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ENVIRONMENTAL ISSUES GENERATED BY INFORMATION AND COMMUNICATION TECHNOLOGY

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ABSTRACT

Advancements in electronics and Information and Communication Technology (ICT) industry have transformed our world entirely by giving us the information at our fingertips through the products they create and introduce to us. The benefits of technology in our economy are undeniable across all sectors. At the same time, we recognize the fact that technology has a negative impact in our environment that needs to be addressed. As much as we appreciate the usage of the electronic products, it comes a moment where these products go to the end of their lifecycle and need to be disposed of properly. This investigation paper will examine the negative impact of technology in our environment and what are the factors that contribute to electronics waste. This subject is not new and is not only an issue for our country, this is a global issue that is affecting the environment we live in, and we all need to be cognizant of the challenges we face with the electronics waste and find better ways to reuse or recycle our products.

KEY-WORDS: Benefits of Technology, Environment, Negative Impact, Electronics

1. BACKGROUND

1.1 Introduction to the problem

Information Technology has become such an integral part of our lives and the technological advancements have been incredibly satisfying to all our needs. We use technology everywhere; at work, academic settings, at home and it serves us well in performing tasks and communicating with each other. It is pertinent to note that information technology has affected the way the world is shaped economically as it affects health, information creation and dissemination, political discussions, meetings, trade, business, education, job creation, security and so on (Ukwandu & Nnamocha, 2013). We are becoming so attached to technology and rely heavily on it even for the simplest things that we do in our everyday lives. As our reliance and dependence on technology becomes more prominent, we continue to innovate and create more sophisticated technologies and designs.

We are so focused on creating and leveraging new technology that we tend to neglect the impact these innovations have on our environment and our health. Deniz (2016), indicates that many of the environmental pollutants are caused from the production and use of products and services including their limited design overlooking the environmentally conscious consumers. Technology and design play a big part in how we shape the behavior of consumers and make them aware of the environmental issues we face. Laws and regulations should be in place and companies should comply in order to properly dispose of their electronic waste.

1.2 Negative impact of Information Technology on Ecosystem

The first environmental issue relating to Information technology is the impact of production the computers and other electronic devices. Based on (Polaiah, 2016) studies, 81% of the energy that a computer uses is expended during the production phase. The amount of energy it takes to produce computers is far more that it takes to run the computers and both combined can produce significant amounts of carbon dioxide (CO₂), which has a negative impact in our environment. Air, water, and noise pollution are the key components of an environment that has been continually polluted as a result of technology. Emission of large quantities of gases such as CO₂ in the air by large industries causes air pollution which in turn has degraded the environment immensely (Polaiah, 2016).

The energy consumption of the computers depends on the type of the computer or model, it also depends on the processor, graphic cards and optimal or hard drives. The processes the computer performs can consume the energy differently, if the computer is performing calculations or working with large datasets, it will consume more energy than when performing simple tasks. The structure of energy consumption and the conditions of Sulphur (SO_x) and noncombustible hydrocarbons, (NO_x) and CO₂ emissions affect the global changes (acid rain and greenhouse

effect). Today, considerable effort is being devoted to reducing CO₂ emissions because of the Kyoto Protocol on climate change (Bilgen, 2014).

Technology constantly tries to find better ways on improving power management both manually and automatically, but we are still far from solving the problem even with the adjustments on the settings to save energy and create green computing. We recognize the environmental advantages that computers have brought to us with green technology and the power of research that it offers to contribute to environmental protection, but we also recognize that the power used to produce and operate the computers partially come from fossil fuels which burning the fossil fuels creates pollution in our environment. Chip manufacturing requires highly toxic chemicals. For example, chips are coated with a light-sensitive compound that allow chips to be photographically printed with circuit patterns. That compound typically contains ethylene glycol ethers, or EGEs (Schlanger, 2017). Even the materials we use to clean the computer equipment contain chemicals and when released they can harm the environment.

1.3 Disposal of electronic products

A second environmental issue for our environment is the proper disposal of electronic products. This is a problem that imposes risk domestically within the US and Internationally. The proliferation of the E-waste (electronics waste) has brought real issues worldwide for our environment and us as humans. Let's start by explaining what E-waste is. Electronic waste, or E-waste, comprises of old, end-of-life electronic appliances such as computers, laptops, TVs, DVD players, refrigerators, freezers, mobile phones, MP3 players, etc., which have been disposed of by their original users (Wath & Chakrabarti, 2010). Consequently all these appliances and devices need to have a proper disposal process instead of the process that is now in place, which apparently needs to be reviewed and actions to take place. According to Soltan (2019), the US exports 50 to 80% of the E-waste to the Asian countries for "recycling", which might sound like a positive thing but in reality, is waste dumping.

The reason this is so alarming, is the fact that after it reaches the destination it is processed by the workers of China and India or other developing countries and exposes them to the toxic materials that the "recycling" process contains. The rest of the E-waste remains here, and it affects the community where it is recycled. The production of electrical and electronic equipment (EEE) is one of the fastest growing global manufacturing activities. Rapid economic growth, coupled with urbanization and a growing demand for consumer goods, has increased both the consumption and the production of EEE (Pinto, 2008). With the growth of this sector of production comes the responsibility of E-waste management which can prevent many environmental issues, especially public health issues.

1.4 Public health issues

We emphasize the public health issues because the reports and data we receive clearly state the fact that E-waste is not handled properly in majority of the cases. Results in (Krishnamoorthy, Sakthivel, & Sarveswaran, 2018) showed that in 2016, indicate 44.7 million tons of e-waste was generated with 2 million tons produced in India alone. Out of this, only 20% of the e-waste generated globally was handled properly. The situation is worse in India where more than 90% of the e-waste was handled by informal sector workers (Krishnamoorthy, Sakthivel, & Sarveswaran, 2018). Cases like this show how the E-waste is an environmental pollution problem but also a health issue when is handled by workers who really don't have the proper knowledge to follow the disposal process, hence they will be exposed to the toxic waste.

For some recovering certain devices and burning some others to melt away non-valuable materials by using mercury and acids to get something valuable or taking products that need to be disposed and repair them for their use or to sell them to make a living. This category includes men, women and children who are not informed of what can happen to their health and who do not wear protective equipment while working with E-waste. The other part of the problem in this case is also inhaling toxic chemicals which are very dangerous for their health as well. Research has found that inhaling toxic chemicals and direct contact with hazardous e-waste materials (even in some formal e-waste recycling settings) result in increases in spontaneous abortions, stillbirths, premature births, reduced birth weights, mutations, congenital malformations, abnormal thyroid function, increased lead levels in blood, decreased lung function, and neurobehavioral disturbances.

Moreover, e-waste toxins contaminate the air, soil and groundwater (Cho, 2018). Companies should comply with the public health rules and the safety rules as well as have controls and measures in place to prevent pollution or creating health issues. In order to do that they will need to dedicate resources and budget, which becomes an

expensive process. Sometimes companies find other ways to recycle their unused or obsolete products in the developing countries where they can save money by not complying with these essential regulations of E-waste. This is a big part of the environmental issues we are facing.

2. WHAT ARE THE CONTRIBUTING FACTORS ON E-WASTE?

2.1. Electronic products

2.1.1. Direct connection

There is an increased number of electronic products we purchase over time. Everything in our daily life and activities has a direct connection with electronic devices in general whether they are computer related or mobile devices. As we continue to buy and satisfy our needs, before we know it, we somehow contribute to the E-waste because as soon as we buy the new products, we need to throw away the old one. Perhaps, passing them on for reuse or recycle properly, will be a better solution than to throw them away and create more E-waste. A large number of what we mark as E-waste can be reused; either the whole device or parts of it can be readily marketable again. If they are not readily marketable, they can easily be recycled for material recovery. Whether from breakdown, slow-down, or just the availability of a newer model, people discard electronics at the slightest inconvenience. It's not just laziness or a lust for the future, either; the economics of gadgets encourages disposal (Ahmed, 2016).

2.1.2. Acceleration of E-waste

Another reason for this acceleration of E-waste is the shorter life span of the consumer electronics and household appliances. As we continue to innovate and introduce new products in the market, we are prone to desiring the new models and new technologies that fulfill our needs better. For instance, as soon as the new version of the phone comes in the market, naturally we would like to have it for the new features or design that it offers, or if a new model/design of the flat screen TVs comes in the market, we want to have it in our houses even if nothing is wrong with our old one. All these creates obsolete and unwanted products because of the design or the labeling of the products. Service-life of the consumer electronics and other products has been a contributor to the shorter life span of the technology. Many products will be discarded if the battery stops working, when simply we can replace the battery and keep the product longer. Companies purposely plan to bring new software updates and offer them to the clients for cheaper price rather than fixing the old ones or extending the use of the old ones by continuing to support the old version. Naturally this is done to drive profits from the sales of the new software designs.

2.1.3. E-waste pollutants and dangers for the environment

Clearly, for E-waste to be such a pollutant and sometimes dangerous for our environment is the fact that electronic products contain toxic materials constituents. Reddy (2004) explains that although it is not well known, E-waste contains a brew of toxic substances such as lead and cadmium in the circuit boards; lead oxide and cadmium in monitor cathode ray tubes; mercury in switches and monitors; cadmium in computer batteries; polychlorinated biphenyls in capacitors and transformers; and brominated flame retardants on printed circuit boards, plastic casings, cable and polyvinyl chloride cable insulation that release highly toxic dioxins and furans when burned to retrieve copper from the wires.

2.1.3. E-waste management

Overtime, E-waste has become a big issue, is the fact that E-waste management, which includes the process from inception to the final disposal in most cases is not where it is supposed to be. This is a global issue and it affects our environment globally so finding the proper methods of recycling and refurbishing electronic products is necessary. There are organizations involved in this process that try to make companies aware of the negative effect technology can have in terms of the environment. Some companies understand and comply with the rules and regulations of E-waste management (domestically and internationally), but more work needs to be done in this aspect for all the reasons above. There are methods to alter the process and reduce waste of technology in a way that benefits everyone.

2.2. Recyclable materials

2.2.1. Repaired / refurbished and sustainability

For products that cannot be fully disposed of like PVC materials, manufacturing companies can use recyclable materials, so we turn that into something useful and we reduce waste in our environment. For the electronic products that can be repaired or refurbished we should take initiatives in doing that rather than putting them in landfills and

creating contamination in our communities. While producing 100-percent recycled goods may be a tall order, it's not too late to start a path towards sustainability. Manufacturing companies can use these sustainable business tips to forge a brighter future for their company: Look for alternatives by working with suppliers and sustainable alternatives.

Reduce waste - if a business produces waste during the manufacturing process, such as scrap metal or plastic, look for ways to reuse these resources or donate them to a good cause. Be more flexible – look for ways to reduce energy use, save water, and use sustainable resources even if it means making the manufacturing process more complicated. These are a few sustainable business practices to attract new customers and make up for these added costs. Another is Green Certified - organizations like Green Business Bureau help and guide businesses through the process. Sustainability doesn't have to be a difficult challenge. If a company is willing to change to a holistic approach then it could incorporate these practices into the manufacturing process, find new solutions and become a leader in sustainability.

2.2.2. Security

Another reason why we should come up with a better process for waste management of electronic products is the fact that not properly disposing of electronic devices can be a security issue when companies follow illegal or informal paths of recycling electronic devices. For most of us there are rules in place before disposing of an electronic device: the data should be wiped out, so classified or financial information doesn't go in the hands of hackers who look for opportunities like this to get into our systems. There are a variety of methods for permanently erasing data from devices (also called sanitizing). Because methods of sanitization vary according to device, it is important to use the method that applies to that particular device. Before sanitizing a device, consider backing up the data. Methods for sanitization include: deleting data. Use a disk cleaning software designed to permanently remove the data stored on a computer hard drive to prevent the possibility of recovery, such as *Secure erase*.

This is a set of commands in the firmware of most computer hard drives. If you select a program that runs the secure erase command set, it will erase the data by overwriting all areas of the hard drive. *Disk wiping* is a utility that erases sensitive information on hard drives and securely wipes flash drives and secure digital cards. Overwriting, another method of sanitization, is to delete sensitive information and write new binary data over it. Physical destruction of a device is the ultimate way to prevent others from retrieving your information. Specialized services are available that will disintegrate, burn, melt, or pulverize your computer drive and other devices.

3. CONCLUSION

It is our responsibility to use the technology in the most efficient way and not to harm the environment and our communities. We need to be aware of the impact of technology in our lives, health and society and recognize both the benefits relating to the economy and satisfying our needs. Also, we need to be aware of the negative impact the technology has in our environment. Educating people about how to recycle, reuse, and dispose of electronics at all levels will teach them and their communities how to behave more responsibly towards the environment. Indeed, electronic waste is a global problem requiring a global solution (Bhutta, Omar, & Yang, 2011). The responsibility should be shared with key stakeholders the innovators and the users of technology so we can reduce the mismanagement and put measures in place to control environmental pollution globally.

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COMPETITIVENESS EVALUATION OF TEXTILE INDUSTRIES IN MADAGASCAR

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ABSTRACT

The context of globalization has led to fierce competition. The Malagasy textile sector is affected by this scourge. It can be seen that the textile, apparel and accessories market is heavily dominated by thrift and imported products. An analysis of the Malagasy textile value chain has been conducted and the diagnosis of the production capacity and technology makes it possible to affirm that the factories producing for local consumption are not competitive. The volume of production does not satisfy domestic demand. The technology used is assumed to be obsolete and does not offer quality to finished products. The cost of production is high while the purchasing power of the population is low. Therefore, an update of the technology used, the promotion of innovation in all its dimensions, a technical restructuring and the promotion of the training are to be carried out by Malagasy textile companies to be competitive on the market. The intensification of research and development is also a determining factor for improving the competitiveness of companies. However, technology watch, innovation management and knowledge management can simultaneously address the issue of these companies operating in the field of textile in Madagascar. Other diagnostic dimensions are yet to be established to complete the present study.

KEY-WORDS: competitiveness, textile industries, technology, value chain, Innovation

1. INTRODUCTION

The textile industry in Madagascar was born in the sixties. At the time, the textile factories, players in the economy, successfully managed to control the local market, because this last was relatively protected. The situation then worsened in the late eighties, a consequence of the opening of the Malagasy economy. Currently, the majority of the Malagasy population dress in second-hand clothes imported from outside. On the other hand, the invasion of imported textile products dominates the market. Also, most of the existing industries, mostly Free Zones enterprises, do not sell their production locally; only a few textile manufacturing industries that are small production units manufacture for local consumption. Over the medium to long term, these second units of units are expected to compete closely at the production level. This context poses a dilemma on the survival of these medium capacity units in the face of local and international competition.

A programme was launched : the establishment of a Shared Cost Support Fund (FAFP) whose main objective is to foster conditions for inclusive growth by distributing technical assistance and support for access to basic equipment for small and medium companies in the Textile / Clothing / Accessories sector, in most cases are informal, operating outside the Free Zones and Enterprises conditions, with a view to helping them to develop their activities and strengthen their links within the value chain with exporting companies under the conditions[4]. To be able to detect flaws, determine constraints and find potential solutions for sector development, a value chain diagnostic is needed. It is an integrated tool developed by the United Nations Industrial Development Organization that has enabled many countries and development agencies to develop improvement strategies. Production capacity and technology will be the variables to be considered in this paper for the case-study. Thus, the method will allow us to identify what types of appropriate technologies are to be used and also to bring ideas on the possibility of development of textile industries in Madagascar.

