research objectives and questions

a) **Objectives :** A nation's industries competitiveness depends on its capacity to innovate and upgrade. Also, in a world of increasing global competition, nations' roles have become important because the basis of competition has shifted more and more to the creation and assimilation of knowledge. Furthermore, competition advantage is created and sustained through a highly localized process, that's why managers are pressing for government support for the industry sector. Hence, among governments, there is a growing tendency to experiment with various policies intended to promote national competitiveness. Nevertheless, in developing countries like Mali, such an issue is the joint responsibility of both the government and the private sector, thus to reach the objectives of his research, the researcher deemed it necessary to :

- Help promote the development of infrastructure in the country.

- Help the country textile industries improve their productivity and produce quality products.

b) Questions

How to promote the infrastructure development in the country ?

Industrial development of a country largely depends on its infrastructure because this (infrastructure) furthers the competitiveness of an economy and generates a business environment that is conducive to agro-industrial growth and development. Indeed, good infrastructure efficiently connects agro-industries to their suppliers and customers, and enables them to use modern production technologies. Therefore, the level of infrastructure development in a country greatly influences the trade flows, costs, and competitiveness.

How to improve textile industries productivity and help them produce quality products ?

Productivity improvement is a technique of extracting greater output from inherent input of various resources through the conversion efficiency. Regarding quality products, they help maintain customer satisfaction, loyalty, reduce the risk and cost of replacing faulty products.

3. Hypotheses

- a) Infrastructure development (energy, transport, water and telecommunication) helps a country manufacturing industries be competitive.
- b) Adopting lean manufacturing and employees training policy help textile industries improve their productivity and produce quality products.

Chapter 2

1. Literature Review

As business evolves in the 21st century, SCM is the predominant management focus driving many organizations, a recent study even cited SCM as one of the three most important management practices which will decide about world class performance. Also since its introduction in retailing, the SCM concept has spread to other industries including automotive, electronics, and chemicals and it is fast becoming critical for any industry which intends to stabilize its position in the market (Brewer, 2000). In addition, the globalization of the market, the growing competition and an increasing emphasis on customer satisfaction are regularly considered to be the catalysts in the growing interest in SCM (Webster, 2002). SCM is therefore considered as a key to building a sustainable competitive advantage through improved relationships within and among firms (Ellinger, 2000).

In addition, supply chains are SCs where the « members are strategically, operationally, and technologically integrated » and anticipated for long-term stable relationships with the ability to change to the demands of the environment (Hult et al, 2004). Furthermore, in recent years, numerous theories paradigms have been used by scholars to understand why strategic supply chains succeed in creating value while others do not. Although perspectives of and prescription to SCM vary, a common idea among scholars is that competitive success for a SC is contingent on the management's ability to recognize changes in the competitive environment and then direct and coordinate action within and across organizations to utilize resources effectively and meet the demands of the environment (Stonebraker and Afifi, 2004 ; Fawcett and Magnan, 2001). In short, SCs as organizational entities are more likely to succeed when they are able to adapt and align with the demands of the external environment (Thompson, 1967).

A second theory that helps explain how SCs can mobilize to create value and goes hand in hand with contingency is Lewin's (1951) force field theory. Force field theory implies that the driving forces (external threats combined with internal benefits) must exceed the resisting forces (barriers) (e.g. culture, structure, perceptions of how things should be done) so that any organization entity can change and survive in changing environments. The ability to scan the environment for the forces driving SCM, to identify the potential barriers and to implement bridges (overcoming barriers), enables members of a SC to maintain a competitive success in changing environments and become a successful SC.

Typically, the contingency model is driven by dynamic technological innovation, management skills across departments and organizational functions, and integration vertically and horizontally across the industry (Stonebraker and Afifi, 2004 ; Funk, 1995 ; Hammer and Champy, 1993 ; Lawrence and Lorsch, 1967). These drivers can be considered driving forces (Lewin, 1951). Although these drivers push for SC collaboration, barriers or resisting forces push back (Lewin, 1951). Such resisting forces include lack of member support, inadequate infrastructure and information systems, and organization culture. Nevertheless, organizations are not powerless in terms of choices or their ability in attempting to overcome these barriers. In addition, SC partners can create and implement initiatives that bridge the gap between a SC and a successful SC. Some of those bridges include government endowment, people empowerment, information integration, and alliance design. Thus, successful SC can create value contingent on the management ability to overcome resisting forces through a various mechanisms.

Finally, to win customer allegiance, organizations must have what they want, when and where they want it. And close relationships with suppliers leave room for special orders in unique times of high demands, helping satisfy customer expectations. Additional benefits are market responsiveness, added economic value, capital utilization, decreased product lead time to

market, and logistics costs reduction (Lee, 2004 ; Mentzer et al, 2000 ; Tyndall, 2000). Revenue growth fueled by increased responsiveness occurring at lower costs using fewer assets translates into stellar performance. Overall, SCM potentially creates value for all members in the chain. However, such benefits vary in importance and degree among partnering chain members (Agrawal and Pak, 2001). This variance in importance is further complicated by the potential risks strategic SC place upon aligned firms.

Critical literature review : The implementation of successful SC is not an easy task because many barriers are usually encountered. Some of these barriers are shown in the below table n° 1. Because SCM involves sharing of proprietary information, strategy, planning, and goals, companies usually feel uncomfortable exposing such elements to other companies as they are afraid of a loss of control (Benton, 2005).

Table 1 : Barriers to successful SCM

1. Failure to share information
2. Fear of loss of control
3. Lack of self awareness
4. Lack of partner awareness
5. Enormity of supply chain
6. Lack of supply chain satisfaction
7. Lack of customer understanding
8. Lack of understanding of supply chain
9. Myopic strategic
10. Deficiency of mutuality

From this table, the potentials barriers to successful SCM are intimidating. They can come both from the nature of the organization itself and the people who compose it. In addition, they

(barriers) can be classified under two headings : « inter-firms rivalry » and « managerial complexity » (Park and Ungson, 2001). Inter-firm rivalry is a misalignment of motives and behaviors among allying partners within the supply chain (Park and Ungson, 2001). Some barriers under this category include internal and external turf protection, poor collaboration among chain partners, and lack of partner trust. In short, inter-firm rivalry is the tendency for allying partners to compete rather than willingly cooperating. Furthermore, irregular collaborative meetings among chain partners hinder managers opportunities to share with one another concerns, weaknesses, and best practices.

