Information and CommunicationsTechnology: Strategic Tool and Aid in Decision Making

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Abstract-The fact is that the majority of former and current technological achievements, based on the single principle of the electronic coding of information, led to a misunderstanding of the role of Information and Communications Technology (ICT), and has resulted in an irrational use of this technology.

Indeed, based on this principle, most decision makers appeal only to automate, inform and communicate, ignoring ICT's ability to contribute to strategic contributions initiatives.

This study uses the analyses of [1] to identify four strategic dimensions to explain the strategic character of ICT: work, strategy, decision-making and strategic scanning.

The main objective of this research is to identify the role of ICT as a tool for strategy and assistance to decision making. This research contributes to shed light on ICT as a strategic tool in order to aid and improve the decision-making process. With this objective in mind, a literature review was conducted in order to better our understanding of the role of ICT in the evolution of work, in decision-making, in business strategy and finally in the development of the strategic scanning.

Keywords- ICT; Work; Strategy; Decision Making; Strategic Scanning

I. INTRODUCTION

This research aims to identify the use of ICT as a strategic tool and aid to decision-making. The intent of the research is to use [1] analyses concerning the strategic and competitive choices of a business to identify four strategic areas that explain the strategic nature of ICT. These four areas are work, strategy, decision-making, and the anticipation of risks. Four research questions are presented to conform to our conceptual scheme. The first is about the evolution of work; the second is about the elaboration of strategy; the third is about aid to decision-making; and the forth is about the anticipation of risks.

The research has four objectives. The first is to demonstrate the role of ICT in the evolution of work. The second objective of the research is to demonstrate the structuring role of ICT in the expansion of business strategy. The third objective is to demonstrate the dynamic role of ICT in decision-making constitutes. The fourth idea focuses on the role of ICT in the design of strategic scanning. Finally, the research aims to demonstrate the strategic impact of ICT on the new economy doctrines that use ICT as a means of growth, as a tool to reduce poverty, and in the fight against unemployment.

For the identification of the previously mentioned four strategic areas, the research is going to deduce the analysis of [1], including his book Strategic Choice and Competition, so as to explain the fact that the best way for a company to improve its strategic position is to observe the following:

- The factors which explain the nature of the work performed by the company to optimize costs, risks and returns;

- The factors which explain the categories of strategies adapted to the structure of a sector;

- The factors which explain the process of decisions in the company to act favorably on operation, profitability, performance, and even survival of the firm;

- The factors that explain the nature of competition that requires the implementation of business intelligence to anticipate risks.

Consequently, to solve this problem, we propose the following conceptual schema, Fig. 1:
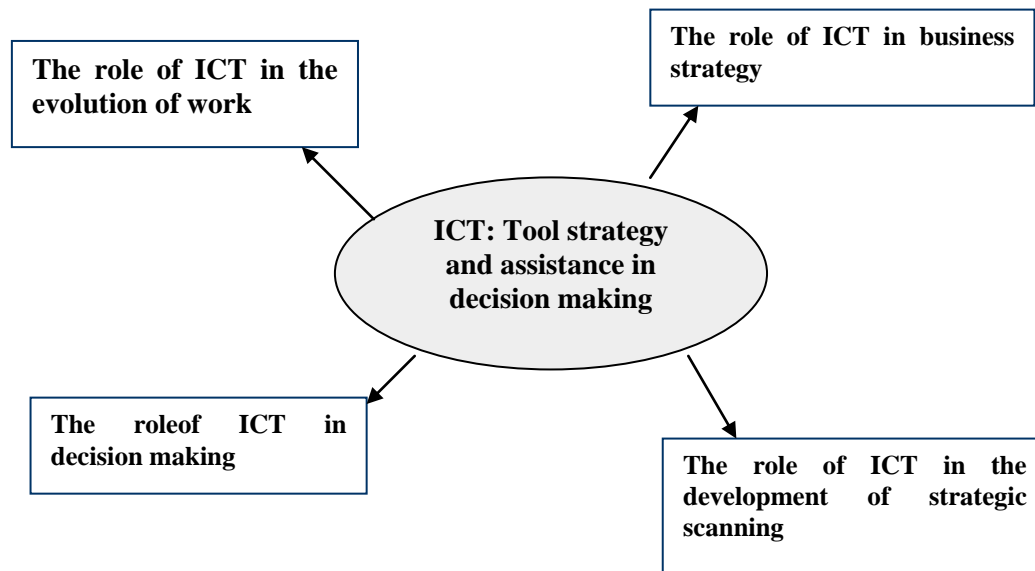
Fig. 1 Conceptual schema

Four research questions are presented to comply with our conceptual scheme. The first is about the role of ICT in the development of work; the second is about its role in the elaboration of strategy; the third is about its role in decision-making; and the forth is about its role in the development of strategic scanning.