2. APPROACH-TOOLS AND METHODOLOGY

It is a question of evaluating the technical performances of the companies in the sector in question. Before proceeding to the actual diagnosis, a mapping of the chain is always necessary. Map tracing, according to the UNIDO method, involves nine different steps :

- collection of information
- definition of functions
- Specification of the types of actors
- drawing flows as an arrow
- specification of end markets
- inclusion of generic categories of support services
- adding additional data
- secondary source data collection
- drawing of the final map.

The diagnosis makes it possible to understand the current situation, to determine the possible solutions and to plan possible impact scenarios. The ability of companies to manufacture and process products is to be analyzed. More precisely, it is the means of production (machinery, equipment, equipment), human resources, knowledge and technologies. Reviews of technical productivity, financial profitability and profit margin indicators are required for the description of the production capacity and the calibration of the process in relation to those of the competitors. The production capacity and the use of technology are critical success factors for an industrial enterprise. These are skills or features that a company must possess to be competitive. These two variables are entry barriers into the value chain. The material installations, the machines, the equipment and the spaces used, the knowledge and the know-how of the personnel in the production have impacts on the productive capacity. The minimum quantity to produce to exceed the breakeven point, the quality of the final product and the time taken to finish a product are very important.

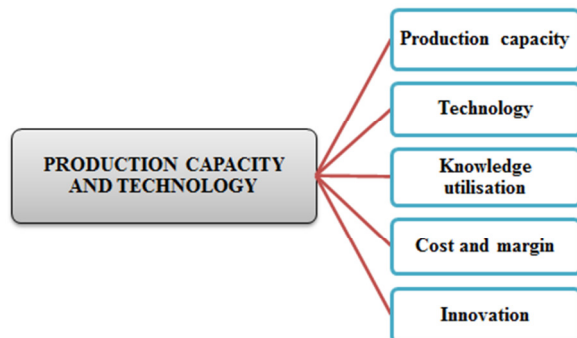


Figure 1: **Parameters of the diagnostic**

2.1 Production capacity

We can define it as the set of fixed assets (building, machinery and equipment) which, depending on the technology, the organization of production and the applied work systems, gives the maximum possible production of a factory, a company, a sector. The diagnosis will enable us to evaluate the productive capacities of companies in the value chain by considering the size of the factories, the number of employees, the level of production achieved; or to quantify the capacity utilization rate (exploitation rate), defined as the ratio between the actual production and the maximum quantity of production (with the existing capital stock). The storage rate, the yield analysis and the cycle time are also involved in the evaluation of the production capacity.

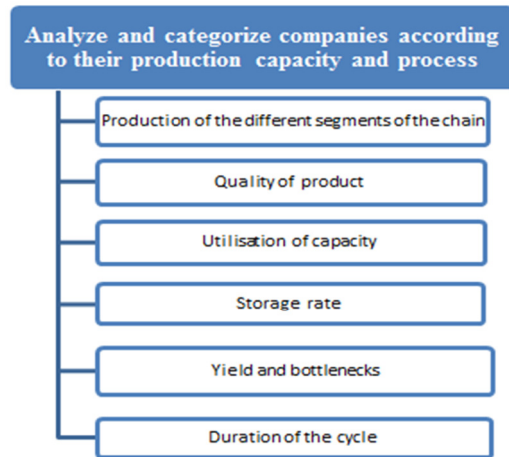


Figure 2: **Production capacity evaluation**

2.2 The use of technology

It influences quality and profitability. In other words, the cost of production and the quality of the final product result from the type of technology used in the production process. Thus, a technology watch must continually be made by the company to maintain a good balance on costs and benefits. The use of obsolete and inefficient technologies leads to a bad competitive position. Companies are forced to be both reactive and proactive. In other words, a change in business, knowledge and technology is driving innovation.

If technology has a direct influence on cost or differentiation, it plays a role in the competitive advantage by modifying the other factors of change in cost or uniqueness. The technologies are of four types:

- Key technologies: whose domination is a success factor.
- Basic technologies: mastered by all, allows the quality but not the position compared to the competitors.
- Advanced Technologies: Improves Competitive Position.- Emerging technology: high probability of becoming a key technology.

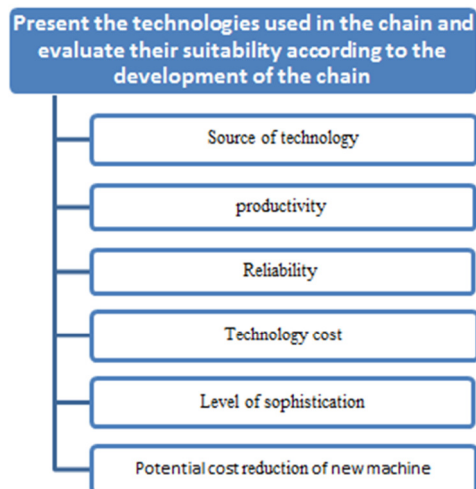


Figure 3: **Technology evaluation**

2.3 The use of Knowledge

The intensity of knowledge is measured by the level of sophistication of the final product and the complication of the production process. Knowledge can be developed by different sources: the company itself, the customers, the experts or the technology and equipment provider. Knowledge is acquired on practice and long-term use. They are transformed into know-how and skills. Less developed actors need to strengthen their capacity and increase their knowledge to be more competitive. Networking companies that participate in similar transformation processes in a geographically limited area can be an important source of knowledge exchange and innovation promotion.

Knowledge Management is one of important method for capitalizing and creating new knowledge which have a big place in competitiveness notion.

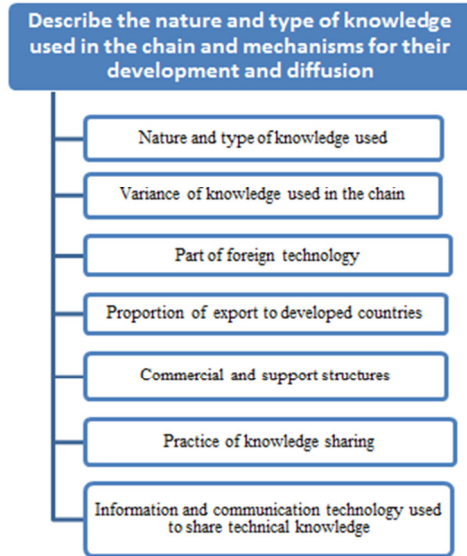


Figure 4: Use of knowledge analyzing

2.4 Cost and Margin

Make calculations of some financial parameters for the important companies in the chain. The net income margin is one the financial analysis to be considered. The calculation of margins involves fixed costs and variable costs. Other financial criteria are cash flow, profitability threshold, and internal rate of profitability. These concepts are available in many books and training materials. The analysis of its indicators will be globalized; it is for all the actors of the chain.

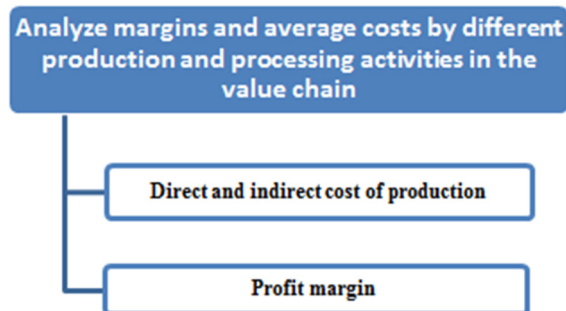


Figure 5: Cost and marging analysis

2.4 Innovation

Innovation is a new, more efficient approach used in the production chain. It allows the company to master the competition. It can be applied in the technical field or in the organizational aspect. The management of innovation in the company is a source of competitiveness in terms of technology. Indeed, the one who masters innovation will dominate the market. Innovation ensures continuous improvement of the production process. The use of innovations requires innovation skills, especially people with the necessary technical capacity. The existence of these skills within the human resources in the company constitutes a blocking factor. Support from scientific institutions and the research and development department is essential to better condition innovation.

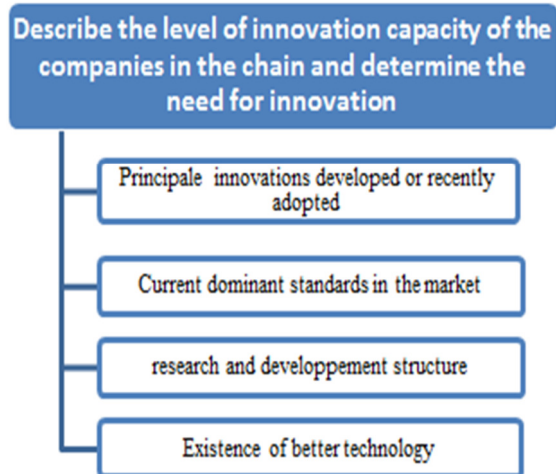


Figure 6: **Innovation analysis**

3. RESULTS AND DISCUSSIONS

- The amount of cotton produced is unsatisfactory for the domestic demand of the textile industries, but its quality is acceptable. This difficulty in the cotton sector is due to the poor climatic condition of the southern region of Madagascar and the lack of insecticide leading to a decrease in the number of planters and thus the decline in production.

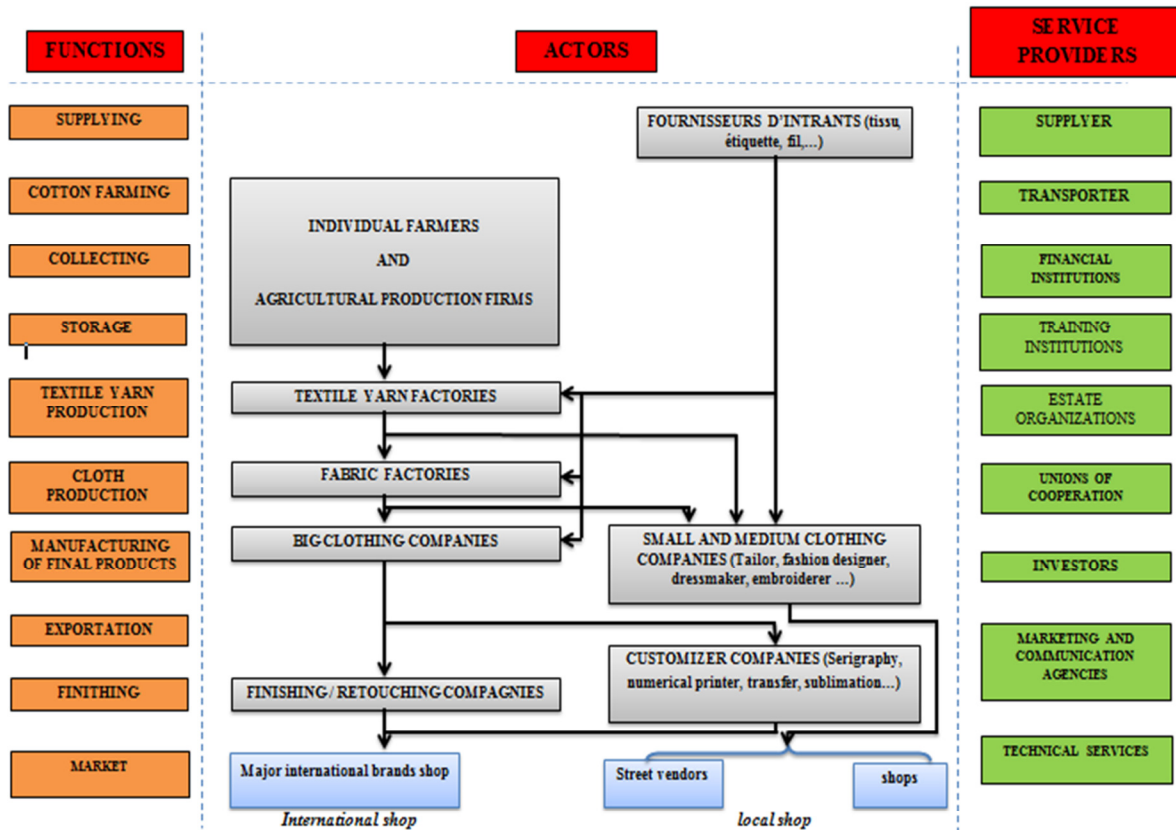
- There are large factories, especially the Free Zones industry, which use a huge space (surface) for production and employ up to more than three thousand workers. These first types produce for international orders and are able to produce on a large scale.

Small and medium-sized units are also found, employing only a few dozen to a few hundred workers. These are those who produce for local consumption and in small quantities.

- In terms of production capacity: companies can produce up to one hundred and seventy thousand pieces / day. Sometimes orders received exceed the productive capacity, according to a key person operating in the textile sector in Madagascar. However, some companies are forced to increase their capacity to meet the demand of their customers. This action is also an anticipation for the satisfaction of unplanned requests.

- The increase in production capacity can be done by adding overtime, adding team, eliminating bottlenecks, acquiring new productive system, expanding facilities, call for outsourcing.

✓ *VALUE CHAIN MAPPING*



MAPPING OF THE TEXTILE VALUE CHAIN IN MADAGASCAR (Source: author)

Figure 6: Mapping of the textile value chain in Madagascar

Case of a SMALL FAMILY TEXTILE ENTERPRISE

✓ RAW MATERIAL CONSUMPTION ANALYSIS

Products \ Raw materials	buterfly	Ndège	Baby Wool	Triple I	France Pelote
PULL-OVER	7 to 10	6,5 to 8	8,5 to 10	6 to 8	8 to 10
BONNET	1.5	1.5	2	2	2
HOOD	3 to 4	3 to 4	4 to 5	4 to 5	4 to 5
GLOVE	2	2	2.5	2.5	2.5
MITTEN / CHAUSSON	0.5	0.5	0.75	0.75	0.75

Table 1: Raw material consumption

✓ PROCESS PRODUCTION AND CHARACTERISTICS

<i>PROCESS</i> \ <i>RUBRIC</i>	MACHINE TYPE	NUMBER OF EMPLOYEE
1-KNITTING	2 MACHINES FOR KNITTING MEMOMATIC SINGER	2
2-SEWING	2 MACHINES FOR SEWING SINGER	2
3-FINITING AND CONTROL	1 IRONER	1

Table 2: Process and characteristics

✓ *PRODUCTION CAPACITY*

TYPE OF PRODUCT	PRODUCTION CAPACITY
<i>Pullover/ chandail</i>	<i>10 pieces per day</i>
<i>Bonnet</i>	<i>100 pieces per day</i>
<i>Hood</i>	<i>50 pieces per day</i>
<i>Glove</i>	<i>30 pieces per day</i>
<i>Mitten / chausson</i>	<i>400 pieces per day</i>

Table 3: Production per day

✓ *ANALYSIS OF THE DURATION OF THE CYCLE*

<i>Products</i> \ <i>Rubric</i>	process	Duration	Duration of the cycle per product	Capacity per machine per day
PULL-OVER	Knitting	2 h	2h 45 min	5
	sewing	30 min		
	Finiting and control	15 min		
BONNET	Knitting	15 min	27 min	50
	sewing	10 min		
	Finiting and control	2 min		
HOOD	Knitting	30 min	42 min	25
	sewing	10 min		
	Finiting and control	2 min		
GLOVE	Knitting	40 min	62 min	15
	sewing	20 min		
	Finiting and control	2 min		
MITTLE /CHAUSSON	Knitting	15 min	22 min	200
	sewing	5 min		
	Finiting and control	2 min		

Table 4: Duration of the cycle

✓ *COST AND MARGIN*

Pull-over					
	<i>Buterfly</i>	<i>Ndège</i>	<i>Baby Wool</i>	<i>Triple I</i>	<i>France Pelote</i>
Quantity	1	1	1	1	1
Unit price	40000	40000	40000	40000	40000
INCOMES	40000	40000	40000	40000	40000
Input cost	3000	2900	1800	2200	2000
water	0	0	0	0	0
electricity	0	0	0	0	0
packing	200	200	200	200	200
Transport fees	3000	3000	3000	3000	3000
Others (lighter, communication...)	1500	1500	1500	1500	1500
VARIABLE COSTS	7700	7600	6500	6900	6700
amortization	0	0	0	0	0
salary	4000	4000	4000	4000	4000
FIXED COSTS	4000	4000	4000	4000	4000
NET MARGING (Ariary)	28300	28400	29500	29100	29300

Table 5: Cost and margin for pull-over

Bonnet					
	<i>Buterfly</i>	<i>Ndège</i>	<i>Baby Wool</i>	<i>Triple I</i>	<i>France Pelote</i>
Quantity	1	1	1	1	1
Unit price	6000	6000	6000	6000	6000
INCOMES	6000	6000	6000	6000	6000
Input cost	450	435	360	440	400
water	0	0	0	0	0
electricity	0	0	0	0	0
packing	50	50	50	50	50
Transport fees	30	30	30	30	30
Others (lighter, communication...)	500	500	500	500	500
VARIABLE COSTS	1030	1015	940	1020	980
amortization	0	0	0	0	0
salary	1000	1000	1000	1000	1000
FIXED COSTS	1000	1000	1000	1000	1000
NET MARGING (Ariary)	3970	3985	4060	3980	4020

Table 6: Cost and margin for Bonnet

Gant	Buterfly	Ndège	Baby Wool	Triple I	France Pelote
Quantity	1	1	1	1	1
Unit price	12000	12000	12000	12000	12000
INCOMES	12000	12000	12000	12000	12000
Input cost	600	580	450	550	500
water	0	0	0	0	0
electricity	0	0	0	0	0
packing	50	50	50	50	50
Transport fees	30	30	30	30	30
Others (lighter, communication...)	500	500	500	500	500
VARIABLE COSTS	1180	1160	1030	1130	1080
amortization	0	0	0	0	0
salary	1200	1200	1200	1200	1200
FIXED COSTS	1200	1200	1200	1200	1200
NET MARGING (Ariary)	9620	9640	9770	9670	9720

Table 7: Cost and margin for Gant

The project is profitable regardless of the type of raw material used and the type of output to be produced.