Other barriers to SCM fall under managerial complexity or misalignment in allying firms' processes, structures, and culture (Park and Ungson, 2001). Under the umbrella of managerial complexity barriers include information system and technological incompatibility, inadequate measurement systems, and conflicting organizational structures and culture (e.g. Sheridan, 1999 ; Tyndall et al, 1998 ; Quinn, 1997). Because many companies are comfortable using their systems for only their own tasks, then it is not surprising to see inconsistent information and technology systems as a barrier. People are change averse and unwilling to share information for fear of exposing their weakness and secrets to others.

Finally, once the barriers to successful SCs are identified, bridges can be designed to attain the desired benefits. But for such bridges to work, managements need to redesign their approaches to problem resolution as SC collaboration entails « significantly different business models and thinking styles of management » (Moberg et al 2003).

2. Methodology

a) Participants description

Participants findings : Participants of this study were three textile industries and some of their managers, the participation was based upon the willingness of both the three textile industries

and their managers who participated in the study. The three textile industries participation was essential as this helped the researcher get in touch with their managers who collaborated with him. For the three textile industries' contacts information, this was available both at : www.malipages.com, and the « Guichet unique du Mali », but in order to gain their acceptance to participate in the study, more specifically, one of the researcher friends went in touch with and asked them to participate in the study before he explained them through direct phone call the nature and the scope of the research.

Population of the study : This research paper population consisted of the 522 employees of three textile industries located in Bamako, more specifically : Batex-CI 450 employees, MASEDA 42 employees, and SOFACOH 30 employees. These three textile industries were picked using convenience sampling method.

Sample selection : The method of purposive sampling was used to select who to participate in the study. According to this method, which belongs to the non-probability sampling techniques, sample members are selected on the basis of their knowledges, relationships and expertise regarding a subeject being studied. In the current study, the sample members who participated in, were the following : Supply Chain and Logistics Managers, Human Resource Managers, Production Managers, Sales and Marketing Managers, Managing Directors. One of each of these five groups of managers was selected per different textile industries under investigation. These five groups of managers were purposedly asked to collaborate because they were considered to have special relationship with the phenomenon under study.

Table n°2 : Number of participants

Category of industry	Company	Participants
Textile	Batex-Ci	5
	SOFACOH	5

	MASEDA	5
	Total	15

Demographic profile of participants : This section analyses the various demographic characteristics of participants, supporting tables and figures are provided together with comparative informations about them.

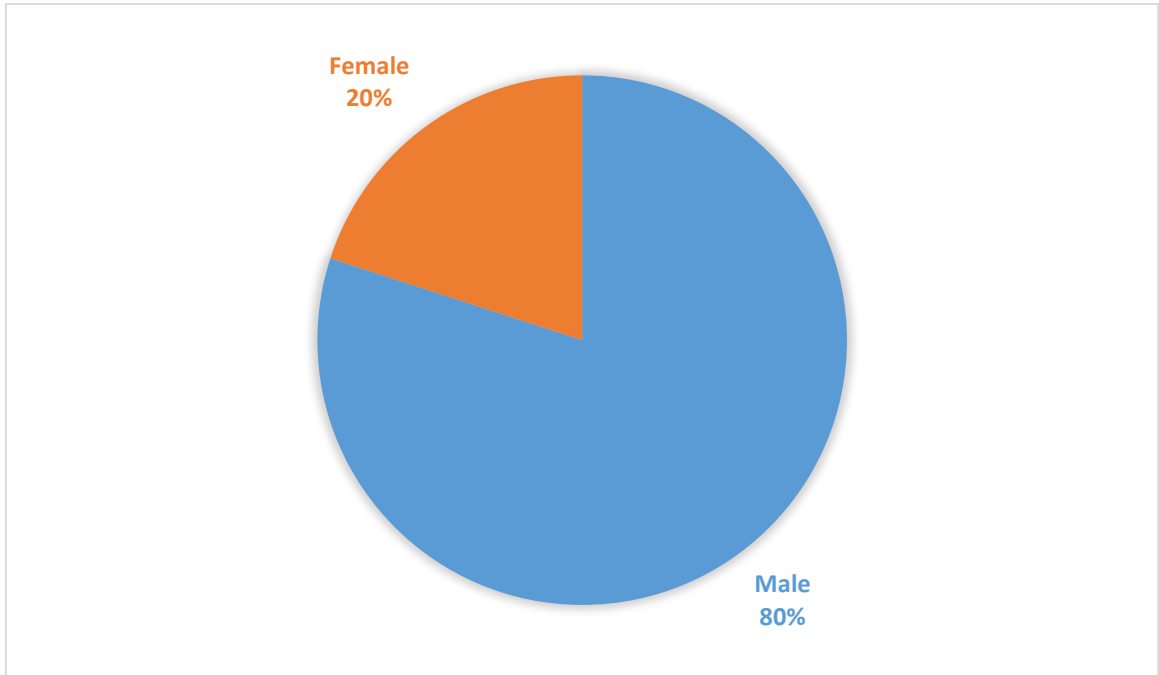
Participants' age :

Table n°3 : Age grouping

Age group	Number	Percentage
20-29	3	20%
30-39	5	33%
40-49	5	33%
50-59	2	13%
Total	12	100%

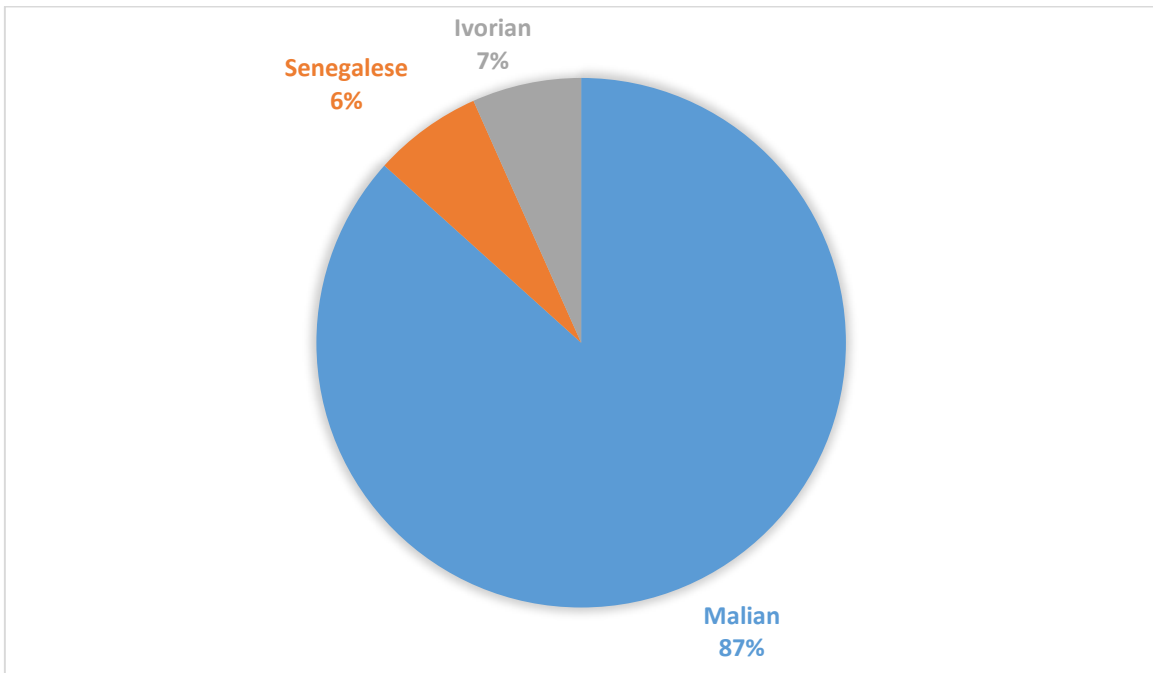
Participants' gender composition : There was a significant gender difference between this study participants, in other words, 12 or 80% of them were male while only 3 or 20% were female (see the below figure). According to Mali population projection made by the NPD (National Population Directorate), population of Mali in 2020 was estimated at 20 933 072 inhabitants, of whom 51 % were women. Nevertheless, in spite of the law of 2014 which granted a 30% quota for women in different workplaces across the country, men are still more likely to be employed.