To attain perspective of our work, we are going to demonstrate the impact of ICT on the four areas of our study so that we can find out how ICT becomes a means to enhance growth, reduce poverty, and fight against unemployment.

II. LITERATURE REVIEW

In most businesses, ICT is still comprehended as an autonomous structure and separated from other activities. The dominant use of these technologies defines them as a support function of the activity rather than a strategic function. This superficial vision is due to two main reasons; the changing role of ICT and how it is initially introduced into the company.

Traditionally, ICT was introduced into many companies to automate management, information, and communication tasks while leaving policy makers' free to fulfil their roles as analyzers, designers, planners, and strategists.

Today, the move towards a so-called digital and information society, characterized by ICT, must focus on thinking about the use of technology to achieve the objectives set in the strategy of the company.

There are a number of researches that have measured the impact of ICT and its ability to save time, space, computerization spots, and the expansion of the information stored. These studies however, did not demonstrate the strategic nature of technology. They simply focused on the technical characteristics of technology and demonstrated their performance. More to the point, there are bulks of studies that have tackled the vital role of ICT in business. They have tackled the issue from different perspectives. Some have written about applying ICT in businesses [2-4], others have focused on the use of ICT in several business management areas [5, 6], and others on renewing ICT functions in businesses [7]. A study conducted in 2007 by the NAALC network in partnership with Storm Lab Cigref aimed to identify methods and analysis approaches of the use of ICT in companies. This study established a number of findings and recommendations [8]:

- The use of ICT determines the performance or non-performance of the company;
- Technical innovation can be greatly reduced by the lack of ownership of users;
- Most of the proposed approaches and methods involve the user at each step;
- The use of ICT is a social construct of those who use it;
- The actual use of ICT can reconcile technological change and organizational transformations.

While emphasizing the importance and relevance of these studies, we would like to explain that this research does not apply to the study of the use of information and communication technology. However, it does set out to explain the strategic importance of ICT to make better use of its capabilities.

- Since our research aims to demonstrate the strategic nature of ICT, we have identified four strategic areas that can validate our assumption Work;
- Strategy;
- Decision-making; and

- Anticipating risks.

The study recognizes that there are ICT influences many factors in the work-place. At the level of business strategy planning, on decision-making processes, and at the level of anticipating risks.

Indeed, ICT can play a vital role in helping decision makers to better coordinate and to effectively employ a clear strategic plan. Furthermore, in today's technologically focused business world, decision makers can no longer remain isolated from using ICT [9] found within the practice of ICT management in business that among the most vital factors in determining the success of businesses was ''that the senior managers take a leadership role in a handful of key IT decisions'' [9] When applied to ICT, leaders who need to make decisions possess the knowledge and skills required to make well informed decisions. The continuous and rapid advancement of ICT presents decision makers in businesses with important and useful skills as well as an astute level of understanding to figure out the complexity of the decision-making processes.

III. RESEARCH QUESTIONS

The definition of ICT is problematic. Several authors have attempted to define ICT without managing to explain its strategic nature. We deliver some examples:

ICT includes computers (hardware, software and services), telecommunications (equipments and services) and electronics (components, professional electronics, and public electronics) [10].

The term ICT refers to the latest technologies such as computers, telephones and broadcasting. They concern the collection, compilation, processing and transportation of texts and sound in addition to traditional digital data [11].

The ICT sector appears as a list of activities covering three sectors: IT with the manufacturing of computer software, and telecommunication networks including the Internet, and finally electronics [12].

Information technology and communications bring together all the techniques that contribute to scan and digitize information in order to treat and store them and to make one or more users available [13].

