Intelligent automation in communication management

Automatización inteligente en la gestión de la comunicación

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Abstract:

New technologies have allowed the development of the industry, transforming it from 1.0 to the current, called 4.0 industry, which sees a rapid growth by the penetration of artificial intelligence and its various technologies that promise to surprise us all and invade the market and transform the world. Many of these technologies go hand in hand with intelligent automation that projects a large-scale transformation. Faced with this metamorphosis, in this article deepens on the intelligent automation and in a special way in the management of the communication of the

Resumen:

Las nuevas tecnologías han permitido el desarrollo de la industria, transformándola así desde la 1.0 hasta la actual, denominada industria 4.0, que avizora un rápido crecimiento por la penetración de la inteligencia artificial y sus diversas tecnologías que prometen sorprendernos a todos e invadir el mercado y transformar el mundo. Muchas de estas tecnologías, van de la mano de la automatización inteligente que proyecta una transformación a gran escala. Frente a esta metamorfosis, en el presente artículo se profundiza sobre la automatización inteligente y de manera especial en la gestión de la

organizations, reviewing the existing bibliography and deepening on it. In conclusion, we propose a much more clarified state of the question and a contribution to the scarce bibliography referring to the subject of study that can serve as a connector between the aforementioned theories and a projection of automation in the field of communication.

Keywords:

Communication, automation, industry 4.0, artificial intelligence, communication processes

comunicación de las organizaciones, repasando la bibliografía existente y profundizando sobre ella. Como conclusión se propone un estado de la cuestión mucho más clarificado y un aporte a la escasa bibliografía referente a la temática de estudio que pueden servir de conector entre las citadas teorías y una proyección de la automatización en el campo de la comunicación.

Palabras clave:

Comunicación, automatización, industria 4.0, inteligencia artificial, procesos de comunicación

At first, briefly, the changes that have arisen from the industrial revolution 1.0 to the current 4.0, as a contextualization to the processes of changing industrial revolutions and technological environments, are traversed. In a second section, the role of automation in communication management and the changes it has generated is deepened. A vision with a focus on several authors that refer to this theme is presented. Finally, a proposal of four technological factors that influence the automation of communication management in current times and that would be predictable factors in the growth of automation in communication management are presented.

2. Methodology

The development of the present investigation was elaborated under a methodology of systemic literature review. For Kitchenham (2004, p. 1), the systemic review of the literature provides the facility to identify, contrast, evaluate and interpret the relevant research available and to answer certain research questions that have been raised, which may be one or more of one. The purpose of using this methodology is to identify current research regarding automation in communication management and find new fields or lines of research for future research.

A protocol, which includes the following elements, was used:

The objective of the research is to determine the current state of intelligent automation in the management of communication in organizations.

1. Introduction

As a research question was determined, PI: Are new technologies necessary in the automation of communication management of organizations?

The scope of technology not only reaches the field of information and communication, but it also breaks all barriers, and impacts on structural fields of the economy, politics, legal, social, labour aspects (Cabero Almenara, 1994, p. 14) and many

The search strategy used keywords: automation, big data, communication, intelligent automation, automation in more, covering the entire spectrum of human creation.

communication, marketing automation, intelligent process automation, algorithms in communication, industry 4.0, and

One of the fields that is being disrupted is the one of the communication, especially in the journalistic environment; artificial intelligence.

however, little is said about the changes in the management of the organizational communication of the companies,

The databases used to search for academic articles were: IEEE Xplore, ScienceDirect, Scopus, Scielo, Google Scholar and where the technological revolution 4.0 also generates impacts.

Dialnet.

3. Transformation of the industrial revolution from 1.0 to 4.0

According to the Dictionary of the Royal Academy of the Spanish Language (2019), the word revolution means a rapid and profound change in anything. Therefore, the revolutions that have arisen and that have been provoked throughout humanity, have brought with them various iconic stages in the transformation of the world, which has especially impacted the economic, social and communicative spheres of people.

History states that to reach the 4.0 revolution, three stages preceded it. Where, even, before the beginning of these stages, the human being goes from being a nomad to become a sedentary and producer of his own supplies and products for survival. In addition to this, the traditional way of making the same products. Until, many years later, the first industrial revolution appears. For Klaus Schwab, (2016) it ranged from 1760 until about 1840, although its origins could be earlier. Crucial moment for the man where the generation and creation of new inventions begins to emerge, such as the introduction of the James Watt steam engine in the industry of Great Britain, the construction of the railway and many other inventions that boosted the creation of various factories and near them they began to inhabit conglomerations of people who met the demanding labor needs at those times. These places, years later, would be called cities.

The second industrial revolution, arises between the end of the XIX century and the beginning of the XX century, here new visionaries as Henry Ford appeared, who promoted the generation of large-scale works, the so-called Fordist type. A production that was impacted by the invention of electricity, that had a profound impact on people's lives.