Figure 1 : Participants' gender composition



Participants' nationality : For the participants nationality, 13 or 87% of them were Malian, while only 2 or 13 % were Ivorian and Senegalese. Except these three nationalities, there was no representation of other nationalities among them (see the below figure).

Figure 2 : Participants' nationality



b) Description of intervention

Research approach : Research conducted for this study was applied because there are a lot of previous similar academic researchs not only for Africa, but also for other parts of the world. As such, it (research) took the form of a new research on existing subject.

Description of intervention and data collection tools : In order to collect useful data for this research paper, mail survey and online interviews were used.

The mail survey is a data collection method through postal service, or another mail delivery system. It was used to collect data from managers in strategic positions who in this study were considered to be able to adequately answer the survey questions which consisted of closed-ended items. Each of them had to answer the questions by himself/herself. Moreover, mail survey which generally consists of a cover letter, the survey questionnaire, and other materials, such as an informational brochure and detailed instructions about how to participate in, was convenient and necessary because not only the researcher and the participants were in different continents, but also not all the participants were comfortable with web-based method of data collection.

Also online interviews were held during January and February with managing director of each of the three textile industries. Online interview is a new form of data collection, and it's often due to the physical distance between the researcher and the participants of a study. The aim of this method was to identify the studied companies' managing directors' emotions, feelings, and opinions regarding specific practices in their SCs. Like the mail survey, online interviews were also necessary while conducting the study because as mentioned above, the researcher and the participants including managing directors lived in different countries. For the interview purpose, platforms including Facetime, WhatsApp and Zoom were used, and the discussion lasted approximately 20 to 25 minutes according to the availability of the interviewees. Moreover, they (managing directors) freely expressed their views about the questions they were asked, and the

discussions flowed smoothly and pleasantly. The main advantage of these interviews was that they helped the researcher satisfy his research objectives using the feedbacks from the three managing directors.

Finally, as far as data collection tools were concerned, the conduction of the research involved the use of these two ways of data collections. A number of questions were prepared for the mail survey to get useful informations, but for the interviews, additional questions were made during the discussions.

Detailed and descriptive data collection procedure

In order to achieve this research paper objectives, participants were asked to share informations about their respective industries SCs, their thoughts, feelings and experiences about questions that might be perceived as sensitive. Therefore, special attention was given to data collection strategies that would address privacy concerns, and greater security of information. In addition, due to the difficulties in obtaining data as well as the likelihood of participants to freely collaborate as the survey questions were complex and sensitive, a pilot test was conducted (carried out in October 2020) prior to the decision to launch the study. This pilot test objective to evaluate the feasibility of the study. Moreover to make it easier, the survey questions were conducted in French language. Furthermore, both participants and their respective industries were fully informed about the objectives of the research while assuring them that the informations about theirs SCS were treated as confidential as possible and only for academic purposes.

In sum, 100% of their responses i.e. a total of 15 valid and usable responses were received from the three textile managers for the purposes of data analysis. However, human error may have occurred when analyzing data, as there is a risk for researchers to misinterpret the collected data, thereby generating false and unriable conclusions (krippendorff and Bock, 2008).

Chapter 3

1. Data analysis and presentation of results of findings.

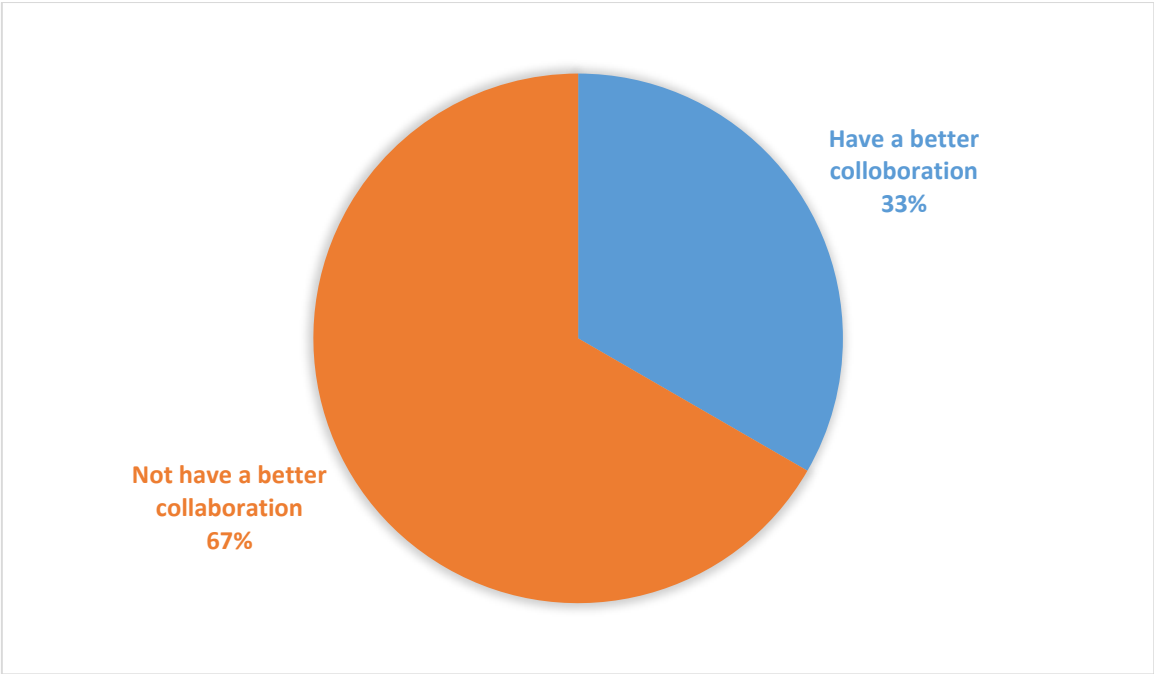
a) Mail survey

After 4 months of running the survey, the researcher obtained the following responses which were 100% from reliable sources.