We can note that these definitions do not highlight the strategic nature of ICT. They focus on the basic functions of ICT, which are to inform and to communicate.

Furthermore, [14] emphasizes that the definition of ICT is quite difficult and offers seven criteria required for inclusion in ICT:

- Networking
- Automation of intellectual work
- Media
- Convergence
- Nomadism
- Multipolar use
- Normalizing effect

These criteria explain the functions of information technology and communications in an organization; however, they do not provide information about their reason to exist.

Reference [15] notes that many decision makers rely on information technology and communications only for its fundamental duty, which is to automate, to inform and to communicate. Reference [15] summarizes the direct contribution of these technologies in the following six points:

- The compression of time
- The compression of space
- The expansion of stored information
- Flexibility of use
- Ease of use
- The cost of access to technology

These contributions do not explain the strategic importance of information technology and communications. They just describe their characteristics, ignoring the significance of their strategic nature.

According to [16-21], whose purpose is to determine how humans make decisions, are the exception. They represent a critical and necessary step in the development of a scientific and rational definition of information technology and communications. He introduces the concept of bounded rationality, stressing that the rationality of an individual is limited by his/her environment, history, and the lack of information needed for decision-making [16].

In addition to this, he explains that the bounded rationality of man is a result of his limited memory. Only information technology and communications are likely to fill the gap as well as allow human beings to streamline the process of decision-making.

To explain the limitations of human memory, Simon announces that: "Every human organism lives in an environment that produces millions of bits of new information every second, but the bottleneck for the unit of perception certainly does not admit more than 1000 bits per second and probably less" [17].

Ten years later, in order to confirm his hypothesis, he says: "Individuals have a share of a long-term memory in which information is stored by topic with an index and links to combine this information. On the other hand, short-term memory is where information is processed and activated. But this short-term memory, in contrast to long-term memory, is limited." [18].

This leads us to study the supportive role of the computer in decision-making.

Indeed, the similarity between the organization of the computer and that of the human brain allowed Simon to approach ICT as a tool capable of supporting mechanisms for decision-making. This similarity has been the starting point for Simon and other researchers, including Newell, to study the design of artificial intelligence with the objective of allowing the computer to appropriate the same functions normally associated with the human spirit such as understanding, reasoning, conversing, learning, and adapting or adjusting.

Since 1955, Newell and Simon designed the first artificial intelligence program based on deduction and the demonstration of theorems known as The Logic Theorist.

In 1957, they revolutionized the process of decision-making by the discovery of the General Problem Solver for solving problems. This discovery shows the intimate connection between decision-making, information technology, and communications. Since then, the process of decision-making is not the result of reflections. Instead, it is likened to a spatial resolution of a problem in which the decision passes through a series of stations. At each station, information processing is carried out by technology.

As a conclusion, Simon, Newell, and others were approaching ICT as a tool to aid decision-making. They were able to compensate for the limited rationality of man.

It is an established fact that most decision makers within organizations approach information technology and communications by only exploiting their characteristics to reduce time and space. This creates a problem that can affect the strategic level of governance of the organizations.

To shed light on this issue, our research is going to identify the role of ICT as a strategic tool and aid in decision-making.

Consistent with the conceptual scheme we presented at the introduction of this paper, we ended up with four research questions: What is the role of ICT:

- In the development of work?
- In the business strategy?
- As an aid in decision-making?
- In the development of strategic scanning?

IV. THE ROLE OF ICT IN THE DEVELOPMENT OF WORK

ICT has invaded all sectors and all businesses while contributing to the transformation of work itself. This transformation has resulted in major changes within organizations and managerial practices.

Indeed, collaboration supported by ICT is accompanied by changes in reporting relationships and multidimensional trade cooperation. ICT enables human resources to find business opportunities [22], to acquire professional skills, to master the objectives and modes of operation of the organization, to enrich industries by ongoing exchanges expressing the analyzed and proposed views, and to help create solidarity networks.

Another major consequence of the use of ICT in the workplace is the concept of learning. To better understand this concept, [23] defines the community of practice as a social structure of knowledge.

From then on, the company can be seen as a community of practice and a place of learning. The author then explains the role of ICT in the transformation of work in knowledge management. Therefore, he defines the company as a community of practice comprised of people who share the same trades and engaged in an ongoing process of learning.