Then came the third industrial revolution, also known as post-industrial or as the era of the computer or digital revolution. It is mainly characterized by the invention of the computer, computer science and informatics. Accompanied by this, new digital changes that meet the diverse needs of the people, companies and organizations of the time. "The birth of the Internet, in the second half of the twentieth century, was what marked the Third Industrial Revolution, also known as the digital revolution" (Paramio and Hernando, 2019, p. 154).

At the discretion of Rafael Macau (2004, p. 4), it is in the eighties, Third Industrial Revolution, where the impact of technology is more evident for organizations, even more than imagined and understood until then by the large companies, achieving a strong reach when using this technology, ranging from cost reduction for the organization, through the improvement of information management, to reach to the support in the organization's own management.

This industrial revolution is characterized mainly because digital media transformed the forms of communication. But especially, because of the creation of new media where people are generators and consumers of information, especially for the appearance of social networks (Lamberton & Stephen, 2016).

Right now, there are moments of transition between the third and fourth industrial revolution. This last one that began at the beginning of the 21st century and is characterized mainly by giving life to new forms and tools to communicate through the internet, by the appearance of artificial intelligence, machine learning, robotics, big data, blockchain, internet of things, automation and many more sciences that have been growing and possibly others that will appear in the coming years.

The so-called fourth industrial revolution is also called industry 4.0, I4.0, digitalization of production systems or reindustrialization. The term industry 4.0 was coined at the Hannover Fair of 2011 where it was described how it will revolutionize the organization of global value chains (Schwab, 2016). An Adeco study conducted in 2018 says "in reality, the fourth industrial revolution, also known as Industry 4.0, is an evolution of the digital infrastructure that we already have towards new systems" (Adecco, 2018, p. 46). This era is the transition to the knowledge and information society. Where relationships and the way of communicating change in the human being.

By recapitulation, the stages of the revolution and their main characteristics are summarized:

Table 1. Stages of the industrial revolution and its characteristics.

Stage of Revolution	Main Features
First Industrial Revolution	Creation of first inventions. Various origin criteria. Possibly 1760 – 1840.
Second Industrial Revolution	Industrial stage. It emerged in the late 19th and early 20th centuries. New visionaries and large-scale job generation appear.
Third Industrial Revolution	Post-industrial stage. Called the computer age or digital revolution era. Computer and computer science pre-dominates.
Fourth Industrial Revolution	Also called revolution 4.0 and with other denominations Early 21st century New ways and tools to communicate over the Internet. Emergence of artificial intelligence and other sciences.

Source: own elaboration.

Facing of all developments that could result in progress for humanity, for the critic and analytic of the digital culture Bernard Stiegler (2014, p. 150) externalizes that we are in the hyper-industrial phase that transforms social, economic and cultural structures, where hyper control is carried out through a generalized automation process. Moving from an era of proletarianisation to digital retention or what Stiegler himself points out (2014, pp. 147-148) that hyper-industrial society has given way to the loss of know-how in the 19th century then to the loss of knowing-living in the twentieth century because of the mass media and now in the twenty-first century the loss of theoretical knowledge with the integral automation that digital technology enables.

For a better understanding, what he refers to with the hyper-industrial society to which Stiegler refers, in the review of the book *"La société hyper-Industrielle"* by author Pierre Veltz, mentioned by Eguzki Urteaga (2017, p. 188), it is caused by the processes of economic globalization, territorial forms of the knowledge economy, new industrialization and business strategies, which causes super-industrial society as a representation of a new productive capitalism that society lives.

Making a socio-historical review, the human being is the centre of change and the transformation process lived and now with greater force in digital transformation. The technologies almost force, or put more subtly, invite companies to readjust their work dynamics and that implies a series of changes and adaptations.

The digital transformation must be seen as a stage of business development for the company, but also employees. For Javier Neira (cited in Portfolio, 2019), digital transformation is not only about technology, but its meaning is also broader, it is understanding the customer and always improving the user experience, using technology as an ally, so that processes of attraction, retention, remuneration and development evolve and achieve their objective.

New technologies are changing the dynamics of production, service and consumption processes, which makes the nature of business also change. There are manufacturing processes in the industry that have already been automated and others that are also likely to be automated to improve their efficiency (González-Filgueira & Rodríguez, 2018, p. 2).

What has been addressed so far is a referential framework that allows a retrospective of what happened and that aligns with the subject matter of this article, intelligent automation in communication management.

4. The power of automation in organizations

Advances in technical developments in computer hardware and software have allowed the introduction of automation in virtually all aspects of human-machine systems (Parasuraman, Sheridan, and Wickens, 2000, p. 286). This science not only replaces physical matter, but also causes changes in the activities developed by human beings.