- **Does your company have a better supply chain collaboration ?**

Based on the respondents, only 1 (33%) of the studied three textile industries has a better supply chain collaboration while 2 (67%) of them do not. Having a better supply chain collaboration is to remove bottlenecks and allow for the seamless sharing of information, providing a big-picture view of the supply chain from end to end.

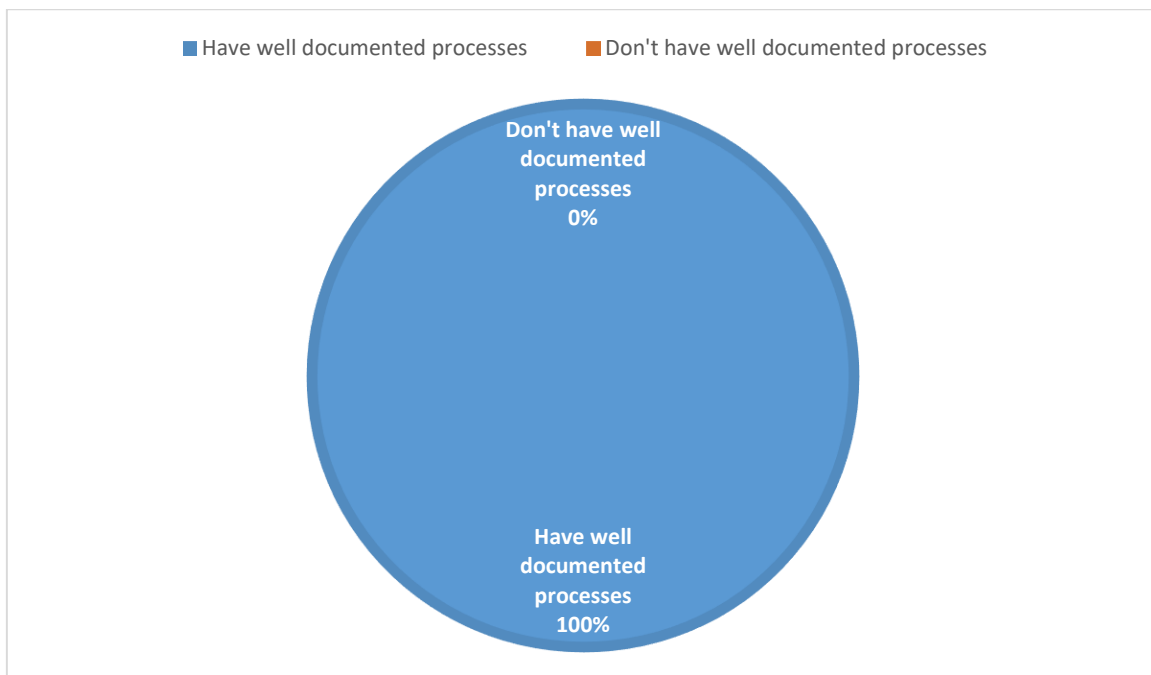
Figure 3 : Better collaboration



- **Are your production/work processes well documented ?**

According to the respondents, 100% (3) of the three studied industries work processes are well documented. A manufacturing is essentially a group of interrelated processes, hence, if processes aren't in writing, breakdowns can occur.

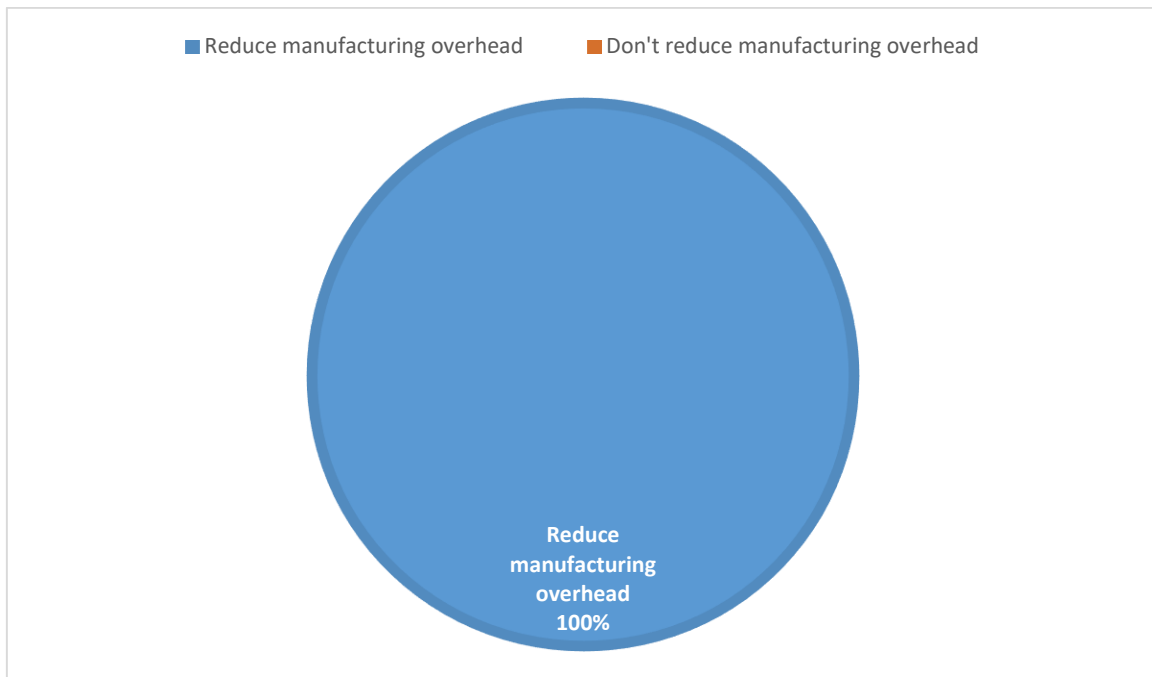
Figure 4 : Work process documentation



- **Does your company continuously reduce its manufacturing overhead ?**

Based on the respondents, 100% (3) of the three textile industries under the study reduce the manufacturing overhead. Controlling manufacturing overhead without having to compromise on the quality and quantity of the products, can result in significant product cost saving when the right strategies are used for this purpose.