By defining the community of practice as developed by Wenger and his colleagues, [24] explains that this community has a lifecycle composed of several steps. We will introduce each, along with the key role of ICT within them:

- Step 1: Discover the potential to define a network of master practitioners and trade experts to share their knowledge in order to transform local competences into a global knowledge repository. In this step, ICT provides the means of exchanging

knowledge via, forums and discussion. It also provides, all technologies and concepts likely to remember, capitalize, communicate, and update knowledge;

- Step 2: Unify the organization with an, aim to develop relations of trust and respect, which can only be done if there is a common interest guide. This guide can be, published and maintained by ICT;

- Step 3: Mature where the task at hand is the creation of values through the building, collecting and disseminating of knowledge provided by computer networks;

- Step 4: Organize and thereby create a sustainable momentum within the organization that addresses internal and external changes. Such momentum requires the implementation of a business intelligence (BI) strategy acting as co-pilot and allowing the company to continuously adapt at to changes in the environment;

- Step 5: Transform the community of practice with a new definition of tasks and new bases for global collaboration and learning.

ICT also participates in the transformation of modes of production, consumption, communication, circulation of knowledge, and learning [25]. Reference [25] explains that the Internet innovation makes several changes of social order at work. The changes are as follows: the emergence of new modes of expression, the communication and dissemination of information, the emergence of public chat rooms, the growth of opportunities for contact and the change and transformation of identity.

All this is in addition to the new practice in education, and the transformation of job sites.

Meanwhile, [26] estimates that according to [27], changes at work are due to the introduction of ICT since the eighties. These changes have been on the increase ever since. They are associated with the numerical and functional flexibility such as:

- Downsizing;

- Outsourcing; and

- Temporary work.

In 2001, The Organization for Economic Cooperation and Development (OECD) published a report on the new economy and growth, and another on the effects of the Internet [28].

Regarding the first report, its findings show that ICT acts in three ways at the level of economic impacts:

- Investment in ICT contributes to capital deepening, and increasing productivity at work;

- Technological advances provided by ICT in the production of goods and services contribute to the growth of capital and work; and

- The use of ICT allows the growth of multifactor productivity, efficiencies, or network effects.

As for the second report, the beneficial effects of the Internet have been demonstrated by the OECD survey typical in 2005 [29]. Companies surveyed have delivered three response categories:

- Reduced time of transactions;

- Improved quality of customer service; and

- Lowered costs.

The OECD has also conducted two surveys to measure the social impacts of ICT. The results revealed that ICT impacts include:

- The way employees work;

- The jobs held;

- Daily activities;

- Expenditures;

- Time;

- Obtaining information; and

- How to communicate.

In 2006, the Center for the Study of Employment conducted a survey, entitled: Organizational Changes and Computerization, about the links between ICT and working conditions. The survey covered a sample of 6,399 companies and 14,331 employees, with response rates of 82%. The survey encompasses three categories of employees' users of ICT, non-users of ICT, and employees who have little or no connection to computers. Analysis of the investigation results led to the following conclusions [30]:

- Connected users of computers benefit from better working conditions and generally feel satisfied;

- Employees with little or no connection to computers have intensive work with little leeway to respond;

- Non-ICT users are with less intense and unsatisfactory work; and

- The risks of using ICT are related to the organizational context and decisions of firms regarding the assistance of information management.

- Organizationally, the Strategic Analysis Center in 2012 [31], in turn, lists the impact of ICT on the development of interpersonal relationships as follows:

  - They promote interactivity and cooperative modes;

  - They allow the emergence of multidisciplinary and flexible network organizations; and

  - They encourage the deployment of social networks in the workplace.

The final report of the center published in 2013, dealing with the impact of ICT on working conditions, highlighted the disadvantages associated with the uncontrolled use of ICT in business. These are:

- Intensification of work;

- Misinformation;

- Reduction of autonomy; and

- Weakening of the collective.

It is clear from these studies and researches that ICT has participated actively and intensively in the development of work. The main changes are:

- New practices in expression, communication and information;

- Reduction of time, space and personnel;

- Easy access to information and information overload;

- Business transformation into a place of learning;

- Enhancement of corporate business;

- Emergence of the digital and extended enterprise; and

- Capital deepening accompanied by growth in productivity.