✓ TECHNOLOGY USED

All the machines used during the chain are all manual and therefore consume zero energy. The characteristics and the operating instructions of the machines are almost the same as those used in large production units. The SINGER brand is one of the oldest in the field of textile machinery. The machine can manufacture up to 500 different types of models according to the customer's order. Note that at present, a semi-automated version of this machine exists and that large factories use to accelerate their production rate. The productivity of a worker is from 5 to 200 pieces per day depending on the type of finished products. During the knitting phase, the worker pushes manually a carriage moving back and forth, standing for two hours. This is an ergonomic problem that will have negative impacts on productivity. This problem is also encountered in large factories. We can say that the level of sophistication of the machines used is still quite low. An automated version of this knitter will multiply the value of current productivity by 5 but it is very expensive. At the maintenance level, the applied method is the correction, that is, the curative maintenance is used. Failure is most often seen at the machine needles. The operator simply replaces the needle damaged or deviated by another occasion. No special oil is used for the lubrication of machine parts. Finally, the tools used are not professional and incomplete.

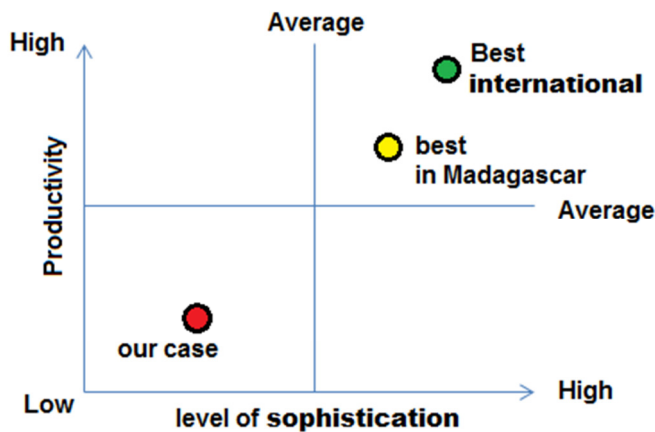


Figure 8 : Technology efficacy

✓ NATURE AND TYPE OF KNOWLEDGE USED

Variance of the knowledge used in the chain: a guide for the use of the machine is used and serves as a reference for handling. In this small manufacturing unit, the knowledge and know-how for 20 years is transmitted from generation to generation. The parents train their descendants to manipulate the machine. They have not received any vocational training or even basic training in the field of textiles.

Share of foreign technologies: 100% but currently obsolete

Exportation to developed countries: all finished products are sold in place.

Commercial and support structures: none.

Knowledge sharing practices: direct and practical learning (companionship).

Information and communication technologies used to share technical knowledge: verbal transmission and practical case. No theoretical training.

No support organization is available for small textile companies in Madagascar. On the other hand, platforms such as the grouping of free enterprises, the text Mada Cluster exist but they are dedicated for large companies. Networking work like this needs to be intensified and integrating all existing business structures.

✓ *INNOVATION*

The level of Research and Development is very low for small and medium enterprises operating in the textile field. However, they are called to innovate to be more effective than competitive. For example, the acquisition of a new machine may have many innovative features that allow for more productive use.

The big textile factories are already gradually tending to develop their capacities to innovate. Not to mention that innovation is a source of success, sustainability, expansion and value creation for a company.

innovation is not limited to technical innovation with new machines. Indeed, there can be an innovation in the business plan, in the sales channels, in the types of product designed, the "organic" or "fair" approach, creation of a brand, fabric "handmade "Or" zero emission "without the use of polluting engine, etc.

4. CONCLUSION

The textile sector, which is currently the basis of the Malagasy economy, needs a deep refoundation to have a better place on the podium of the international competition. According to the diagnosis, the production capacity and technology used by small and medium-sized Malagasy textile industries do not allow the control of competitiveness. With the area of expertise and technology associated with equipment and machines in current utilities, factories will not be able to meet local demand in quantity, quality and cost. For the free zones, Malagasy textiles, the productive capacity and the technology used are acceptable, but efforts are still to be considered to ensure continuous improvement. These are called to produce for local demand in parallel. Also, all the Malagasy textile factories are obliged to improve their capacities to innovate to be able to control the competition, this by intensifying the research and development. Apart from production capacity and technology, other diagnostic dimensions must be brought to the Malagasy textile sector to ensure its rapid and sustainable development.

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IDENTIFICATION DES FACTEURS DE SÉCURITÉ SUSCEPTIBLES D'INFLUENCER LA DÉCISION D'IMPLANTER OU D'UTILISER L'INFONUAGIQUE

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RÉSUMÉ

Ce article porte sur les facteurs susceptibles d'influencer la décision des gestionnaires d'adopter l'infonuagique ou d'implanter un ou plusieurs des services qu'elle comprend. Bien qu'on attribue à cette option beaucoup d'avantages, elle entraîne aussi des défis en matière de sécurité. La confidentialité, l'intégrité, diverses vulnérabilités, la disponibilité et le contrôle des données constituent des obstacles à l'adoption de l'infonuagique. Ce article présente un questionnaire qui touche les trois aspects de l'infonuagique : la sécurité infonuagique, l'accord sur la garantie de service (SLA) et les risques liés à l'infonuagique. Les réponses au questionnaire nous permettront de faire une analyse des données et de tirer des conclusions sur les facteurs influenceurs à l'adoption de l'infonuagique. Nous mettons également en évidence les différentes contraintes liées à l'adoption de l'infonuagique, comme les coûts, les infrastructures, les risques et la sécurité des données, la protection des renseignements personnels, les facteurs de sécurité, etc. Pour identifier les facteurs, nous allons nous baser sur une recension des écrits, sur des entrevues et un sondage auprès de quelques gestionnaires d'entreprises, détenteurs d'un MBA.

Mots clés : infonuagique, risques, défis, menaces, sécurité, accord de niveau de service.

ABSTRACT

This report focuses on the factors that may influence managers' decision to adopt the cloud or implement one or more of the services it understands. While this option is credited with many benefits, it also creates security challenges. Confidentiality, integrity, various vulnerabilities, availability and control of data are obstacles to cloud adoption. This report presents a questionnaire that addresses all three aspects of cloud computing: cloud security, service level agreement (SLA), and cloud computing risks. The answers to the questionnaire will allow us to analyze the data and draw conclusions about the influencing factors in the adoption of the cloud. We also highlight the various constraints related to cloud adoption, such as costs, infrastructure, risk and data security, privacy, security factors, and so on. To identify the factors, we will rely on a literature review, interviews and a survey of some business managers with MBAs.

Keywords: Cloud Computing, Risks, Challenges, Threats, Security, Service Level Agreement (SLA)

1. INTRODUCTION DE L'INFONUAGIQUE

1.1 Définition de l'infonuagique

L'expression infonuagique remonte aux origines de l'informatique utilitaire, un concept que l'informaticien John McCarthy a proposé en 1961 (Erl et al., 2013, p. 39 et 40). Il suggérait de rendre l'informatique payable à l'utilisation comme l'électricité et le téléphone. Il convient d'apporter quelques définitions à propos de ce concept, qui a bien évolué depuis ce temps-là, afin de le clarifier dans le cadre de ce article. Dans cette section, on présente un schéma, représentatif de l'infonuagique ainsi que les différentes définitions qui en découlent. La figure 1 représente l'infonuagique et ses différentes composantes. La traduction de « cloud computing » en français est « l'infonuagique », selon le grand dictionnaire terminologique.

Ce terme, proposé et accepté par l'office québécois de la langue française, revêt plusieurs significations, parmi lesquelles on retiendra la définition de l'institut national des normes et de la technologie (NIST, 2011) non seulement parce qu'elle s'appuie sur des critères précis, mais aussi parce qu'elle expose les cinq caractéristiques de l'infonuagique, à savoir : le libre-service; l'accès au réseau; la mutualisation des ressources; l'élasticité et la rapidité; la mesure de l'utilisation du service. Nous examinerons plus en détail ces caractéristiques dans le deuxième chapitre de ce article. Les fournisseurs de services infonuagiques offrent différents types de services à leurs clients, comme le SAAS (logiciels en tant que service), la PAAS (plateforme en tant que service), la PBAS

(processus d'affaires comme un service) et la IAAS (infrastructure en tant que service). Le schéma ci-dessous en montre les principales caractéristiques.

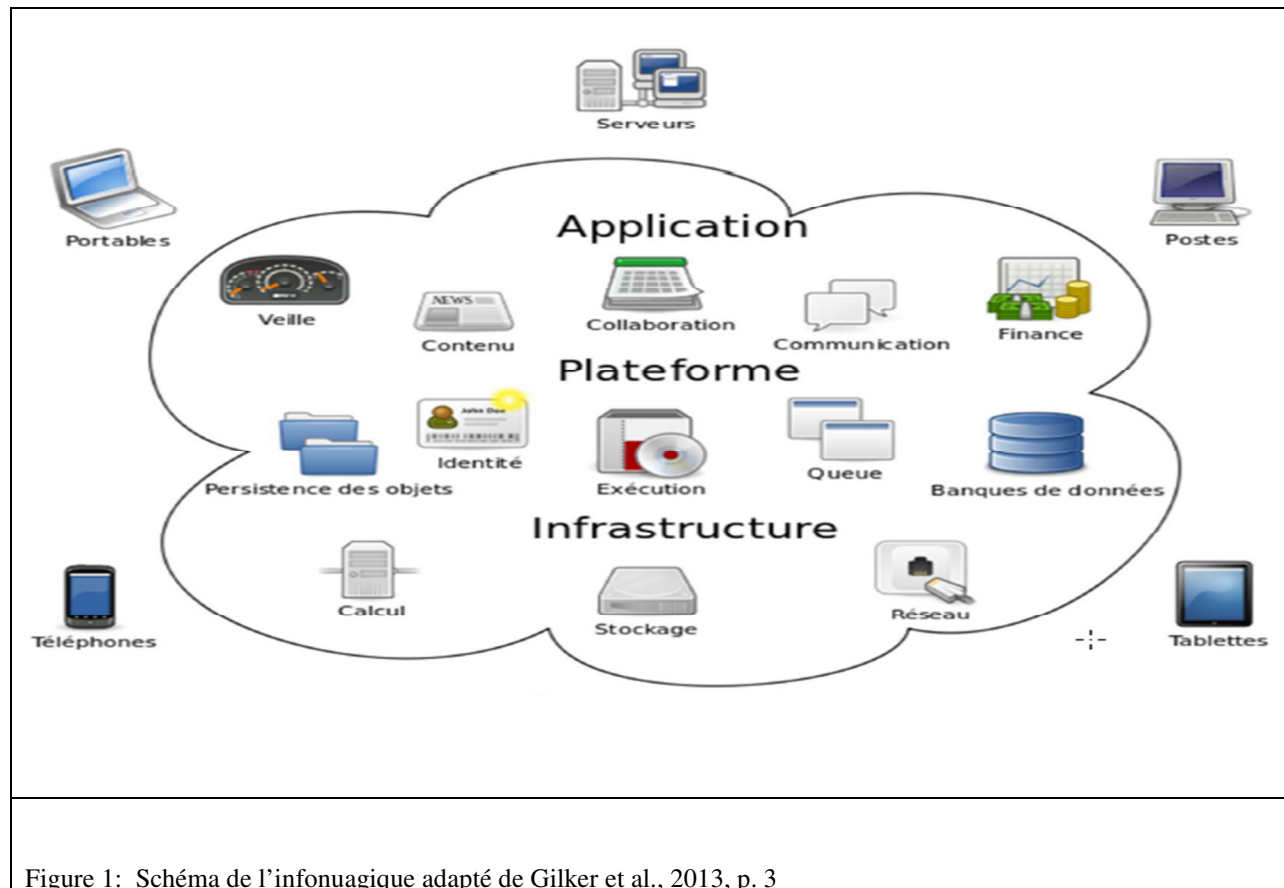


Figure 1: Schéma de l'infonuagique adapté de Gilker et al., 2013, p. 3

1.2 Importance économique de l'infonuagique

Les prévisions du marché mondial des services infonuagiques indiquent que l'utilisation des services pourrait augmenter considérablement. Ainsi, les ventes mondiales infonuagiques dépasseraient 214 milliards de dollars en 2019 (Gartner, 2019) soit une augmentation de 17,7% par article à l'année de 2018. , Gartner Research (2019) présente une prévision du marché mondial de l'infonuagique (2019- 2022) pour les divers types de services (SaaS, IaaS, PaaS, BPaaS ainsi que la gestion et la sécurité, qui atteindraient 331 milliard en 2022. Ces données présentées montrent le dynamisme infonuagique pour les fournisseurs. Près de 60 % des entreprises nord-américaines ont désormais recours à l'infonuagique, il s'agit d'un grand succès pour le marché mondial de l'infonuagique (Forrester, 2019)

1.2.1 Les fournisseurs de services infonuagiques

Les principaux fournisseurs de services infonuagiques (FSI) se trouvent dans le tableau 1 ci-dessous. À titre d'exemple, on présente l'augmentation des revenus pour cinq (5) grands fournisseurs (selon un article de Forbes, 2019) quant aux trois (3) modèles de services cités pour l'année 2019.