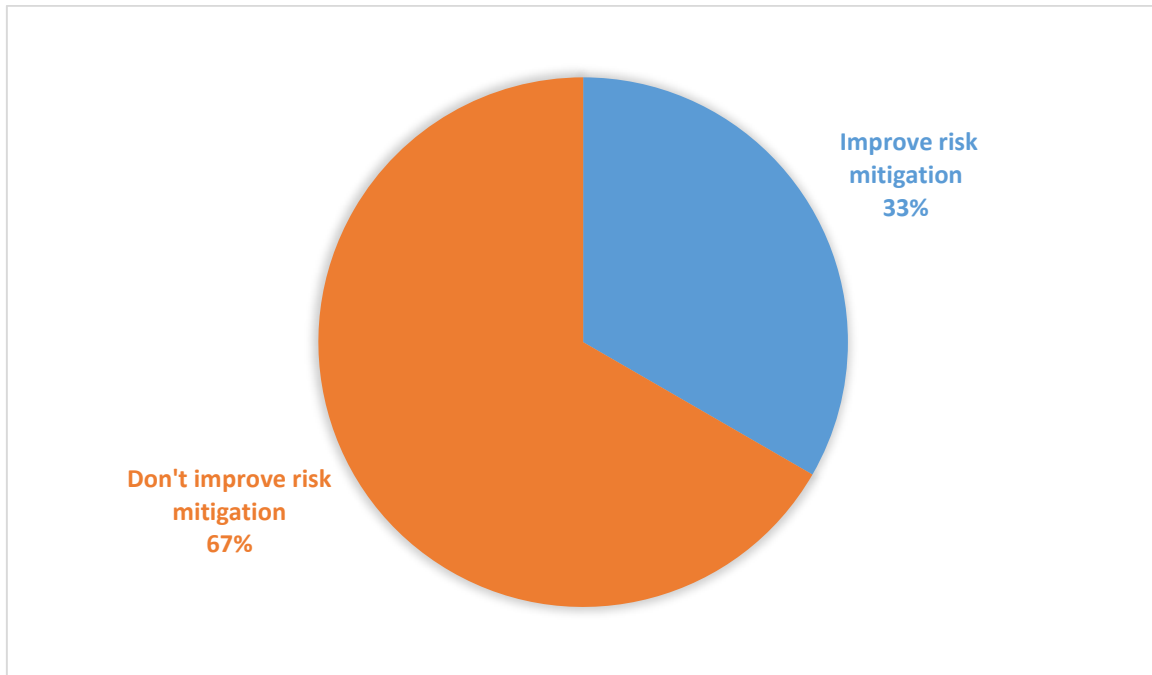
Figure 5 : manufacturing overhead costs reduction



- **Does your company improve risk mitigation ?**

According to the respondents, 2 (67%) of the three studied textile industries don't improve risk mitigation while only 1 (33%) of them does. Proactive actions such as preventive maintenance, training employee on safety management can help industries save money and protect their future.

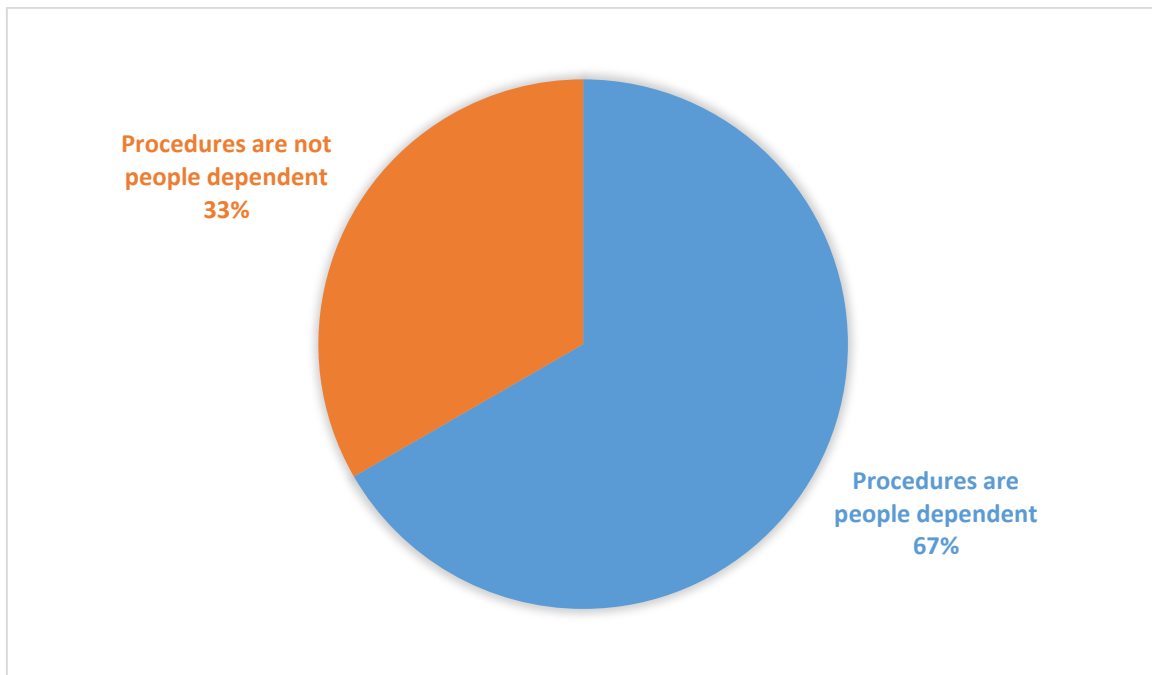
Figure 6 : Risk mitigation



- **Are your operational procedures people dependent ?**

Based on the respondents, 2 (67%) of the three studied industries operational procedures are people dependent while only 1 (33%) of them operational procedures aren't. For their sake, manufacturing industries must reduce people dependence as some of those might quit, take emergency leave because of personal exigencies, and in the extreme cases, others might even die.