V. ROLE OF ICT IN THE BUSINESS STRATEGY

The role of ICT in business strategy has inevitably raised the interest of several major authors, including Morton. His work had, as a main objective, the study of the impact of information technology and communications on corporate strategy [32-34].

The author strengthened his doctrine with field studies and by working directly with large companies.

He directed more than thirty research projects whose results were published in his book, Information Technology and the Corporation of the 1990s [35].

These results clearly show that ICT has revolutionized the business world. It has also made the necessary changes that can lead companies to a competitive advantage.

According to Morton, the contributions of technology on business strategy can be summarized in the following points:

- ICT plays a key role in coordinating organizations;

- ICT creates a synergy among companies, products and markets;

- ICT is an effective way to increase productivity;

- ICT allows management skills oriented by redefinition of tasks;

- ICT goes beyond the boundaries of traditional business to openness. It makes the business open to new customers and suppliers through its networks;

- ICT allows electronic commerce by disrupting all classic managerial ways based on the traditional order;

- ICT improves customer relations by self-service, online sales, and order tracking;

- Finally, ICT is profoundly changing the organization of work within the company.

For their part, [36] conducted a study of 505 French companies with the aim of identifying the role of strategic alignment between ICT strategy and business strategy in organizational performance.

The survey showed that these companies, using outsourcing and partnership, have reached a high level of performance. This performance is conditioned by the following:

- Consideration of ICT as a strategic challenge;

- The ability of ICT to provide support for inter-organizational business infrastructure; and

- Intra-and inter-organizational coordination based on the sharing between companies and their partners.

In the same vein, [37] constructed a model to demonstrate that the strategic alignment of ICT with the strategy of partnership or collaboration can influence the performance of the company.

This model was tested with 381 SMEs. It demonstrated that compliance with business strategy choices by the ICT strategy is a prerequisite for their performance.

Many authors have demonstrated the competitive advantage created by technology: [15, 38, 39]. Therefore, Information and Communications Technology (ICT) allows:

- A computer aided design in the process of manufacturing, maintenance and distribution. Such a design will result in reduced costs, and the ability to keep up with the current field of competitors;

- An automated client ordering system as well as a broadcasting network for calls for tender in order to improve the bargaining power vis-à-vis customers;

- A dynamic website to research, communicate, identify, and enlarge the base of suppliers and improve bargaining power with them;

- Expert systems: software for integrated management, and client networks linked automatically to decreasing prices, improving products, developing entry barriers, and fighting against the threat of new entrants;

- A computer aided manufacturing to propose variations of marketed products and combat substitutes.

One could also wonder what the impact of ICT is on the innovation strategy in general. Regarding this impact, numerous researchers: [40] from the Center of Productivity and Prosperity of HEC Montreal, confirm that ICT enables several types of innovation:

- Commercial innovation which allows for a new form of distribution, promotion and marketing;

- Organizational innovation through new business management processes, and relations with clients, suppliers, employees and investors;

- The innovation of products at the level of design, production and improvement;

- The innovation of processes through computer aided design;

- Technological innovation provided by functional, productive and informational technologies;

- The innovation of business models acquired by the ICT transformation of both classical and digital business;

- Finally, the innovation of markets by facilitating the access, sale and promotion of products and services via dynamic websites.

Regarding the links between ICT and innovation strategy, a team of researchers from [41] have developed another model dealing with this link. The influencing factors of this model are as follows:

- The intensity of ICT use;

- The organizational change;

- The presence of multidisciplinary teams; and

- The acquisition of expertise and culture of experimentation.

This very model was the basis for an investigation led by Cifrio in collaboration with Cigref along with 32 French companies, with employee strengths greater than 500. The outcome was the confirmation of the links between ICT and innovation strategy. The investigation identified the following:

- Innovation has become systemic and affects the products, the organization, and its processes;

- The intense usage of ICT has contributed in a significant way to the innovative capacity of surveyed businesses. Businesses that have opted for a strong organizational change have benefited from a considerable positive effect on their market performance.

In short, the contributions of ICT to business strategy are evident. They are shown through the following:

- The cooperation between different business components;

- Inter-and intra-organizational coordination;

- Online sales and automated taking of orders;

- Consolidation of competitive advantage.