Fournisseurs infonuagiques	Services IaaS, PaaS et SaaS
Microsoft	+20.4
Amazon	+16
IBM	+15.8

Tableau 1 : Augmentation de revenus milliards de dollars

1.3 Problématique

1.3.1 Les avantages et les désavantages de l'infonuagique

D'après Ionescu et al., (2013), les entreprises utilisent la technologie infonuagique pour les raisons suivantes : améliorer le processus d'affaires des entreprises et la prise de décision de leurs gestionnaires. Elle permettrait de créer des services informatiques adaptés aux besoins des utilisateurs et de réduire les coûts associés. Les entreprises recourent à l'infonuagique dans l'espoir de gagner des avantages concurrentiels, favoriser la réduction des coûts, accroître leur agilité et permettent de bénéficier d'un retour sur cet investissement (ROI) important. Comme bénéfique, on pourrait citer notamment la réduction des coûts sur les services infonuagiques IaaS, SaaS et PaaS (Attasena et al., 2017).

Pour les petites, les moyennes et les grandes entreprises, l'infonuagique pourrait générer plus d'avantages commerciaux que l'approche traditionnelle, parce que ses solutions offrent de plus grandes opportunités (Thomas et al., 2016). Selon Forester Research (2019), de plus en plus, les petites et les moyennes entreprises adoptent les services infonuagiques. Thomas et al., 2016 ajoutent « Cette présence croissante de la technologie infonuagique va transformer les entreprises des pays développés. Pour la plupart de ces dernières, elle devient incontournable parce qu'elle facilite les économies d'échelle ». Dans le tableau 2 ci-dessous, on présente les principaux avantages et désavantages de l'infonuagique.

Avantages	Désavantages
L'accès aux applications de n'importe où.	Des problèmes techniques, mauvais fonctionnement du système.
Offre une plus grande ouverture aux nouvelles technologies.	Sécurité et protection des données (attaques, vol de données, fuite de données...).
Le soutien organisationnel 24/24 heures à l'infrastructure et au contenu.	Indisponibilité des services, par exemple panne du système.
Augmentation des capacités à la demande.	Manque de confiance.
La réduction des coûts	Pertes liées aux pannes.
Sauvegarde et récupération des données.	Erreurs dans le traitement et la gestion de la sauvegarde des données.
Stockages illimités.	Incapacité possible de maintenir l'intégrité des données.
Intégration automatique des logiciels.	Des bogues applicatifs.

Tableau 2: Avantages et désavantages de l'infonuagique; Source : (Benslimane et al., 2015, Chen et al., 2016, Abdala et Varol, 2019) / (adapté de la source)

1.3.2 Les risques liés à l'infonuagique

Si la technologie infonuagique ne cesse d'évoluer, elle apporte son lot de préoccupations et de risques en termes de sécurité. L'infonuagique repose sur de nombreuses promesses visant à faciliter la vie des entreprises. En revanche, elle n'offre pas réellement de garanties solides. En effet, l'infonuagique offre de nombreux avantages (la croissance économique) pour les entreprises, mais comporte des obstacles, comme c'est le cas pour toute nouvelle technologie. Les questions de sécurité en limitent l'adoption : les entreprises ne font pas confiance à l'infonuagique pour la sécurité, la confidentialité et l'externalisation de leurs données, (Qing et al., 2018, Nguyen et Khorev, 2019).

Certaines entreprises ont pris des décisions basées sur ces promesses et connaissent aujourd'hui des ratés sur le plan de la sécurité. Du point de vue de la sécurité, l'adoption généralisée des services infonuagiques est entravée par les problèmes de sécurité liés à son utilisation (De Donno et al., 2019). Les besoins en sécurité infonuagique représentent un grand défi pour les fournisseurs (Salman et Rahman, 2019) et leurs clients. Selon Alhenaki et al., (2019), divers constats témoignent des problèmes de sécurité du côté des machines virtuelles, des applications, du partage des données, des logiciels et de la communication. L'intégrité des données et les méthodes de cryptage

peuvent entraîner des problèmes de sécurité dans les centres de données. Certains problèmes peuvent aussi provenir du client quand la stratégie d'authentification est faible, (Murali et Prasad, 2017).

Certaines études portant sur cette problématique indiquent que l'infonuagique pourrait être mieux sécurisée. Ainsi on pourrait mieux garantir la sécurité et l'intégrité des données, la confidentialité, la traçabilité, en utilisant le cryptage homomorphe, système avant-gardiste qualifié par de nombreux auteurs comme une technologie adéquate pour les entreprises prêtes à adopter l'infonuagique (Derfouf et Eleuldj, 2018). Il existe d'autres défis tels que l'utilisation malveillante du service infonuagique les interfaces de programmation d'application (API) non sécurisées, les problèmes dus au partage de la technologie, la perte, la fuite de données, le détournement de compte ou de service, etc. (Cloud Security Alliance, 2018). Héberger les données dans un autre pays engendra beaucoup de risques par exemple les conflits internationaux, l'accès aux données par USA Patriot Act, le gouvernement américain peut ouvrir des injonctions, avoir des accès aux données à n'importe quel moment (USA Patriot Act, 2001).

Le tableau 3 présente une liste des principales menaces et de grands défis dans l'infonuagique.

Menaces	Défis
Perte de données et fuite d'information	<ul style="list-style-type: none"> - Problèmes de confiance avec le fournisseur. - Procédures, normes et méthodes de conservation des données non testées. - Manque de connaissances.
Interfaces et API (Interface de programmation d'applications) non sécurisées	<ul style="list-style-type: none"> - Incapacité de revoir les événements associés à l'utilisation de l'API. - La complexité des API.
Malveillants	<ul style="list-style-type: none"> - Les fournisseurs cachent leurs stratégies d'entreprise aux employés. - Retard des solutions développées après l'incident. - Incapacité des fournisseurs de l'infonuagique à surveiller les employés.
Vulnérabilités de la technologie partagée	<ul style="list-style-type: none"> - Le développement de composants partagés n'est pas garanti. - L'utilisation des machines virtuelles - Correspondance entre le processus de fabrication et le processus d'affectation de composants partagés.
Abus des services infonuagiques	<ul style="list-style-type: none"> - Capacité limitée de surveillance des fournisseurs infonuagiques en raison des lois sur la confidentialité. - Les intérêts variés des parties prenantes.

Tableau 3: Défis et menaces de l'infonuagique ; Source : (Choon et al., 2018, Bhattacharya et al., 2018, Alhenaki et al., 2019, p. 4,) / (adapté de la source).

À partir de ce qui précède, la mauvaise configuration des plateformes peut fragiliser la sécurité infonuagique, y causer des failles et entraîner des fuites de données. Au cours de la phase d'analyse et de conception, d'autres questions de sécurité se posent aussi, telles que les accès non autorisés aux ressources infonuagiques, le contrôle du processus de développement logiciel, la conception architecturale du logiciel, etc. Ces aspects ont un impact négatif sur l'adoption de cette technologie (Aljawarneh et al., 2016).

L'exigence de sécurité des données constitue parfois un obstacle à l'adoption de la technologie infonuagique, mais les entreprises pourraient se fier aux diverses approches sécuritaires déjà mises en place, comme le cryptage, la réplication et la vérification des données. L'application de ces approches permet de minimiser les risques (Subramanian et al., 2018, Plaisent et al., 2015). Pour certains auteurs tels que Baboval et al., (2019), les services infonuagiques seraient sécurisés. La gestion de la sécurité comme service offre une autre option de protection des données.

2. CADRE DE LA SÉCURITÉ DE L'INFONUAGIQUE

Comme le SaaS (logiciels en tant que service), la PaaS (plateforme en tant que service), la IaaS (infrastructure en tant que service) et le PBaaS (processus d'affaires en tant que service) qui est un quatrième modèle de service qu'on ne va pas trop décrire dans cet article. Nous allons maintenant porter notre attention sur les risques de sécurité inhérents à l'infonuagique. Le tableau 4 suivant présente une synthèse des facteurs de risque liés à la sécurité infonuagique recensés dans des études. On retrouve les facteurs de risques suivants : la confidentialité, l'intégrité, la disponibilité, la vulnérabilité, l'authentification. Dans le tableau suivant, nous avons présenté les études, les auteurs et les autres facteurs de risques qui mentionnent ces facteurs.

Les auteurs cités dans le tableau 4 ont classifié les risques de sécurité liés aux services infonuagiques sans identifier de solution qui permettrait de limiter la réalisation de tels risques et de répondre aux préoccupations des entreprises. La prochaine section vise à va décrire les incidents les risques, leur probabilité et leur impact.

Type d'études	Auteurs	Autres facteurs
Ingénierie de la sécurité infonuagique	(Aljawarneh <i>et al.</i> , 2017)	
Sondage de 300 gestionnaires TI	(Alkhatir <i>et al.</i> , 2018)	Risque environnemental, facteurs technologiques, fuite de données, sécurité et vie privée.
Étude sur la politique de sécurité des données infonuagiques	(Zhe <i>et al.</i> , 2018)	Interopérabilité, risques financiers, gestion, tarification, transfert des données, sauvegarde des données, risques juridiques et réglementaires, politiques et organisationnels
Évaluation de la sécurité infonuagique	(Halabi et Bellaiche, 2017)	
Enquête sur les problèmes de sécurité liés à l'infonuagique	(Khan, 2016)	Attaques du réseau informatique, stockage de données, machine virtuelle, duplication des données, virus informatiques, logiciels malveillants
Enquête sur les problèmes de sécurité : 3 groupes de personnes ciblées : spécialistes en sécurité, développeurs des applications et spécialistes en réseau	(Kumar et Goyal, 2019)	Perte de données, déni de service, partage des données, fuite de données
Sondage sur la sécurité infonuagique	(Michel De Donno <i>et al.</i> , 2019)	Problème concernant les applications
Méta-analyse de 97 articles	(Choon <i>et al.</i> , 2018)	Intrusion des données, duplication des données, cyberattaques, suppression des données
Analyse des facteurs influençant l'adoption infonuagique	Raut <i>et al.</i> , (2018)	Risques technologiques risques analytiques, risque environnemental risque au changement, gestion de la complexité infonuagique
675 décideurs informatiques interrogés dans cinq pays (Royaume-Uni, États-Unis, Australie, Hong Kong et Singapour) sur la sécurité infonuagique : problèmes, menaces et solutions	(Singh <i>et al.</i> , 2016)	Humain, serveur de données, réseau, machine virtuelle, application web.
Sondage : Problèmes et défis liés à la sécurité infonuagique	(Singh et Chatterjee, 2017)	Menaces et attaques, Virtualisation, DDoS (Déni de service)
Sondage auprès de quatre personnes	(Teófilo <i>et al.</i> , 2017)	Gestion de risque, risques analytiques

Tableau 4 : Facteurs de risque technique de sécurité liés à l'adoption de l'infonuagique

2.5 Les probabilités et les impacts des risques infonuagiques

Selon un article de l'agence de la sécurité des réseaux et de l'information (ENISA) qui est consacrée à la prévention, à la résolution des problèmes de sécurité des réseaux et de la sécurité de l'information. Dans ce article, nous avons ciblé quatre catégories de risques auxquels est exposée l'infonuagique, Cattenddu et Hogben (2009), Dekker et Liveri (2015) :

- a) Risques politiques et organisationnel : Un risque politique pourrait considérer comme une perte d'activité, non accès au lieu de stockage ou l'arrêt de service à la suite d'une instabilité géopolitique par exemple un conflit international, la guerre, etc. Ces risques pourraient avoir des conséquences sur l'évolution de l'entreprise, Darsa (2012).
- b) Risques techniques: Un risque technique pourrait être un arrêt de service à la suite d'une maintenance applicative ou le déploiement des mises à jour système. L'incapacité de résoudre les incidents mineurs et majeurs dans les délais prévus. Cela pourrait avoir des conséquences sur l'image et la finance de l'entreprise (Darsa, 2012).
- c) Risques juridiques : On peut parler de risque juridique c'est quand les deux parties (fournisseur de service infonuagique et le client) ne respectent pas les clauses du contrat (SLA) signé (Darsa, 2012, Trienekens et al., 2004, Morin et al., 2014).
- d) Risques non spécifiques à l'infonuagique : Ce sont des risques qui ne sont pas spécifiques à l'infonuagique qui doivent être pris en charge lors de l'évaluation des risques.

Ce modèle possède les qualités techniques et les caractéristiques de fonctionnement pour un nouveau produit. La figure 6 affiche le prototype du diagramme conceptuel dans ce diagramme, on trouve les étapes suivantes : Les incitatifs différés la perception de la sécurité, l'efficacité du SLA et le rôle du fournisseur.

Dans ce diagramme ci-dessus, les aspects du questionnaire en proviennent.

- 1- Les incitatifs ;
- 2- La perception de la sécurité infonuagique et les risques ;
- 3- Le SLA et le rôle du fournisseur;
- 4- L'âge du décideur peut jouer un rôle important dans la gestion du nouveau système.

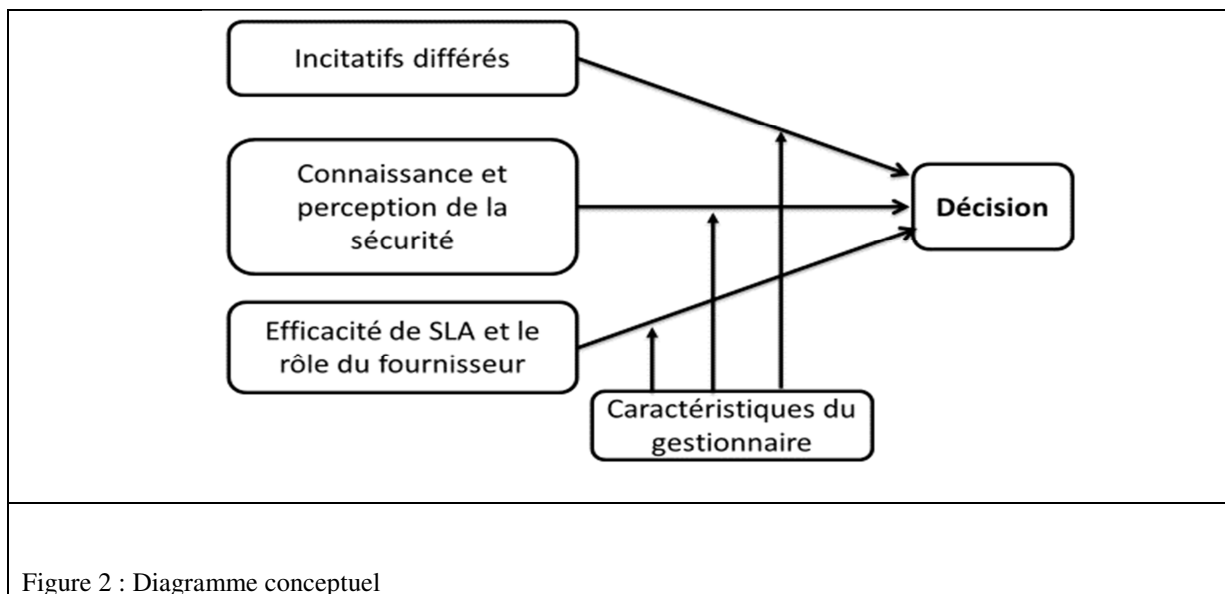


Figure 2 : Diagramme conceptuel

3. CADRE MÉTHODOLOGIQUE

3.1 Population ciblée et échantillon

En ce qui a trait à notre travail de recherche, nous avons ciblé un ensemble homogène d'individus pour atteindre les objectifs. La population choisie pour répondre au questionnaire est constituée de décideurs organisationnels, de

gestionnaires et d'étudiants en MBA (Maîtrise en administration des affaires) à l'UQAM. Nous avons utilisé Survey Monkey pour le sondage et pour analyser les réponses obtenues sur une base qualitative et faire ressortir les points forts quant aux problèmes de sécurité et aux risques, etc. La population ciblée se trouve dans l'annexe 2, tableau 13. Dans notre étude, nous avons utilisé l'échantillon de convenance. Il nous permet d'obtenir des réponses concrètes au questionnaire parce que les personnes interrogées sont des décideurs, des gestionnaires, des étudiants(es). Les résultats de l'étude seront d'autant plus fiables et plus objectifs.