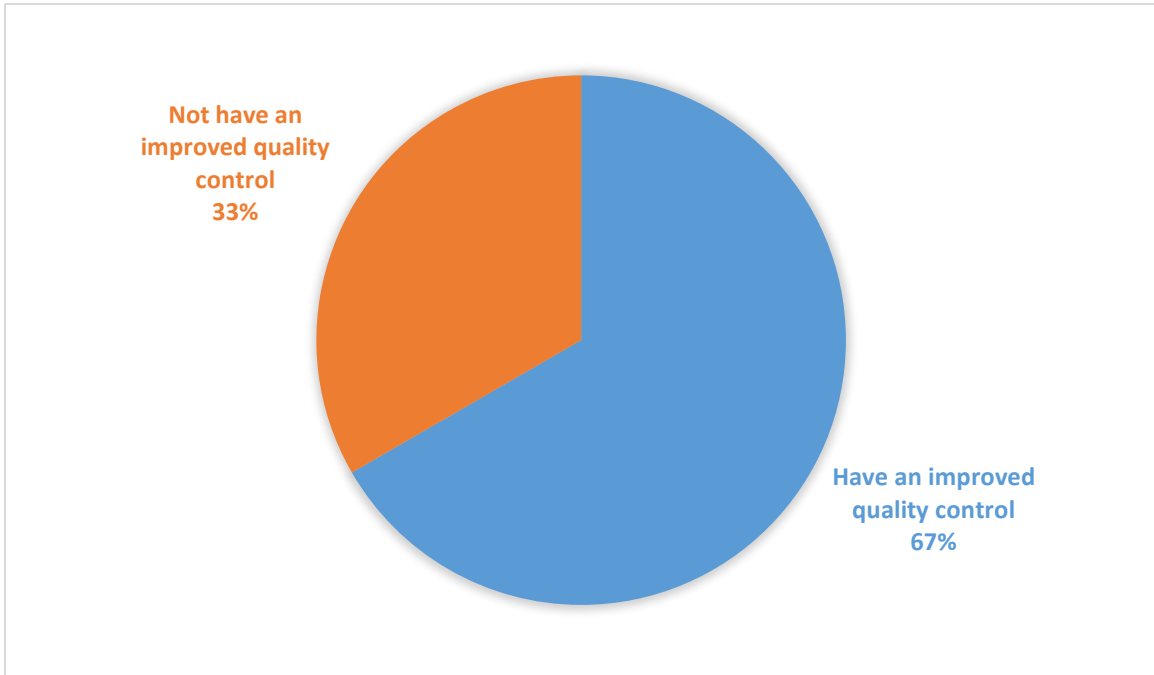
Figure 7 : Person dependence



- **Does your company have improved quality control ?**

Based on the respondents, 2 (67%) of the three studied industries have improved quality control while only 1 (33%) of them does not. Quality control issues follow the rule of 10, explains Arshad Hafeez, Global Expert for SCM Control, in an article for CIO review. According to this rule, the cost to replace or repair an item increases by tenfold at each step of the progression, resulting in significant costs for organizations when quality issues arise.

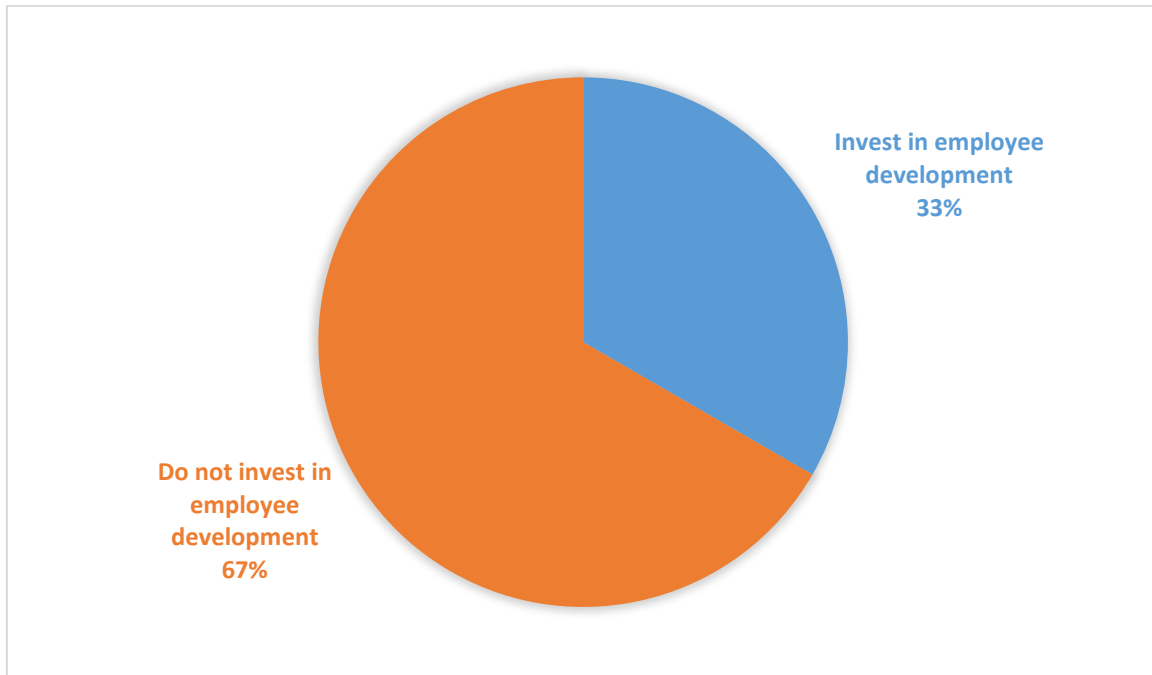
Figure 8 : Improved quality control



- **Does your company invest in employees training ?**

According to the respondents, only 1 (33%) of the three studied industries invests in its employees training while 2 (67%) of them do not. Employees training consists of the job training, coaching etc, and not only helps understand the processes but also positively impacts the business.