VI. THE ROLE OF ICT IN DECISION-MAKING

In order to comprehend the role of ICT in decision-making, we have deemed it useful to refer to Simon's theory regarding this field. This choice has been justified by the fact that the author's research is related to both decision-making as well as artificial intelligence. It is important to reiterate that the link between ICT and decision-making is one of our research objectives.

Initially, Shannon's works allow us to define notions and quantities of information before the importance of information in the decision-making process. Several other authors - like [17, 42, 43] have also demonstrated this concept.

The credit goes to Simon for finding the common ground between Shannon's work, the computer scientist and his own findings about organizational management [44].

The relation between information, decision making and ICT is explained by the latter's ability to store, process, share information and strengthen exchanges between agents of decision making. It also increases the policy maker's ability to adapt and react when faced with unforeseen risks, especially, as ICT enables organizations with information processing and strategic monitoring devices such as "Siad", "DataWarHouse", "Tableau Du Bord", "Data Meaning" and "Data Mart".

On this subject, [45] distinguishes four phases in the process of decision-making:

- Information or intelligence;
- Design;
- Choice; and
- The evaluation of the choices made.

Research into information that is relative to problem solving constitutes the initial point of decision-making. In this sense, information research makes up the initial elementary function of ICT.

The second step in the design consists of constructing solutions, alternatives, and possible scenarios for the policy maker.

The third step consists of choosing an action out of the different possibilities identified in the previous step.

The fourth step corresponds to the evaluation of the choices made which will be either validated or challenged, based on which there might be a need to return to the previous steps.

In the same sense, [46] proposes a topology of the decisions by differentiating between standardized and non-standardized decisions. He affirms that standardized decisions are susceptible to being programed, as in the case of an invoice or in recruiting an employee according to criteria such as degree level, age and skills. We accept the fact that in this case the term "programmable" or "programed", which refers to a set of technologies and programs, allows for the computerization of the aid to decision-making.

Afterwards the author makes an analogy between non-standard and poorly structured decisions. He offers a space for resolutions, representing the non-standard decision with modeling and structuring. He insists that the essential part of decision-making is still the effort of the modeling, which returns to structured and non-structured problems.

Despite the effort of modeling, Simon emphasizes that the policy maker must face the limited rationality of man who insistently reasons, although he is unable to handle multiple problems at the same time. In this view, we insist on the fact that with their great capacity to treat a large quantity of information, ICT can overcome part of this limited rationality.

In practice, [15] sees that before making a decision, policy makers must continuously choose between the immediate decision and final means, note available information, or search for supplementary information that is both relevant and adequate. In other words, decision makers must make use of ICT. This last choice signifies that the process of decision-making holds within it a model of informational management, which is governed and organized by ICT.

The intake of ICT in each of the four phases of decision-making provided by [46] has been demonstrated by [15] as follows:

- During the intelligence phase, ICT provides information that would assist in identifying the problem in the decision;
- During the modeling phase, ICT facilitates the research for a solution by using structuring, research models, and tests;
- During the choice phase, ICT helps the decider to select from among the choices developed in the design phase, through simulation and sensitivity analysis; and
- During the evaluation phase, ICT allows for the distribution and explanation of the choices made, which allows for the monitoring of the decision and feedback.

In light of what came before, information that is treated and adapted proved to be necessary in all steps of the process of decision-making. In this case, ICT, with its ability to supply, verify, analyze and synthesize information, constitutes tools that are crucial to aiding decision-making.

VII.   THE ROLE OF ICT IN THE DEVELOPMENT OF STRATEGIC SCANNING

Deciding requires the adaptation and anticipation of the evolution of environment outside a business. Apart from this reality, business intelligence proves to be an indispensible practice for all economic actors.

We begin by defining this concept before demonstrating the role of ICT in its implementation.

In his work entitled Economic Intelligence in Practice, [47] defines business intelligence as "a process which understands

operations of research, collection, distribution, treatment, validation and the utilization of information to a strategic character, those which are necessary for important decision making."