3.2 Collecte des données

Pour réaliser ce travail, il importe de délimiter les méthodes utilisées ainsi que les techniques de collecte de données. Pour la collecte des données, nous allons utiliser une approche de boule de neige. Cette approche consiste à diffuser le questionnaire à des personnes qui ont les mêmes caractéristiques. Une personne qui reçoit le questionnaire pourra demander à d'autres personnes ayant le même profil de le remplir. Une présentation de notre recherche en classe sensibilisera les gestionnaires appelés à prendre des décisions dans les entreprises à répondre au questionnaire.

3.3 Conception du questionnaire

Pour construire le questionnaire d'enquête, nous avons recensé la documentation, et effectué des observations dans mon milieu de travail, car dans cette entreprise on utilise l'infonuagique, ainsi que des entretiens avec le conseiller en sécurité infonuagique. L'objectif de ce questionnaire était d'identifier les facteurs de sécurité susceptibles d'influencer les décideurs à recourir à l'infonuagique. Pour ce questionnaire, nous avons formulé trois thèmes portant sur les aspects de l'infonuagique : la sécurité infonuagique, le type de contrat de service (SLA) et les risques liés à l'infonuagique.

4. ANALYSE DES DONNÉES

Cette section présente l'analyse préliminaire des données recueillies. Les 30 personnes sollicitées, 27 ont répondu, très rapidement par ailleurs, soit 90%. Les répondants ont tous exprimé leur consentement éclairé explicitement 19% des répondants ultimement ceux qui prennent les décisions quant à l'infonuagique.

Ils occupent les fonctions suivantes : 4 sont gestionnaires des TI, les autres sont gestionnaires, propriétaires ou autre.

A la question 4 : Qu'est-ce qui vous a incité ou vous inciterait à recourir à l'infonuagique?

Nous avons trouvé les résultats suivants dans le tableau 5.

Incitation à recourir à l'infonuagique	n/27	Pct %
Rendre votre informatique plus évolutive et réactive	15	56
Faciliter l'accès à distance aux applications	16	59
Simplifier l'administration	11	41
Rendre plus simple l'accès aux applications depuis les terminaux mobiles.	11	41
Réduire les coûts	10	37
Autre	2	7

Tableau 5: Incitatifs à l'infonuagique

Ces résultats confirment partiellement les études recensées. L'accès à distance semble le plus important motif pour recourir à l'infonuagique.

Question 5 : importance de la sécurité

87% des répondants estiment que la question de la sécurité est très importante dans la décision d'adopter l'infonuagique. La moyenne sur 5 est de 4.78 avec un écart type de .6; la médiane est d'ailleurs à 5 ainsi que le mode. Le tableau 14 montre le résultat sur l'importance de la sécurité.

importance de la sécurité dans la décision d'adopter l'infonuagique

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Moyennement important	2	7.4	8.7	8.7
	Assez important	1	3.7	4.3	13.0
	Très important	20	74.1	87.0	100.0
	Total	23	85.2	100.0	
Missing	System	4	14.8		
Total		27	100.0		

Tableau 6: Importance de la sécurité dans la décision d'adopter l'infonuagique

Question 6 : la responsabilité de l'usage sécuritaire partagé? Interrogés sur la responsabilité de l'usage sécuritaire de l'infonuagique, les répondants affirment clairement que oui (avec n=22, 92%). Ces résultats attestent les études recensées. Pour un bon usage sécuritaire de l'infonuagique, les parties prenantes ainsi que le fournisseur de service infonuagique (FSI) doivent partager la responsabilité. Dans le tableau ci-dessous, on présente le résultat sur la responsabilité d'usage sécuritaire de l'infonuagique.

usage sécuritaire infonuagiques serait une responsabilité partagée client/fournisseur

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oui	22	81.5	91.7	91.7
	Non	2	7.4	8.3	100.0
	Total	24	88.9	100.0	
Missing	System	3	11.1		
Total		27	100.0		

Tableau 7 : Responsabilité d'usage sécuritaire de l'infonuagique

Question 7 : la sécurité infonuagique :

Confrontés à une série de risques informatiques, les répondants devaient en décrire l'importance de chacun comme frein à l'implantation de l'infonuagique. Le lecteur trouvera ci-dessous leurs perceptions, basée sur une appréciation de 1 à 5 dans laquelle 1 = pas du tout important et 5 très important :

question/statistique	moyenne	dev. st.	médiane	mode	valides
Intégrité, confidentialité, disponibilité, authentification;	4.78	.518	5.00	5	23
Risques financiers;	4.35	.885	5.00	5	23
Risques de gestion, risques juridiques et réglementaires, risques politiques et organisationnels ;	4.26	.915	5.00	5	23
Déni de service, perte de données, fuite de données, intrusion de données, cyberattaques, suppression des données ;	4.57	.992	5.00	5	23
Attaques du réseau informatique, virus informatiques, programmes malveillants ;	4.39	1.033	5.00	5	23

Tableau 8: La sécurité infonuagique

Le lecteur constate que tous ces facteurs constituent des freins importants à l'adoption de l'infonuagique. Les considérations de confidentialité et d'accessibilité comptant parmi les plus importantes.

Question 8 : les freins à la décision d'adopter l'infonuagique

Les répondants ont plus ou moins validé les freins recensés dans la littérature académique comme suit :

Freins à la décision	n	%
Incertitude concernant la capacité des fournisseurs à garantir la sécurité de vos données	16	59
Volonté de l'entreprise de conserver l'entière maîtrise de son informatique	9	33
Doutes sur la qualité des services des fournisseurs (disponibilité, performance, etc.)	11	41
Craintes concernant les économies que peut générer l'infonuagique	4	15
De peur qu'il soit difficile de changer de fournisseur (problèmes de réversibilité).	5	19

Tableau 9 : Freins à l'adoption infonuagique

À part l'incertitude liée aux fournisseurs et leur capacité à garantir la sécurité des données, les autres freins recensés dans les articles scientifiques ne semblent pas trop importants.

Question 9 : les facteurs de sécurité qui ont influencé ou pourraient influencer votre décision d'adopter l'infonuagique.

Les facteurs sont : renforcer la sécurité des données confidentielles, renforcer la sécurité de la gestion des accès, utiliser le chiffrement pour crypter les données, faciliter les accès sécuritaires à distance aux applications, adapter le SLA en fonction des besoins de l'entreprise.

Question 10 : Quels sont les services auxquels les répondants sont déjà abonnés

À quel (s) service(s) votre entreprise recourt-elle actuellement ou compte-elle recourir ?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Autre (veuillez préciser)	4	14.8	19.0	19.0
SaaS (Louer les logiciels.)	1	3.7	4.8	23.8
IaaS (Louer les infrastructures.)	2	7.4	9.5	33.3
PaaS? (Plateforme comme un service.)	5	18.5	23.8	57.1
Les trois services (SaaS, IaaS, PaaS)	4	14.8	19.0	76.2
Les deux services (SaaS, IaaS)	5	18.5	23.8	100.0
Total	21	77.8	100.0	
Missing System	6	22.2		
Total	27	100.0		

Tableau 10 : Services infonuagiques

On remarque que les entreprises sont relativement avancées puisque 19% utilisent déjà 3 services, 24 % au moins deux services, 24% utilisent les plateformes, 19% utilisent d'autres services) et 9.5% louent les infrastructures.

Question 11 : Les besoins

Les répondants ont mentionné quels étaient les besoins à la source de leur décision d'implantation, le lecteur trouvera ceux-ci dans le tableau 19, ci-dessous :

Besoin exprimé	n	%
Stockage / partage de documents	17	63
Logiciel comme un service (Software as a Service)	12	44
Hébergement d'applications	9	33
Développement d'applications (Platform as a Service)	5	19
Reprise d'activité	1	4

Tableau 11 : Besoin incitant à recourir à l'infonuagique

À la lecture de ce tableau, le lecteur constatera que les besoins cités dans la littérature ne semblent pas ceux reconnus par nos répondants, sauf stockage.

Question 12 : Importance de la vulnérabilité

Les répondants ont évalué sur une échelle de 1 à 5 dans laquelle 1=pas du tout important et 5= très important. Les résultats sont présentés ci-dessous dans le tableau 20.

question/statistique	moyenne	dev. st.	médiane	mode
Absence de redondance	4.14	.854	4.00	5
Manque de transparence	3.71	1.271	4.00	4 ^a
Manque de solutions standards	3.86	.854	4.00	4
Mauvaise sélection des fournisseurs	4.14	.964	4.00	4
Modélisation inexacte de l'utilisation des ressources	4.00	.894	4.00	4
Insuffisance de ressources et d'investissements dans les infrastructures	4.10	.889	4.00	4 ^a
Absence de stratégie pour le plafonnement des ressources	4.19	.680	4.00	4
Manque d'isolation des ressources	3.62	1.024	4.00	4
Stockage de données dans plusieurs juridictions	4.00	1.304	4.00	5
Mauvaises configurations	4.24	.700	4.00	4
Absence de plan de continuité et de reprise après un sinistre	4.05	.973	4.00	4 ^a

Tableau 12 : Importance de la vulnérabilité

Le lecteur remarquera que l'importance accordée à divers aspects de la vulnérabilité éventuelle de leur entreprise de 3.62 pour le manque d'isolation des ressources à 4.24 pour de mauvaises configurations. L'importance n'est pas extrême et tourne autour de la médiane 4, soit « assez importante » et non pas « très importante ».

Question 13 : Importance du SLA pour tenir compte des risques

Une des questions importantes visait à établir l'importance du SLA pour les répondants. Le tableau 21 ci-dessous présente leurs réponses :

Pensez-vous qu'un contrat de service de base est suffisant pour tenir compte des risques de sécurité à l'infonuagique ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Autre (veuillez préciser)	2	7.4	9.5	9.5
	Oui	3	11.1	14.3	23.8
	Non	16	59.3	76.2	100.0
	Total	21	77.8	100.0	
Missing	System	6	22.2		
Total		27	100.0		

Tableau 13: Importance du SLA

Le lecteur constatera que 76% des répondants jugent insuffisantes les protections prévues dans le SLA et conséquemment, il importe de mettre en place d'autres mécanismes. 14.3% des répondants croient qu'un contrat de service de base est suffisant pour tenir compte des risques de sécurité liés à l'infonuagique et autres répondants 9.5%.

Question 14 : Évaluation du risque

Sur une échelle de 0 à 8, les répondants étaient invités à établir le risque global d'une implantation de l'infonuagique qui tienne compte du risque d'incidents et de l'impact de celui-ci. 95% des répondants établissent celui-ci à au moins 5 sur 8 tel qu'il apparait dans le tableau 22, ci-dessous :

évaluation du risque global d'une implantation infonuagique

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	1	3.7	5.6	5.6
	5	5	18.5	27.8	33.3
	6	4	14.8	22.2	55.6
	7	7	25.9	38.9	94.4
	8	1	3.7	5.6	100.0
	Total	18	66.7	100.0	
Missing	System	9	33.3		
Total		27	100.0		

Tableau 14 : Évaluation des risques

Les statistiques font état d'une moyenne de 6.11 sur 8, avec un écart type de 1.079. La médiane est de 6.0 et le mode est 7 (39% des répondants). Notons cependant qu'un tiers des personnes n'ont pas répondu à cette question.

4.3 Sommaire des résultats obtenus

56% des répondants ont recouru à l'infonuagique pour rendre son système informatique plus évolutive et réactive et 59% pour faciliter l'accès à distance des applications. La sécurité des données demeure un point sensible. 87% des répondants estiment que la question de la sécurité est très importante dans la décision d'adopter l'infonuagique. La moyenne sur 5 est de 4.78 avec un écart type de .6; la médiane est d'ailleurs à 5 ainsi que le mode. 76% des répondants jugent insuffisantes les protections prévues dans le SLA et conséquemment, il importe de mettre en place d'autres mécanismes. mettre des structures adaptées en fonction des besoins de l'entreprise.

Les facteurs de sécurité qui ont influencé les décideurs d'entreprises d'adopter l'infonuagique sont : renforcer la

sécurité des données confidentielles, renforcer la sécurité de la gestion des accès, utiliser le chiffrement pour crypter les données, faciliter les accès sécuritaires à distance aux applications, adapter le SLA en fonction des besoins de l'entreprise.

5. CONCLUSION

5.1 Contribution

L'infonuagique offre des avantages économiques et concurrentiels (voir 1.2 de ce article), mais elle affronte certains risques de sécurité parmi lesquels on pourrait citer la difficulté de garantir la confidentialité, l'intégrité et la disponibilité des données hébergées par le fournisseur. Ce article portait sur l'identification des questions de sécurité susceptibles d'influencer les entreprises à implanter ou à adopter les services infonuagiques contribuent à orienter les entreprises à prendre de bonnes décisions à cet égard. Quant aux facteurs de sécurité qui sont susceptibles d'influencer la décision d'implanter l'infonuagique selon l'analyse du questionnaire, il s'agit : de renforcer la sécurité des données confidentielles, renforcer la sécurité de la gestion des accès, utiliser la clé de chiffrement pour crypter les données, faciliter les accès sécuritaires à distance aux applications, la disponibilité des données, l'intégrité des données et l'adaptation du SLA en fonction des besoins de l'entreprise. Ce article identifie les principaux problèmes de sécurité liés à l'infonuagique. Il permet d'être proactif afin de mettre en place des règles de gouvernance adéquates pour faciliter l'adoption infonuagique avec confiance, (Teofilo et al., 2017).

Selon cette étude réalisée, nous avons constaté que les entreprises ont recouru à l'infonuagique pour des raisons économiques, accès aux applications à distance, hébergement des applications, stockage et partage des documents. L'infonuagique est un sujet d'actualité et nous sommes très satisfaits d'avoir travaillé sur un tel sujet. Nous sommes persuadés que cette étude nous a apporté une réelle valeur ajoutée lors de nos futures recherches (emploi et autres). Ce sujet nous a permis d'avoir des expériences en termes de sécurités infonuagiques.

5.2 Limites de l'étude

Cet article présente certaines limites qu'il convient de préciser afin que les parties prenantes aient les informations nécessaires pour jeter un regard critique sur le contenu du article. Ce article est basé sur l'identification des facteurs de sécurité infonuagique en tenant compte de quelques entreprises du Québec. Et nous n'avons pas fait d'entrevues auprès de fournisseurs infonuagiques sur la perception de la sécurité, ou sur les ententes sur la garantie de service (SLA). Nous n'avons pas non plus fait une analyse comparative plus avancée sur la sécurité auprès de quelques fournisseurs infonuagiques. Nous nous sommes limités à deux entrevues.

Le sondage a été réalisé auprès d'un échantillon de convenance et d'un nombre réduit de répondants. Ils ne sont pas nécessairement très qualifiés pour répondre à toutes les questions.