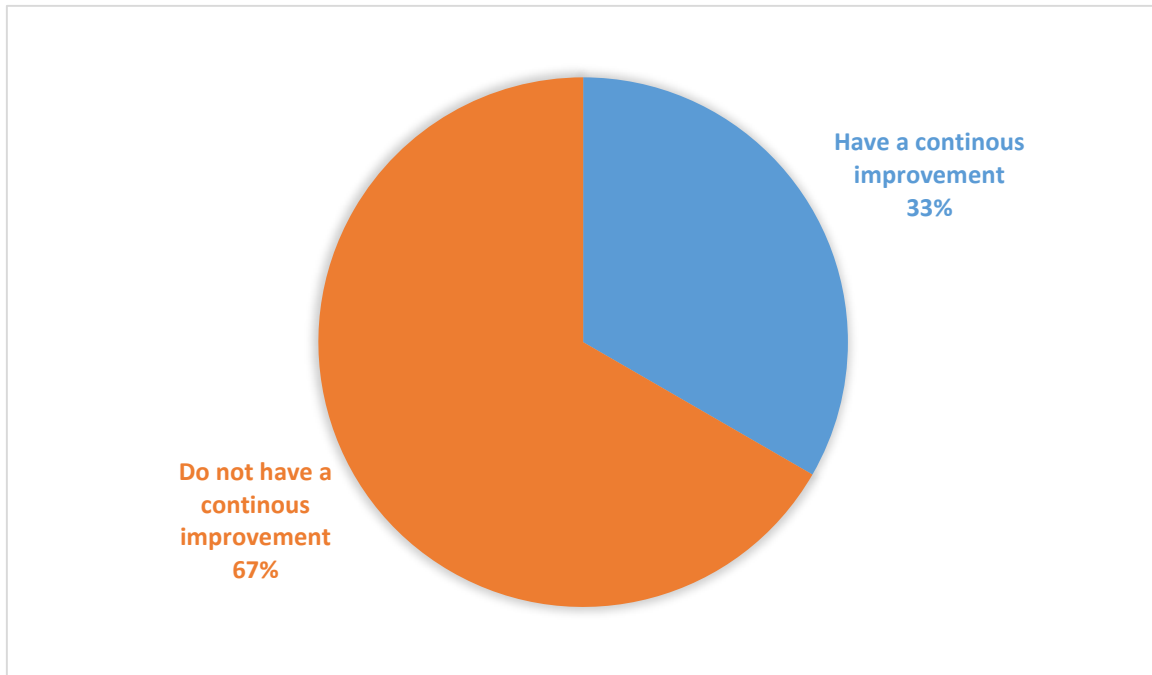
Figure 9 : Employees training



- **Does your company have a continuous improvement ?**

Based on the respondents, only 1 (33%) of the three studied industries has a continuous improvement while 2 (67%) of them do not. Monitoring and evaluating all the time can not only increase speed to market but also deliver the highest standards of customer service. Also in this changing world, industries should never stop looking to find ways to improve their processes.

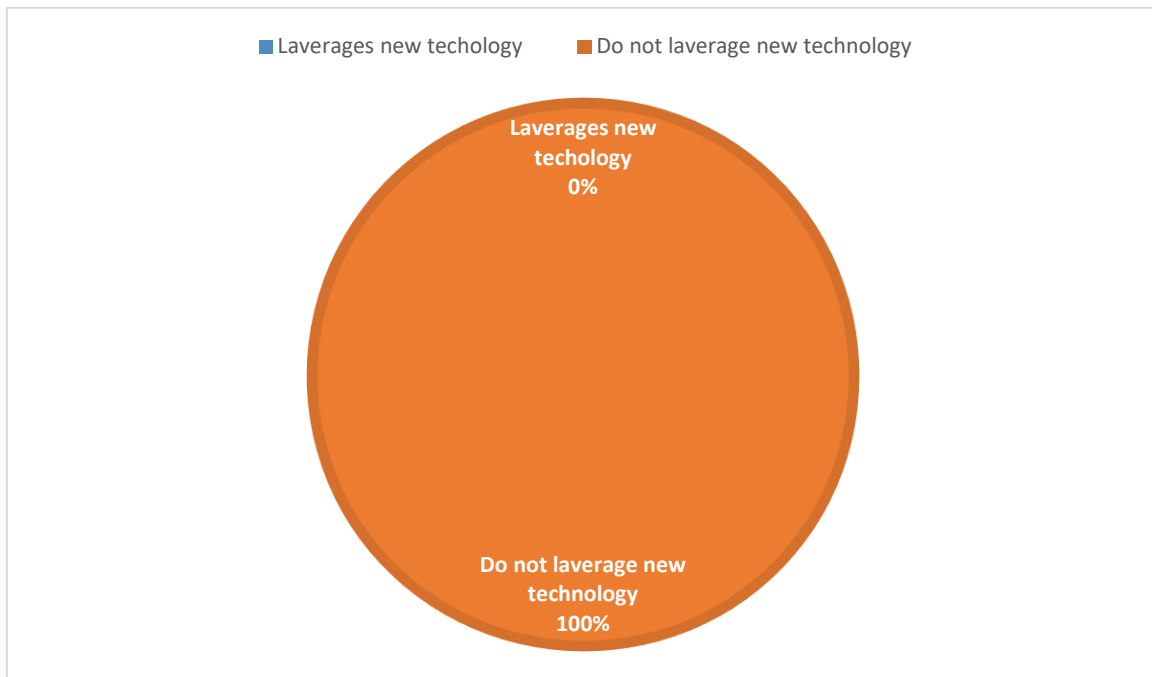
Figure 10 : Continuous improvement



- **Does your company leverage new technologies ?**

Based on the respondents, none (0%) of the three studied industries does leverage new technologies. However, today technology plays a huge role in strengthening SCs, for instance implementing technology software like ERP (Enterprise Resource Planning), WMS (Warehouse Management System) helps successful organizations streamline their SCs.