For his part, [47] emphasizes that despite the fact that the process of business intelligence varies according to numerous authors; it follows common rules and steps which he summarizes in six phases (LESCA, http //www. Veille _ stratégique.com):

Phase 1: targeting the need, or defining areas of supervision;

Phase2: identifying actors;

Phase 3: collecting data;

Phase 4: analyzing, treating and validating of data;

Phase 5: distributing information;

Phase 6: evaluating and readjusting data.

Here an observation of scale needs to be made: business intelligence methods, whether they be mathematic, statistic or computerized decisional tools, are all based on the research, treatment and distribution of information.

In this view, by their ability to capture, treat, distribute, communicate and control information, ICT represents vital tools in this process. It allows for:

- Diminishing uncertainty in decision making;
- Finding pertinent information;
- Monitoring competitors;
- Anticipating risks; and
- Informing the external environment.

These purely technical characteristics of ICT become strategic inputs when they allow the implementation of business intelligence. It allows the organization the opportunity to be in tune with its environment in order to minimize the risks associated with uncertainty, as well as maximize the opportunities it can make use of.

Reference [48] confirms that the role of the Internet is in being a tool to collect information for business intelligence. He identifies four factors which influence its use: (1) environment; (2) organization; (3) the perception of the strategic role of ICT in business; and (4) the degree of use of the Internet within business.

His hypothesis has been validated by an empirical study from a sample of 386 businesses. This investigation has demonstrated the importance of the maturity of the development of the system of information to ensure business intelligence.

Reference [49] analyzed the research and specialized publications of many authors in the domain of business intelligence; [46, 50-55].

This analysis has identified the three key factors, which play a vital role in the success of a project put in place to monitor business intelligence. These are:

- Organizational factors;
- Factors linked to human resources; and
- Material factors.

Regarding material factors, the author explains that the most important of them is the appropriate utilization of ICT.

The crucial phase in the process of business intelligence is the research into relevant information. Numerous authors estimate that research on relevant information is a complicated and difficult task [56-59].

This difficulty can be explained by reasoning itself, which is built on information as a unit of research. One solution would consist of finding another unit of research, in this case, the process.

Must we reason in terms of information or in terms of process for the tracking of relevant information? Our point of view is that we must reason in terms of process, being given the disadvantages that include the design methods of business intelligence [60].

The concept of processes implies activities, which transforms input data into output data. The consequences of such a step are evident in the control of the procedures, a crucial phase for business intelligence.

Similarly, within reasoning in terms of process, ICT becomes more and more vital to the optimization and computerization of businesses.

By way of synthesis, no matter what stage of maturity, business intelligence constitutes a process of research and management of relevant information. The organization of steps taken, and of processes assured by appropriate ICT, is capable of bringing effectiveness and efficiency to such a system.

In order to highlight the role of Information and Communications Technologies in the development of work, business strategy, decision-making, and the development of strategic scanning, I propose the following chart, Table 1:

TABLE 1 THE ROLE OF ICT IN THE DEVELOPMENT OF WORK, BUSINESS STRATEGY, DECISION- MAKING, AND THE DEVELOPMENT OF STRATEGIC SCANNING

The role of ICT in the development of work:	The impact of ICT in the development of work is as follows: ICT • promotes interactivity, cooperation and communication between companies • makes companies become another resource of professional learning, practice, and knowledge • creates better work values • transforms production, consumption, and communication • changes the social order at work • transforms job sites • provides more functional flexibility to work • manages expenditures more efficiently • makes information available • increases work productivity, work efficiencies, and network effects • deepens and grows capital • reduces time, space, personnel, and transactions • improves services and work conditions • lowers costs
Role of ICT in business strategy	The impact of ICT on business strategy are as follows: ICT • coordinates business organizations • facilitates and improves the interaction between the company, the product, the customer, and the market • promotes managerial skills • increases productivity • drives companies to more openness • allows e-commerce • changes the organization of work • promotes the company's performance • supports inter-organizational business infrastructure • reduces costs • makes the company competitive and provides the ability to fight against new entrants • improves bargaining power • enables commercial, organizational, and technological innovations as well as the innovation of processes, markets, and business models.
The role of ICT in decision-making	The impact of ICT on decision-making is as follows: ICT • enables decision makers to store and share information • strengthens exchanges between decision makers • enables companies to foresee unexpected risks and to face them • enables decision makers to solve problems, construct solutions, find alternatives, and design possible scenarios • enables companies to opt for better choices among different possibilities, and to evaluate the choices made • enables decision makers to overcome the limited rationality of man
The role of ICT in the development of strategic scanning	The impact of ICT on the development of strategic scanning is as follows: ICT helps business organizations • foresee risks and abate riskiness in decision making • get, collect, and perceive relevant information • observe, check, and track the progress of competitors • be in tune with the external environment. • Maximize opportunities • ensure business intelligence