5.3 Piste de recherche et mot final

Pour des recherches futures,

- Améliorer le questionnaire;
- Avoir un échantillon plus gros et plus représentatif;

On pourra étudier le cas des fournisseurs quant à la sécurité infonuagique sur d'autres marchés et d'autres pays. Cette perspective pourrait être intéressante, parce que les entreprises s'internationalisent et qu'elles ont besoin des technologies qui sont capables d'appuyer leurs activités dans différents pays du monde. La technologie infonuagique offrant cette possibilité, il serait nécessaire de faire une étude comparative à ce sujet. L'infonuagique est très prometteuse et offre aux entreprises des opportunités de transformation comme le révèlent les chiffres de ce article. Mais de nombreux défis et des risques importants auxquels l'infonuagique fait face devraient être renforcés.

Cette étude nous a permis de répondre aux questions de recherche. Elle prouve que les entreprises voudraient avoir plus en termes de sécurité des données, une meilleure garantie sur l'accord de niveau de service (SLA). Les répondants de ce questionnaire déclarent que le SLA de base n'est pas suffisant. Ils ont tous d'accord pour le renforcement de ce service. On a constaté que 76% des répondants jugent insuffisantes les protections prévues dans le SLA et conséquemment, il importe de mettre en place d'autres mécanismes.

Une meilleure responsabilité de la sécurité des données de la part du fournisseur de service infonuagique et celui du client.

Cet article vise à orienter les entreprises lors de prise des décisions stratégiques, avant d'adopter l'infonuagique. Il met en évidence les différents facteurs de risques qui s'y lient. Cette recherche s'applique à identifier les risques de sécurité susceptibles d'influencer les décideurs avant d'adopter l'infonuagique. Nous avons étudié plus à fond la documentation et mené une enquête auprès de décideurs d'entreprise afin de bien cerner les problèmes réels de la sécurité infonuagique. Les réponses au questionnaire par ces décideurs nous ont permis d'atteindre notre objectif. Dans ce article, nous avons décrit les principaux défis, les facteurs de risque de sécurité et les nombreuses opportunités que l'infonuagique offre aux entreprises.

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A SUCCESSFUL HEALTH MANAGEMENT MODEL: A CASE STUDY

Prosper M. Bernard, PhD

ABSTRACT

This article explains a great model to lose weight by using the following:

- Plant based diet.
- 16 to 18 hours of fasting per day.
- Avoiding certain products.
- Behavior changes.

It is the application of scientific studies. I show the results. **This is not a research report with a sample of one. It is a case study.**

1. BASES FOR THE MODEL

The model is described in more details in: Bernard, Prosper, Plaisent, Michel (2019). *Health Management Models. A Case Study for Success*. University Consortium Press, USA. ISBN [978-0-9904225-9-4](https://www.amazon.com/Health-Management-Models-Prosper-Bernard/dp/9780990422594)

The purpose of this article is to show how one can lose 2 pounds per week with a proper diet and behavior change. In particular, in the case study, the author was able to lose close to 100 pounds in 18 months.

The author is a professor who uses ‘case studies’ to train graduate Business students like it is done in Medicine, Chiropractic, Dentistry, Clinical Psychology, and many other disciplines.

A case study describes the situation and brings participants to learn the environment, recommend decisions or actions, and see how it would apply to other cases.

One tries to identify relevant variables or decisions that can be replicated in a different environment. In many disciplines, we use case studies to study complex situations and identify the relevant factors. One tries to identify variables or factors that can be applied to other situations, knowing that situations may be different. Some schools use mostly case studies as a teaching tool.

One must learn by doing—not only by listening to experts. However, one needs the medical base to do it. The scientific and medical foundations are explained later.

The key is behavior change.

2. WHY DO PEOPLE HAVE WEIGHT PROBLEMS? IT IS THE FOOD

People say it is genetic, it is metabolism, etc. The answer is quite simple: **“It is the food.”** Maybe some people eat anything and have no problems. However, they may have other issues.

The same is true for anything. Some people have received a lot of money from their family for studies. Not everything is equal in life.

Since I have a problem other people do not have, I must solve it, like in any other domain.

However, western society and maybe the world at large has a problem. The percentage of obese people has been rising since 1980.

Why? **“It is the food”.**

Dr. McDougall¹ and Dr. Mercola² both explain the reason for OBESITY: FOOD.

I always was in good health even if I had for many years some excess weight. I do not like the word OVERWEIGHT nor OBESE. But, in January 2018, my weight was 268 pounds, 90 to 100 pounds over the perfect weight or in excess. I had to change.

I was fortunate to be raised on a farm. I am the youngest of a large family of 13. We had plenty of fresh food from the farm. At that time, I did not know what ORGANIC nor what BIOLOGIC food was, but all was organic and biologic.

Maybe the error in the study is to use only *death* as a measure of failure or success to measure “HEALTH”. Conversely, Dr. Longo is another measure not *death* but *quality of life*.³ People who have a plant-based diet die very old **and without suffering**. According to Dr. Mercola, only between 50 and 80 people live to be 110 years old⁴.

Dr. Maurice Larocque says it is incorrect to blame genes.⁵

Medication to lose weight

I have tried many things over the years with successes and failures. My last tentative was a system of daily injections under medical monitoring. My doctor had told me sometimes it works,

¹ www.mercola.com Mercola, Joseph. (2017). *Fat for Fuel*. Hay House. ISBN: 978-1-4019-5377-5. PAGE 142

² www.drmcDougall.com McDougall, John, McDougall, Mary (2012). *The Starch Diet*. Rodale. ISBN: 978-1-62336-027-6.

³ Longo, Valter. (2018). *The Longevity Diet*. Avery. ISBN: 978-0-525-53407-5.

⁴ Mercola, Joseph. (2019) Simple Strategies to live longer.

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⁵ Larocque, Maurice. (2019). *L'obésité n'est pas une maladie*. Un monde différent. ISBN :978-2-89225.

sometimes it does not. It did work for a period, but after a while, I started to gain weight while doing the injections. I stopped all.

Why was I overweight?

I became vegetarian 35 years ago not to lose weight but mainly because

- I do not want to kill animals.
- I did not really like meat.
- Eating meat is not very efficient.
 - The animal eats plants and vegetables and you eat animals. It is not very efficient from a production point of view.
- Raising cattle is not good for the environment.
 - Important source of greenhouse gases.

Environment.

According to the United Nations 2006 report, “... *rearing cattle produces more greenhouse gases than driving cars, UN report warns.*”⁶ In fact, rearing cattle is responsible for 16% of greenhouse gases while transportation is responsible for 13.5%.⁷

As Dr. McDougall writes: “*An Inconvenient Truth: We Are Eating Our Planet to Death. Choosing a Plant-food Based Diet Is a Moral Issue.*”⁸

The trigger

However, the major *trigger* was the following. One day, I needed to buy a suit. I could not find a proper-fitting suit in a regular store. I had to go with my wife, Francine, to a store for *big people*. I purchased a jacket and started my model the next day. Three months later, I gave my jacket to charity as it was then much too big.

Simple model⁹

Objective:

- Plan: lose 1/4 of a pound per day or almost 2 pounds per week.¹⁰ (.11 kilos per day)

⁶ <https://news.un.org/en/story/2006/11/201222>

⁷ <https://www.drmcDougall.com/misc/2006nl/dec/truth.htm>

⁸ Idem.

⁹ The scientific support is given in **Bernard, Prosper**, Plaisent, Michel (2019). *Health Management Models. A Case Study for Success*. University Consortium Press, USA. ISBN [978-0-9904225-9-4](https://doi.org/10.1007/978-0-9904225-9-4).

¹⁰ See: Dr. McDougall and Dr. Mercola

There are three components¹¹

1. Measure on the scale every day

- I weigh myself morning and evening.
- I found that if I avoid going on the scale it does not work. I travel a lot and bring a portable scale.
 - This goes against the advice of some experts. However, we teach in business that if you want to repeat a process you must measure it to see if it is on track and also to be able to repeat it. Also, it is a major motivator.

2. Fasting 16 to 18 hours per day.

I skip supper so I can have 16 to 18 hours of fasting per day. Unless I am traveling.

3. PLANT BASED ALIMENTATION

I have been vegetarian for more than 35 years. However, I liked cheese and other dairy products very much. I have stopped all dairy products (except a bit of milk in coffee when I travel), as well as eggs.

4. MY NEW MENU AND SCHEDULE

Early morning:

- Coffee at 05:15

Breakfast: 06:30 or 07:30

- Oatmeal and fruit.
- Some vitamin supplements.

Lunch: 12:00 or 12:30

- Baked potato and/or rice or pasta (better potatoes)
- Vegetable soup
- Vegetables or legumes such as beans
- Sometimes an apple or other fruit

Dinner: None

- Nothing, just thinking about breakfast next morning.

¹¹ I am not doing recommendations nor giving prescription. I am only explaining what I do.

One must anticipate the next day and the next meal as well as stepping on the scale.

I follow these principles.

Plant based food.

No animal products.

No eggs. No dairy. Just a bit of milk in coffee when traveling.

Soy (or almond/coconut) milk instead of milk.

*No oil. **None***

No added sugar.

Do not drink calories. It seems to me that not all calories are equal.

Look at calories per volume not total calories.

Do not buy any food if sugar is in the first 3 ingredients.

No processed food as much as possible.

Vegetables or legumes such as beans.

Potatoes and soup for lunch as much as possible.¹²

Vitamins and mineral supplements.

One or two prunes per day.

Every morning, I go on the scale to measure my weight and enter it in an Excel sheet to compare with my objective.¹³ Recording on Excel is an important motivator. **It is fundamental.** I also weight myself in evening. Usually, there is a difference of 2 to 3 pounds between evening and the next morning.

Set a goal

- My plan: Each week, I aim to lose 2 pounds (or 1/4lb per day).

Sleeping is important

In my situation I know that I must sleep 7 or 8 hours per day. I travel to China every other month. It is a 15-hour flight from Dallas or Chicago. Even if I leave in the morning, I take a sleeping aid as I board the plane to get the 7 or 8 hours of sleep as needed. When I arrive in China, I go to bed at my regular hour and sleep. I manage to have little or no jet lag.

In general, I go to bed before 9 pm and get up before 5 am. I found this is the best scheduling when I do not have dinner. Also, I work in my home office from 05:15 to 07:00. Then I have breakfast.

¹² Dr. McDougall and the case study by Andre Taylor.

¹³ See the Excel sheet in appendices.

One setback and temptation

However, the biggest temptation is not to eat more **but to skip the scale**. For me, it is important to weigh myself morning and evening. You must always measure, in any system, if you are on track or not. It is, for me, fundamental.

Following the plan is difficult

There is the plan and there is the reality. One must always come back to the plan even after some issue.

5. QUANTITY VS QUALITY

For people like me, who have an issue with weight and food, there are two ways to look at food and calories. Try to eat less calories by limiting the amount of food, or, eat the proper food. I follow the second option.

The results

On January 8, 2018, my weight was 268 pounds (121.56 kilos) and my Body Mass Index (BMI) 38.1. In December 2019, I weighed 176 pounds (79 kilos), with a BMI near 25. The detail results are available¹⁴.

6. THE SCIENTIFIC SUPPORT

I followed advice from some experts, in particular from Dr. Joseph Mercola,¹⁵ Dr. John A. McDougall,¹⁶ and others. Both have written extensively promoting natural food. All natural food promoters have one thing in common. *Avoid sugar*. They also share much of the same vision about food and obesity :“IT IS THE FOOD”.

I do that. I eat breakfast at 06:30 or 07:30 o'clock and lunch at 12:00 or 12:30 then nothing except water until next breakfast. It works well for me. Strangely enough, it is not that difficult. The problem is when I am traveling and have meetings at supper time in a restaurant. I have accepted to violate that principle once per week. Of course, fasting helps limit the total amount of calories per day.

I also drink water with some apple cider vinegar in it.

¹⁴ **Bernard, Prosper**, Plaisent, Michel (2019). *Health Management Models. A Case Study for Success*. University Consortium Press, USA. ISBN [978-0-9904225-9-4](https://www.mercola.com/).

¹⁵ <https://www.mercola.com/>

¹⁶ <https://www.drmcDougall.com/>

I have learned a lot from Dr. Mercola. I recommend subscribing to his daily messages. There is always something that one can use. Dr. Mercola has also a useful book, *Fat for Fuel*,¹⁷ with recommendations for eating correctly.

Dr. McDougall^{18 19}

Dr. John A. McDougall has a very interesting approach to promoting a plant-based diet.²⁰ **Lecturing is not enough. People learn by *doing* not by *listening*. He brings people to Santa Rosa, California, for a 10-day or 3-day working seminar** where he feeds participants 3 meals a day and involves them in the process. My wife and I, we went to a session in California.

These are the diet recommendations I learned from the McDougall on-site session.

- *A starch-based diet is needed to live healthy.*
- *Select food low in calorie concentration.*
- *No fats because the fat you eat is the fat you wear.*
- *Eat foods high in complex carbohydrates, because carbohydrates satisfy the hunger drive.*
- *Eat starches, vegetables, and fruits—low fat and high carbohydrate.*
- *No meat, no dairy products and no vegetable oil.*
calorie dense, high fat and low in carbohydrate
- *Get starches, low in calories*
Like beans, peas, and lentils
Potatoes
- *No sugar, no flour.*
- *Eat green and yellow vegetables.*
- *Eat more raw foods.*
- *No fruit juice.*
- *Eat rice cakes with buckwheat or corn. Rice pasta or whole wheat pasta.*
- *Soy products.*
- *No processed food.*
- *No alcohol.*²¹

Dr. Valter Longo²².

¹⁷ Mercola, Joseph. (2017). *Fat for Fuel*. Hay House. ISBN: 978-1-4019-5377-5. PAGE 142

¹⁸ McDougall, John, McDougall, Mary (2012). *The Starch Diet*. Rodale. ISBN: 978-1-62336-027-6.

¹⁹ McDougall, John, McDougall, Mary (2013). *McDougall Program for Maximum Weight Loss*. A Plume book. ISBN: 978-0-452-27380

²⁰ McDougall, John, McDougall, Mary (2016). *The Healthiest Diet On The Planet*. Harper One. ISBN: 978-0-06-242676-5.

²¹ Also found on web site <https://www.drmcDougall.com> and in the above books,

²² Longo, Valter. (2018). *The Longevity Diet*. Avery. ISBN: 978-0-525-53407-5. PAGE 37.

Dr. Longo explains that the main purpose of a proper diet is not to live forever but to live up to a very old age, **“dying healthy”** with no suffering. He studied people who were over 100 years old. They were all healthy and had mainly a plant-based diet. They died without suffering. Readers could learn a lot about aging in good health from Dr. Longo.

7. IS FASTING GOOD?

The reader can get the fundamental benefits of fasting by reading *The Complete Guide to Fasting*.²³ They explain fasting has many health benefits including lowering blood sugar levels and inducing body fat loss. In that book, Dr. Moore also says he had only four hours on nutrition during medical school. If that is true, what prepares a Medical Doctor to talk about nutrition?

A case study on potatoes²⁴.

Andres Taylor wrote a very interesting book on his case study. He ate only potatoes for almost one year and was able to lose 110 pounds. He explains why potatoes are the perfect food to reduce hunger and have all needed nutrients.