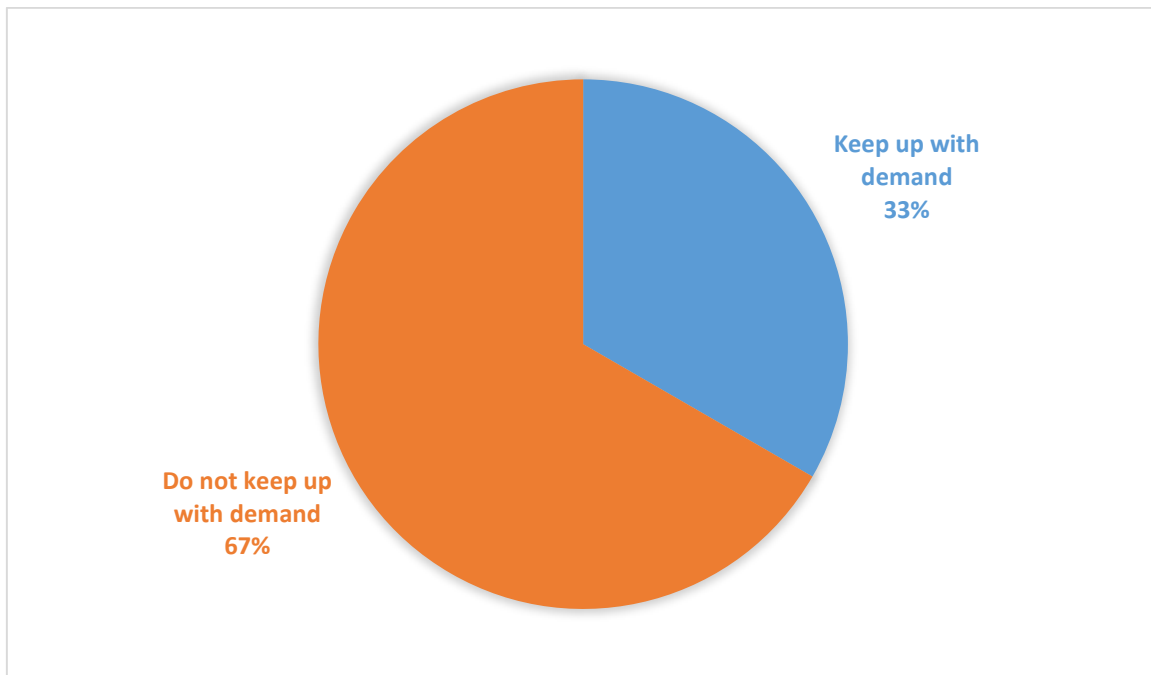
Figure 11 : Technology in manufacturing



- **Does your company keep up with demand ?**

According to the respondents, only 1 (33%) of the three studied industries keeps up with demand while 2 (67%) of them do not. One of the most important things industries must do is keeping up with customers demand as if they want a product they want it quickly, therefore SC has to be agile to make change at the drop of hat.

Figure 12 : Customer demand



b) Online interviews

In order to supplement the results and fill the gaps left in the questionnaire, interviews were held with the three textile industries managing directors, and data collected from these interviews were presented in a narrative form.

- **Findings told us your company doesn't keep up with demand, so what are your process for handling a shipment delay to customers ?**

Managers of the three studied industries unanimously said they first apologize for the delay, and then let the customers know whether they want to wait for or cancel the order. Some of them added that this is used to happening as textile industries in the country often run out of stock.

- **Do you consider infrastructure and good equipment as key enablers to your business success, if yes are they good enough for your operations ?**

The three textile industries managing directors considered infrastructure and equipment as key enablers to their business success, especially when it comes to improve efficiency and

productivity. Nevertheless, they deplored both the poor state of infrastructure in the country and antiquated equipment at their respective industries level. Indeed, inadequate infrastructure and antiquated equipment can be one of the major constraints on manufacturing industries from achieving their goals.

- **What are the major factors preventing you as a company to satisfy the local demand ?**

Managers of the studied industries argued that the performance failure of the manufacturing sector, especially textile industries in Mali is due to a number of factors including the cost of electricity, unfair competition, lack of qualified personnel, insufficient quantity of cotton fiber.

- **Unlike certain industries, why do you as an industry neglect both investing in employee training and implementing preventive maintenance program ?**

It's believed that manufacturing industries in the country are mostly family businesses where decision-making is centralised and informal. Unfortunately, the managing directors regretted that most of those families are reluctant to both invest in employees training and pay for a facility management company.

- **Unlike certain industries, why your industry operational procedures are still people dependent ?**

The managing directors said that their operational procedures are still people dependent because there is not only a lack of skilled workforce in the country but also the transfer of skills which is an essential lever for preserving a company's knowledge capital and ensuring the sustainability of its performance is problematic.

Chapter 4

1. Conclusion

It's true that the performance failure of the textile industries in Mali is due to certain factors including unfair competition, electricity cost, lack of quantity on cotton fiber, and unqualified personnel etc, but also the obsolescence of certain tools of their production chains put the brakes on their performance.

Also the poor state of infrastructure is a block for the industries development in Mali, but for the studied industries, also people issues such as culture, trust, aversion to change are more intractable. Indeed, findings of this study not only showed that there is a problem between the training offered and the needs of the manufacturing industries, but also many of the studied textile industries overlook their employees training, and have problem to transfer skills etc.

2. Implications

Specifically, this research paper was to develop the textile industries in Mali through SCM as an example of developing countries, however, it (research paper) represents a universal phenomenon because it provides important insights to manufacturing industries while improving their SCs. In fact, this study is insightful for textile industries in particular, but also for other manufacturing industries in terms of identifying strategies that would enhance the utilization of SCs within their organizations and across the SCs. Finally at the end, it suggests one of the necessary measures to be undertaken to save energy costs for manufacturing industries, for future research.

3. Recommendations

Recommendations of this study are strategic practices/policies that help develop the manufacturing industries through SCM, they are made according to the findings of the research.

- **Promoting infrastructure development**

In the developing economies, the effort to develop infrastructure is the government responsibility. Therefore for Mali Republic, this must concern physical structures such as roads, electricity and telecommunications facilities because these represent significant drawback of developing the country manufacturing sector.

- **Embracing the awareness of SCM**

Industry is becoming a significant sector of the economy of Mali, hence, embracing the SCM awareness should have to start not only at the industry level, but also from the roots by encouraging subjects related to SCM concepts and practices in schools, colleges, and universities which train the workforce.

- **Promoting ICT**

Information sharing among business partners is vital for a industry to operate an excellent SC. Therefore, government needs to give a special priority to the development of the information highway that may boost the application of IT in the industries.

- **Supporting top management initiatives**

There is nothing important than top management leadership in SCM, but a fully acceptance of this can depend on the cultural factor of an organization. Thus, industries owners (commercial families) must be sensitive of the benefits of introducing SCM best practices and let top management establishes common agreed vision and goals of the total SC concern.

- **Adopting lean manufacturing and employees training policy**

Lean manufacturing is a production process based on an ideology of maximising productivity while simultaneously minimising waste within a manufacturing operation. Some of the benefits of lean manufacturing include reduced lead time, reduced operating costs and improved products quality. Regarding employees training, this is vital in manufacturing industries because processes and equipments are continually evolving, which means employees must also be continually trained to improve output.

- **Developing supply chain collaboration**

Mali is one of the major cotton producers in Africa, nevertheless, the local textile industries lack sufficient quantity of cotton fiber (transforming only 2% of production) because the production is mainly devoted to export.

Therefore, a better supply chain collaboration (in which everyone wins) helps local textile industries compete in today's fast-moving global marketplace because this kind of collaboration will help them keep cotton producers (suppliers) loyal to them. But to do so, top management must have several strategic meetings with cotton producers to clearly establish links and conditions of their collaboration.

Future research proposal

- **Including other dimension of SCM practice**

New technologies are presenting promising opportunities for improvements across the SCs. Africa in general, and Mali in particular enjoys privileged sunshine. Photovoltaic solar energy adapts to all realities on the ground including solar kit equipping an isolated household to the gigantic solar farm supplying entire cities. Hence, future research may focus on creation of an energy-efficient and low-carbon supply chain.

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