VIII. FINDINGS AND DISCUSSION

For over three decades, extensive researches tried to explain the different boundaries and the contrasts between information systems and computer systems. The nature of the definition allows considering computer systems, that is to say ICT as an integral part of information systems, which represent the technological side.

Despite the diversity of information and communication technology, there's only one technique: the electronic processing of information.

This uniqueness of this technique allows itself to explain the essential properties of ICT [15].

The fact is that the majority of former and current technological achievements, based on the single principle of the

electronic coding of information, led to a misunderstanding of the role of ICT in businesses, and has led to the irrational use of this technology.

Indeed, based on this principle, most decision-makers appear only to automate, inform and communicate, ignoring ICT's strategic contributions nature.

The main purpose of our research is to find out how we can demonstrate the strategic nature of ICT. If the electronic coding principle of information can easily explain the evolution of work, that is simply its transformation from manual labor to assisted and automated work; the strategic component of ICT remains unexplained.

It is the impact of the changes in the work on strategy, decision-making, and work environment that may explain the contributions of the strategic roles of ICT.

Strategy, decision-making and work environment are complementary and intimately linked. This relationship explains the complementary new modes of production and the new knowledge economy. Thus, it is these four strategic areas that were the basis for using Porter's analysis to explain the strategic choices of business organizations.

IX. CONCLUSION

Our work consists of identifying the strategic dimensions of ICT as a strategic tool and aid to decision-making.

Based on the analysis of [1], concerning the strategic and competitive choices of a business, we have identified four strategic links, which can explain the strategic character of ICT:

- Work;
- Strategy;
- Decision-making; and
- Anticipation of risks.

We have used these four strategic links to identify four research questions, which conform to our conceptual scheme stated in the introduction, which are:

- The evolution of work?
- The elaboration of strategy?
- Aid to decision-making?
- The anticipation of risks?

The first objective of our research consisted in the demonstration of the role of ICT in the evolution of work. In order to do this, we have based our research on the works of numerous authors like [22, 24-27], together with the studies and investigations of organizations such as: L'OCDE, The Centre of Studies and Employment in [61], as well as the Centre for Strategic Analysis [31].

A combination of these works stated that ICT has transformed work by giving space to major modifications at the level of organization and managerial practices.

The second objective of our research aimed to demonstrate the structuring role of ICT in the expansion of business strategy. The works of [15, 32-34, 36-40] have brought elements of response to confirm this role contained by ICT within:

- The creation of harmony between businesses, products and markets;
- The obtainment of a competitive advantage;
- The performance of organizations;
- The innovation of organizations.

The dynamic role of ICT in decision-making constituted the third objective of our research. We have based our research essentially on the works of Simon, who has distinguished four phases in the process of decision-making:

- Information or intelligence;
- Design;
- Choice;
- The evaluation of previous choices.

Thereafter, by basing our research on the works of [15], we have brought to light the role of ICT within each of these four phases.

The fourth question focused on the role of ICT in the design of strategic scanning.

On this objective, we have asserted that all the strategic methods are based on the elementary functions of ICT: the research,

treatment and distribution of information.

These functions are transformed into strategic contributions when they allow for the implementation of business intelligence.

The problem of translating research into relevant information can be resolved by reasoning in terms of process [61]. And even within this reasoning, ICT proves to be decisive in supporting and computerizing processes.

Finally, we emphasized the fact that ICT also changes markets, activities and even traditional economic models. The new economy, characterized by the emergence of ICT is equally an economy of knowledge and information. In this sense, we proposed as a perspective of our work to demonstrate the impact of ICT in this new economy, notably, the appearance of new economic doctrines based on ICT as a means to grow, reduce poverty, and fight against unemployment.

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