8. CONCLUSION

I found this model to be very effective and rather easy to follow. However, one must do it when ready. One must have objectives. **One must monitor twice a day the progress.** Results *will* follow.²⁵

Side effects

. It has allowed me to:

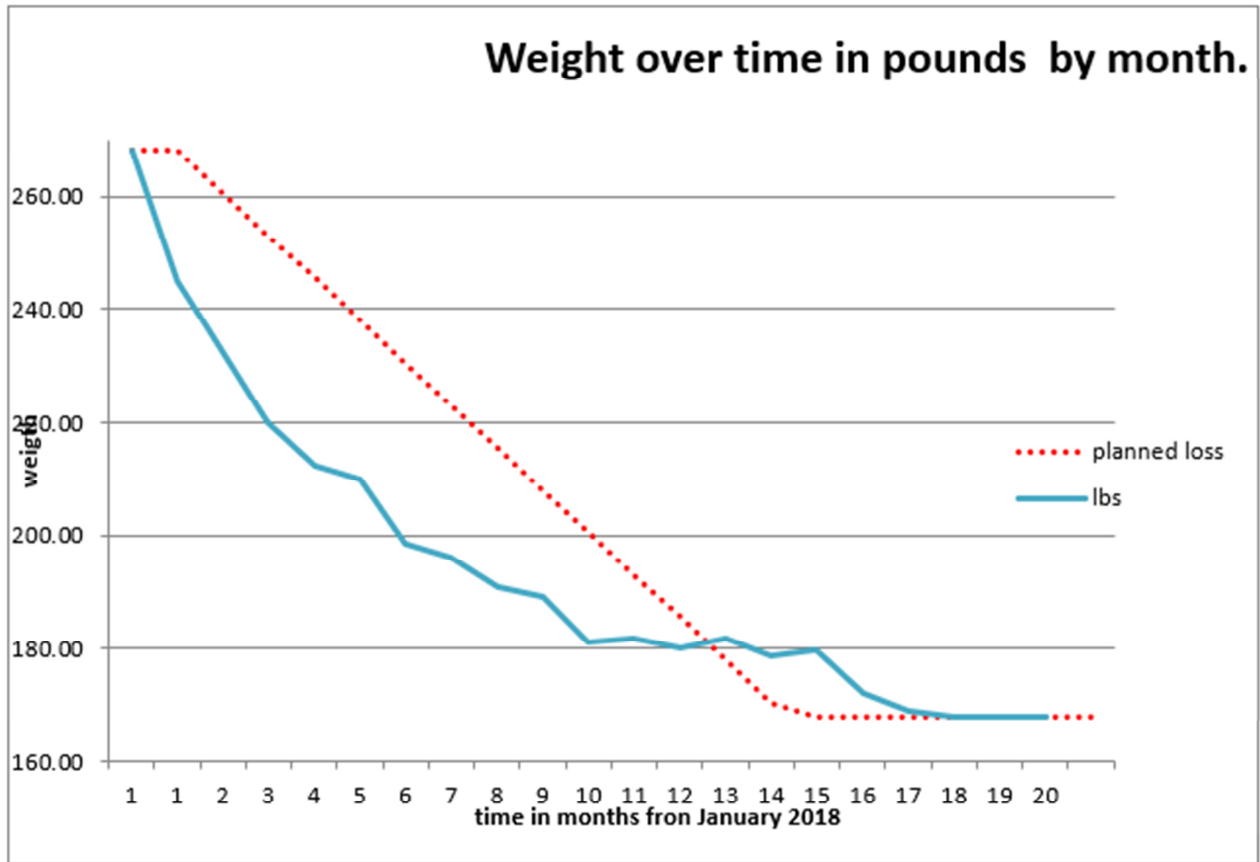
- Give a lot of good clothing to a charity organization that re-sells or gives them to people in need.
- Maintain my health maybe for many more years.
- Show that with clear objectives we can achieve anything.
- Look younger.

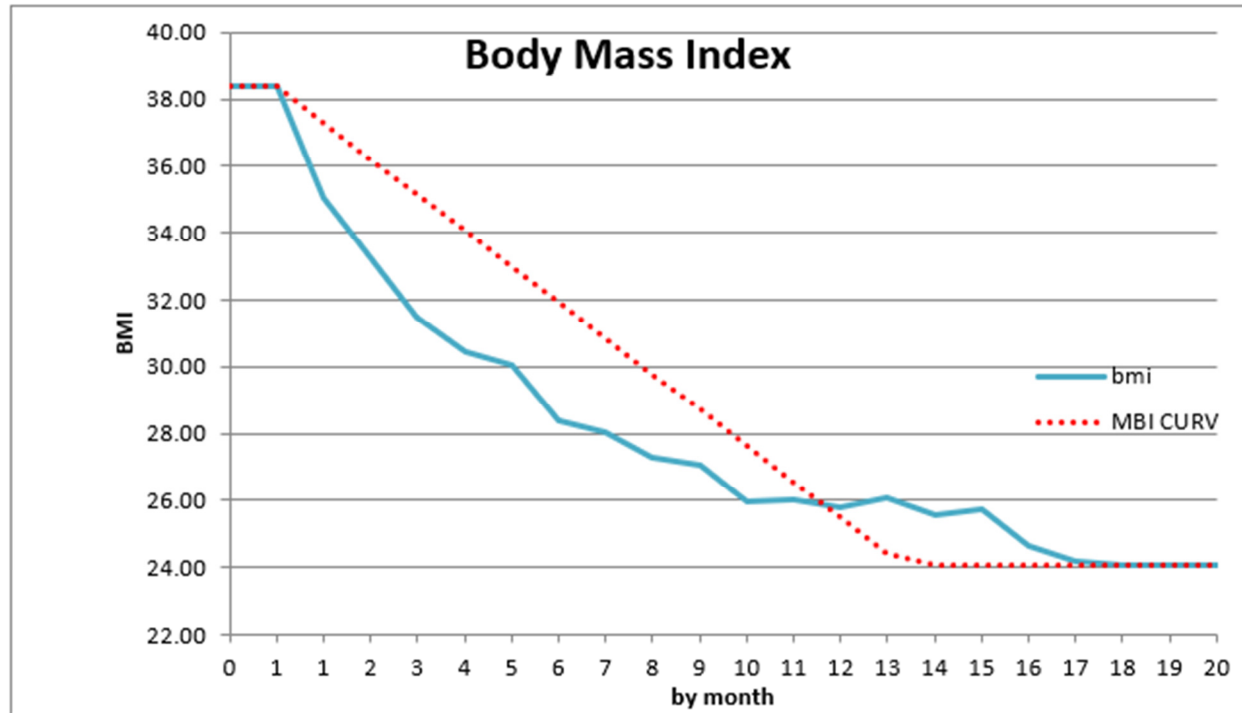
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²⁴ Taylor, Andrew. (2016). *Spud Fit Challenge*. Taylor. ISBN: 978-099-5409637.

²⁵ Again, the reader should be aware that I do not give any medical nor nutrition advice. I just tell you what I do.

9. APPENDIX





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ENTERPRISE REPORTING ANALYSIS ON CLIMATE CHANGE

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ABSTRACT

Climate change is not only ecological occurrence but also directly related with our daily life habits, economy, law, energy systems and industrial process. Environmental footprint plays a great role in climate change problems and its sustainability depends on the size of humanity's footprint relative to Earth's capacity. This is the consequence that a person, company or activity has on the environment. For this reason, in our century the main protection is provided by the conventions and legal agreements that we mention in the first part of our study. A literature review on the environmental politics of the companies in different countries will be given in the second part. In this framework, companies are expected to be transparent about their greenhouse gas emissions during their business activities. In our study, 4 year sustainability reports of 10 companies in Turkey have been chosen for the years between 2015-2018. Content analysis is used for the statistical analysis. The content Analysis method was used to collect data which is an effective method for analyzing and comparing the companies' sustainability reports. It makes it possible to determine the existence of certain words or concepts in one or more texts. After this stage, by using QDA MINER software, keywords related with climate change responsibility were searched from the contents of the reports of the concerned companies. Finally, using variance analysis (ANOVA) realized on SPSS 20.0. Results are also discussed depending the entrance in force of the Paris agreement.

KEYWORDS: Climate Change, Content analysis, ANOVA, Greenhouse Gas Emissions, Paris Agreement

1.INTRODUCTION

Climate change and global warming are the greatest threats confronting the Earth. The atmosphere contains nitrogen (78%), oxygen (21%), argon (0.93%) vapor and carbon dioxide (0.036) that let in sunlight but take in the heat that is radiated back off the Earth. This natural process, called the Greenhouse effect keeps the Earth's temperature at a level that supports life. Some greenhouse gases such as carbon dioxide arise naturally, exhaled to the atmosphere through natural processes activities. Others are generated and exhaled through human activities. Burning of fossil fuels is increasing the levels of carbon dioxide and other heat-trapping gases in the atmosphere. At this point, Climate Change moves very fast and the Planet is in very high risk. Climate Change is a very serious and urgent issue because of the high risk of damage and irreversible impacts on ecosystems, societies, and economies (Jaimes V.R., 2015). Sustainable Development can be the world's strategic action against the climate change and the Environmental destruction (United Nations Report,2012).

"Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being". This principle is declared in The United Nations Conference on the Human Environment at Stockholm on 1972. The Declaration accept that environmental protection is a pre-condition to the enjoyment of internationally-guaranteed human rights (Öncel,Tzanakis 2018). For this reason on international field the main protection is provided by the following Conventions and Agreements as the main ones are U.N. Conference on the Human Environment, held in Stockholm in 1972 and it was the UN's first major conference on international environmental issues, The UN Framework Convention on Climate Change (UNFCCC) in 1992, Kyoto Protocol in 1997, The Aarhus Convention in 1998 and Paris Convention adopted by all UNFCCC Parties in 2015. Also, one of the important international project is on November 1988, with the initiative of G7 countries, The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Program (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation (IPCC, 2018). "In our research, while trying to provide a solution to the climate change problem, we measured the impact of the Paris Agreement on Turkish companies."

2. LITERATURE REVIEW

One of the important research made about measuring enterprises environmental performance is realized by Joanne Wiseman (1982). In this work, an indexing procedure evaluate the contents of the disclosures, the relationship between them and the 26 enterprises' environmental performance. Corporate environmental disclosures are found insufficient. In an another study, Kolk and Pinkse (2005) analyzed the policies of the 500 largest companies according to the 2002 Financial Times Global 500 list, using qualitative data obtained by the Carbon Disclosure Project. They thus defined companies' strategies in terms of climate change in six profiles: Prudent Planners, Emergency Planners, Internal Explorers, Vertical Explorers, Horizontal Explorers and Emissions Traders. The results indicate that the current discretion of management resulting from the perception of risks and / or opportunities regarding climate change drives companies to prefer different approaches from those of companies active in the same sector and industry. Freedman and Jaggi (2010) discussed the impact of the Kyoto Protocol and discovered that GHG disclosures were higher for Canadian and Japanese companies than for European companies and varied slightly among European companies. The study was based on 3 assumptions and survey data from a sample of 282 companies but also annual and environmental reports between the years 2004-2006 .

Basing on corporate governance theory, Rankin et al. (2011) considered voluntary greenhouse gas reporting by Australian companies in the context of a market governance system in the absence of a public policy on climate change. The study concluded that companies that voluntarily disclose GHGs have better quality corporate governance (certified and approved) to environmental management systems and report to CDP. Metaxas and Tsavdaridou (2011) worked on a comparative content analysis of Greek and European companies which focus on the environmental aspect. The sampling sector of operation are industrial, Real estate and energy sectors. The comparison between Greek companies and European showed that Greek companies are as much successful as the compared European companies. Stanny (2013) examined voluntary greenhouse gas emissions disclosures by U.S. companies from the S&P 500 to the Carbon Disclosure Project (CDP). Trends in three disclosures (responding to the survey, explaining emissions and the methodology for accounting emissions) are studied from 2006 to 2008. The frequency of these three disclosures has increased. The study found that many companies responded to the survey but did neither explain the amounts of their emissions nor how they explained them.

Sankaranarayanan and Ray (2017) used content analysis to work on the sustainability disclosures of a sample of 160 global enterprises established in 9 countries. Sullivan and Gouldson (2017) analyzed the Social Responsibility reports of the world's 25 largest retailers between 1990 and 2014 by analyzing the data, and determined that policies, actions and objectives of companies in the areas of climate change, energy performance and energy-related issues have evolved over time. Charumathi and Rahman (2017) measured the level of disclosure on climate change over 5 years between fiscal year 2009-2010 and fiscal year 2016-2017 using the content analysis of the 50 S&P Nifty companies among Indian companies. Their findings found that there are significant differences in disclosure on climate change by company, year, sector and category (polluter or non-polluter). They also found a significant improvement after the Corporate Responsibility Report and the Paris climate agreement were approved. In the next part, we will begin by presenting our research objectives by placing hypotheses and then start doing content analysis for 10 Turkish companies between fiscal year 2015-2018, which will follow a variance analysis.

3. OBJECTIVES OF RESEARCH

- 1) Measure the levels of climate change disclosure made by 10 companies in the BIST Sustainability Index.
- 2) Understand the evolution of the disclosure level Turkish companies regarding climate change after the Paris Climate Agreement entered into force on November 4, 2016.

4. HYPOTHESES

Within the frame of this study, the following zero hypotheses will be tested.

H₀₁ : During the working period, there is no significant difference between companies in the explanations concerning the fight against climate change.

H₀₂ : There is no significant difference in the explanations concerning the fight against climate change between the years of the study period.

H₀₃ : There is no significant difference in the statements of companies regarding climate change before and after the Paris Climate Agreement entered into force.

5. RESEARCH METHOD

In this analytical study, secondary data were used. Secondary data were obtained from companies' sustainability reports. The content analysis method was used to collect the data. Content analysis is a highly effective method for analyzing and comparing companies' sustainability reports (Fifka, 2012). It makes it possible to determine the existence of certain words or concepts in one or more texts. Content analysis consists of four steps: processing qualitative document search data, coding data, searching for themes, editing codes and themes, identifying and interpreting results. In this study, coding was performed according to the selection criteria determined during the first stage and various themes such as climate, energy, emission that were achieved in this context. For the purposes of the study, expressions on climate change were identified. The terms "greenhouse gas emissions", "CO2 emissions", "energy saving", "energy efficiency", "renewable energy", "climate change", "combating climate change" are defined as more frequently used terms related to climate change. In each sustainability report, sentences containing expressions were coded.

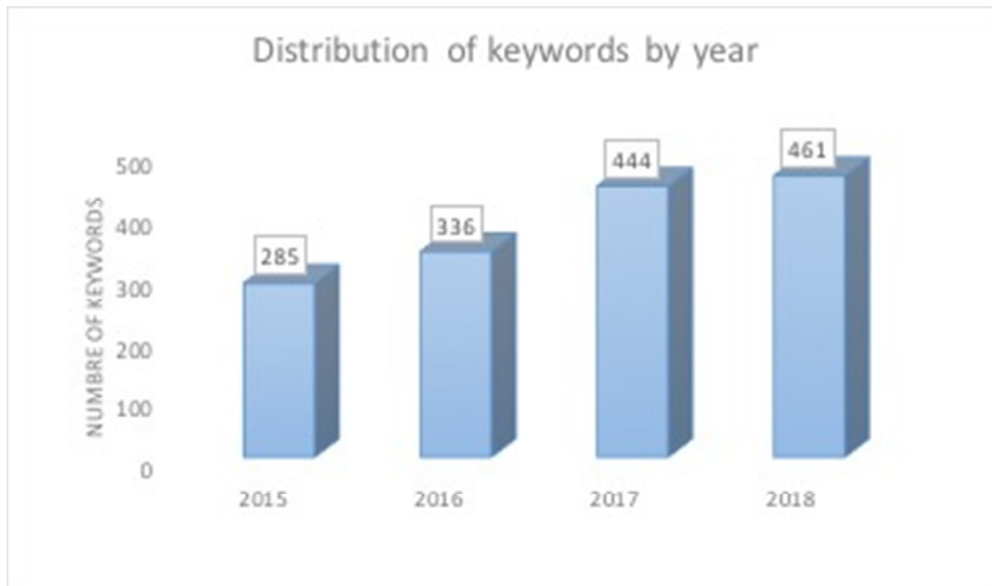
In this study, keywords were counted by automatic content analysis using QDA MINER 5 software. Word count is used to measure the level of information on climate change in sustainability reports, annual reports and integrated reports. The word counting results are considered the frequency of counting words of different terms. In addition, the improvement in greenhouse gas emission reduction amounts and energy savings amounts announced during the study period was also included in the study for comparative purposes. The study sample was selected from 56 companies listed in the BIST Sustainability Index dated November 1, 2019. The companies were selected in 10 different sectors : finance, telecommunications, food production, energy, aviation, retail, defense industry, tire lining, automotive and sustainable consumption sectors. The commercial titles, sectoral information and shares of the companies included in the study are shown in Table 1.

Sector	Enterprise	Percentage
Sustainable consumption	Arçelik A.Ş.	10%
Defense industry	Aselsan Elektronik Sanayi Ve Ticaret A.Ş.	10%
Rubber coating	Brisa Lastik Sanayi ve Ticaret A.Ş.	10%
Automotive	Ford Otomotiv Sanayi A.Ş.	10%
Retail	Migros Ticaret A.Ş.	10%
Finance	T.Garanti Bankası A.Ş.	10%
Telecommunications	Turkcell İletişim Hizmetleri A.Ş.	10%
Aviation	Türk Hava Yolları A.O.	10%
Energy	Türkiye Petrol Rafinerileri A.Ş.	10%
Food production	Ülker Gıda Sanayi ve Ticaret A.Ş.	10%
Total	10	100%

TABLE.1 Example of Retail

The duration of the study is 4 years, ranging from fiscal years 2015 to 2018. With the sample of 10 companies from the BIST sustainability index and 4-year-study term, the total number of effective data points is 40. The companies' sustainability reports (where applicable, annual reports) in question between 2015 and 2018 were examined and searched on the basis of the following keywords: climate change, energy saving, greenhouse gases. In this study, variance analysis (ANOVA) was used to determine whether there are significant differences between companies and years in the description of climate change over the study period. Furthermore, the T-test of the dependent sample was used to understand the evolution of climate change level announced by the companies in study before and after the Paris Agreement entered into force. QDA MINER 5 software was used to collect word frequency data in reports using the keywords. The social science statistics software package (SPSS 20.0) was used to analyze data variance.

6. RESULTS AND DISCUSSION



GRAPHIC.1 Distribution of keywords by year

Graphic 1 displays the rate of keyword usage chosen by the companies in the study during the study period (2015-2018). The results are derived from the QDA Miner 5 program and traced. The upward trend in the keywords usage in sustainability reports shows that companies are broadening their descriptions of combating climate change. The overall upward trend in climate change disclosure levels can be attributed to the fact that Paris Climate Agreement entered into force.

	N		Mean	Std. Deviation	Minimum	Maximum
	Number	Missing				
Greenhouse gas emissions	40	0	8,8000	7,62990	1,00	37,00
CO2 Emissions	40	0	7,9750	4,20919	2,00	20,00
Renewable energies	40	0	2,0000	2,64090	,00	9,00
Energy savings	40	0	4,4000	3,30346	,00	11,00
Energy efficiency	40	0	3,8000	3,60342	,00	14,00
Climate change	40	0	9,0000	5,59304	1,00	31,00
Fight against climate change	40	0	2,1750	2,82741	,00	14,00

TABLE.2 Descriptive Statistics - Climate Change Keywords

Table 2 shows descriptive statistics of climate change-related keywords. The results are calculated with SPSS 20. The maximum number of keywords used throughout the study period is 267 by Turkish Airlines. The term "climate change" is the most used keyword, and followed by "greenhouse gas emissions" as the second most used keyword. The term "renewable energy" is the least used keyword. Hence, it can be concluded that these 10 companies selected in the BIST Sustainability Index are aware of climate change risk, that they often include values and details on emissions in their reports and they are still far from the "renewable energy" concept.

	N		Mean	Std. Deviation	Minimum	Maximum
2015	70	0	4,0714	3,93543	,00	15,00
2016	70	0	4,8000	4,12346	,00	16,00
2017	70	0	6,3429	6,58916	,00	37,00
2018	70	0	6,5857	5,91851	,00	36,00

TABLE 3 Annual Descriptive Statistics on Climate Change

Table 3 shows descriptive statistics on climate change-related keywords throughout the years of study. It is evident that the disclosure level was low in 2015, the first period of study, and has shown a rapid increase since 2016. Hence, it can be concluded that there has been an increase in the companies' reports mentioned in the study on climate change in recent years.

	Sum of squares	df	Mean square	F	Sig.
Between enterprises	9879,600	9	1097,733	6,522	,000
Within enterprises	5049,500	30	168,317		
Total	14929,100	39			

TABLE 4. ANOVA Results at the Enterprise Level

Table 4 displays the results of ANOVA for the difference on the enterprise level. Since the p value is greater than 0.05, the null hypothesis H01 is accepted at the significance level of 5%. For this reason, there is no significant company-based difference in the description of climate change among the sample companies during the study period.

	Sum of squares	df	Mean square	F	Sig.
Between enterprises	9879,600	9	1097,733	6,522	,000
Within enterprises	5049,500	30	168,317		
Total	14929,100	39			

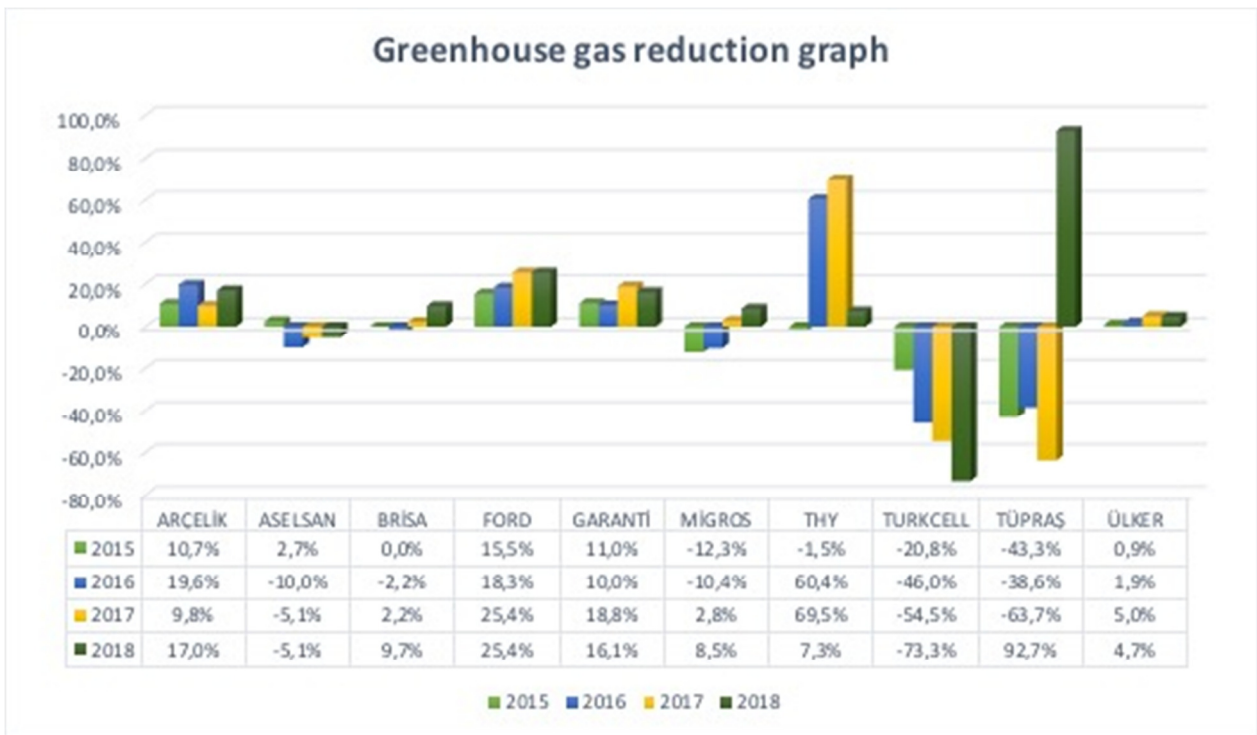
TABLE 5. ANOVA Results at the Year Level

Table 5 displays the results of ANOVA for the difference in terms of years. Since the p value is less than 0.05, the null hypothesis H02 is rejected at the significance level of 5%. That is why there is a significant difference between the sample companies during the working period in terms of climate change in terms of years.

Pairs	Differences between pairs					t	df	Sig.
	Mean	Std. Deviation	Average standard error	95% confidence interval of difference				
				Lower Bound	Upper Bound			
AP Before AP After	-28,40000	32,04927	10,13487	-51,32666	-5,47334	-2,802	9	,021

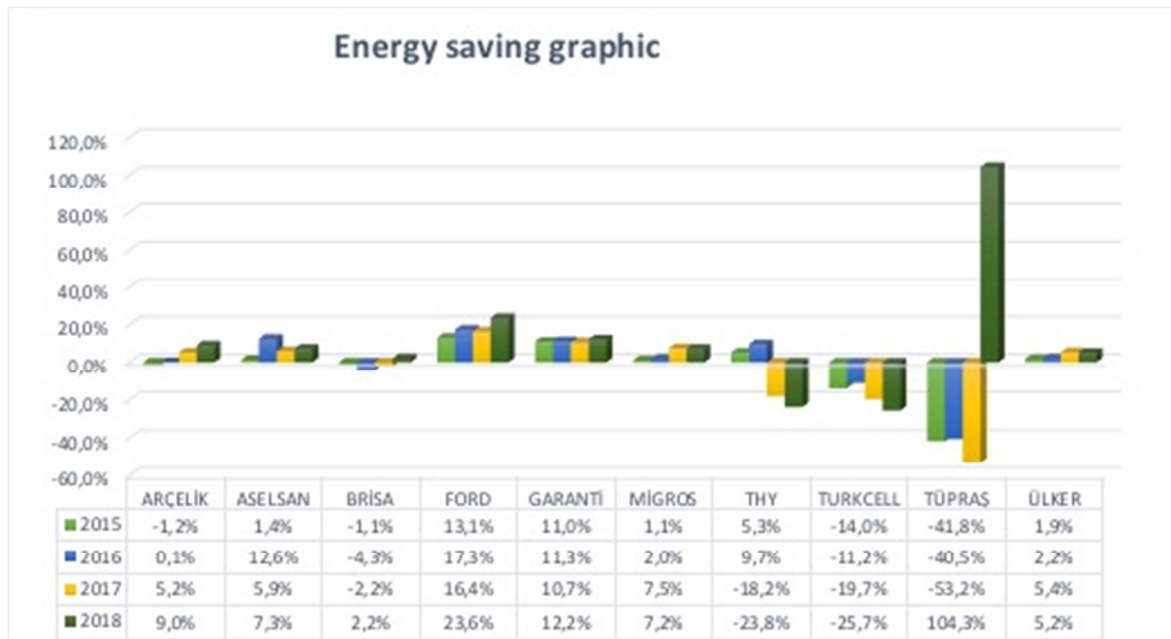
TABLE 6. T-Dependent Sample Test Results - Differences in Climate Change Disclosure Before and After the Paris Climate Agreement

Table 6 displays the results of the T-dependent sample test on changes in the disclosure level regarding the climate change before and after the beginning of the Paris climate agreement. Since the value is less than 0.05, the null hypothesis H03 is rejected at the significance level of 5%. There is, therefore, a significant difference between companies in the sample before and after the Paris Climate Agreement entered into force. After the Paris Climate Agreement entered into force, the disclosure level of the companies in the sample increased. In addition to the content analysis, companies' amounts of greenhouse gas reduction and their energy savings were compared based on the 2014 results of each company.



GRAPHIC 2. The percentage of companies that improved their greenhouse gas reductions compared to 2014.

Graphic 2 displays the percentage of companies that improved their greenhouse gas reductions compared to 2014. The comparative data were obtained from corporate sustainability reports or CDP (Carbon Disclosure Project) reports. For example, the greenhouse gas reduction on Tüpraş is 126,442 tones of CO2 in 2014, 71,744 tones of CO2 in 2015 and 243,666 tones of CO2 in 2018. In this case, the improvement in greenhouse gas emissions of Tüpraş is 43.3% lower in 2015 compared to 2014. In 2018, it prevented an additional 92.7% of greenhouse gas emissions compared to 2014 and increased greenhouse gas emission reductions.



GRAPHIC 3. The percentage of companies that improved their energy savings compared to 2014

Graphic 3 displays the percentage of companies that improved their energy savings compared to 2014. The comparative data were obtained from corporate sustainability reports or CDP (Carbon Disclosure Project) reports. For example, the energy savings achieved by Tüpraş in 2014 amounted to 1,772 TJ (terajoule), 1,031 TJ in 2015 and 3,620 TJ in 2018. In this case, the improvement in energy savings in Tüpraş was insufficient at 41.8% in 2015 compared to 2014. In 2018, it saved 104.3% more energy than in 2014.

7. RESULTS OF RESEARCH

1) 10 companies selected from the BIST Sustainability Index in terms of keywords included in sustainability reports during the study period have an upward trend in climate change disclosure levels.

2) 10 companies selected from the BIST Sustainability Index have made efforts to understand the climate change risk with the introduction of the Paris Climate Agreement in recent years.

3) There are significant year-to-year differences in the disclosure level of 10 companies selected from the BIST Sustainability Index during the study period.

4) There is no significant year-to-year difference in the disclosure level of 10 companies selected from the BIST Sustainability Index during the study period.

After the Paris Climate Agreement entered into force, there has been a significant increase in the declarations of 10 companies selected from the BIST Sustainability Index on climate change.

7.1 Limitations of the Study

The limitations of the study are:

- 1) Secondary data limits apply to this study.
- 2) Because of time constraints, the sample is limited to 10 companies and 4 years.
- 3) Because of the absence of a second researcher, coding in content analysis could not be cross-checked.

7.2 Recommendations For Future Research

This study measured the disclosures of 10 BIST Sustainability Index companies regarding climate change. Future studies could be considered:

- By including more companies in the study, companies can be compared on a sectoral basis in addition to the study comparisons.
- A comparison can be made among countries that have signed the Paris agreement by including international companies.
- In the study, only data based on the number of words were collected and used. Therefore, other parameters such as the number of sentences, the number of pages, the number of lines, etc. can also be considered for future studies.

CONCLUSION

Given that climate change is not a local but a global problem, it is one of the priority areas that should be addressed politically, economically, environmentally and socially. It is an important step to make companies aware of climate change in managing this situation. This is why research into the perception of climate change has started to gain importance. This study aimed to measure the disclosure levels of 10 companies from the BIST Sustainability Index on climate change. Companies attending in the study increased their climate change disclosures with the impact of climate change mitigation activities such as the Paris Climate Agreement. Companies have mainly used the terms "climate change" and "greenhouse gas emissions" in their sustainability reports. The expression "renewable energy" is the least used keyword. However, there is no regular improvement in greenhouse gas reduction and energy savings. This is due to the concern of companies to offer more products and services to meet the needs of the growing population, and to act with a focus on growth for competition. Nevertheless, companies are striving to report more transparently on their energy saving and greenhouse gas reduction activities. The growing trend in climate change disclosures that took place before and after the Paris Climate Agreement shows that companies have increased their awareness of this issue. While there was a significant difference in the explanation levels on an annual basis, there is no significant difference found on the enterprise basis. Therefore, the study findings will discuss the awareness level of climate change and contribute to future studies on this subject.

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