The technological development of which we are a part is linked to the automation that for Parasuraman et al., (2000, p. 287) refers to the total or partial replacement of a function, previously performed by the human being, and the level of application, that is to say, if the process is light or highly automated. To better understand the concept of automation, the Royal Academy of Exact, Physical and Natural Sciences (*RACEFyN*) of Spain, starts from the definition of automatic, understood as the set of methods and procedures for replacing the operator in physical and mental tasks previously programmed, therefore, is understood by automation to the application of the automatic to the control of industrial processes and that has evolved to many fields of science. The Dictionary of the Royal Spanish Academy (2019) derives it from the verb automate the same one that has two meanings: on the one hand, "convert certain movements into automatic", and, on the other, "apply the automatic to a process or to a device."

The definition of the Oxford English Dictionary (1860) is also rescued, when it refers that automation is the action or the process of introducing automatic equipment or devices into a factory or other process or installation, or also the fact of doing something through of a system, device, etc. automatically. In addition, since the 1950s it was related to mechanical or electronic devices and allowed the replacement of people's work, which has remained until today.

For Parasuraman et al., (2000, p. 287) automation refers to the total or partial replacement of a function, previously performed by the human being, and the level of application can vary, that is, if the process is slightly or highly automated.

In another investigation, Parasuraman and Riley (1997, p. 231) define automation as a concept that can change over time, under the conception that automation comes from a machine (usually a computer) and where the assignments of functions from human to machine will be transferred and will change over time.

There are several criteria regarding the roots of automation, for Sergio Parra (2014) dating back to very ancient times before Christ:

> In the eighth century B. C., Homer, in his famous *Iliad*, already describes mechanic servants endowed with intelligence built by Hephaestus, the god of metallurgy. Between 400-350 BC., Archytas of Tarentum built an automatic bird. Between 262-190 a. of C., Apolonio of Perga invented a series of water-driven musical automatons. Ctesibio also built musical automatons, whose sound was created by the passage of air through various tubes.

For Macau (2004, p. 2) one of the first milestones that marked the history of automation is that "since 1960, information technology is introduced in organizations with the aim of automating repetitive administrative tasks (accounting, billing and payroll, mainly) "transforming the organizational processes of the companies from that time until today. The next big step, taken at the end of the seventies, according to Rafael Macau (2004, p. 3) is the emergence of the concept of "Management Information System (MIS), an integrated information system that, based on a design global, includes both systems of automation of bureaucratic work and management information systems of the different management levels "within an organization.

For Gerardo Tunal (2005, p. 196) automation has two origins that approximate the 1980s. The first when the statesman of the United States Census Bureau, Herman Hollerith, had created a computer that was capable of classifying perforated files, duplicate them and compare them, being able to encode population data to generate census statistics; and the second milestone, when in 1994 Howard H. Aiken, from Harvard University, created the first fully automatic and electronic calculator, the Automatic Sequence Control Calculator (ASCC for its acronym in English, Automatic Sequence Controlled Calculator), with which there was possible to perform continuous operations previously programmed. Inventions that for the time kept a high value for the conditions and technological advances in which they were developed, the first has even been considered as a pre-computer.

Pablo Míguez, points out Coriat's work *"The workshop and the robot"* where the passage of Fordism to the Post-Fordism is analysed, focusing mainly on the emergence of new ways of work, such as microelectronics and computer science, which would have led to a new wave of innovations, in the so-called "era of automation" and what would be the first stage of automation "(Míguez, 2008, p. 3).

What is evident is an automation that has been perfected and improved over the years to become intelligent and self-sufficient technologies through technological systems and equipment.

For Bravo, Santana, & Rodón (2014, p. 269) "the essence of the automated role is related to the extent to which technology performs activities replacing the human". For Kaber and Draper (2004) cited in (Bravo et al., 2014, p. 269) they state that who makes the decision to automate the processes and to differentiate the activities that will be carried out by humans and machines is the responsibility of the organization. In this same sense, Davis (1986, p. 299) states that the general

managers of organizations play an increasingly important role in decisions related to the computer support used within them, by their collaborators.

Automation draws public attention to the economic benefits it can provide, or at least those perceived (Parasuraman et al., 2000, p. 286). It has freed humans from many activities, especially those that require a lot of time and physical effort. It is now possible to make human work more productive, which increases the demand for work (Acemoglu & Restrepo, 2019).

David Autor (2015, p. 5) argues that the interaction between the machine and the comparative advantage of the human being allows computers to replace workers in performing routine and coding tasks while extending the comparative advantage of workers in the provision of problem-solving skills, adaptability, and creativity, which at no time can or at least until now have not been replaced by the human being. These cognitive functions such as decision making, planning, and creative thinking are those that automation has not been able to replace (Parasuraman and Riley, 1997, p. 231).

Maintaining a more critical stance, Tunal (2005, p. 100) believes that the impact of technological change on some contemporary productive organizations has been more harmful than beneficial for some social groups, and this because computers, and with it computer networks, have allowed the development of new types of relationships and capacities, not always applied with responsibility. In addition, he points out that the technological impact on the automation of work processes is inevitable; therefore, senior managers must have the ability to reconfigure their way of doing management.

Automation advances rapidly, and the challenges of replacing workers with machines in tasks that require flexibility, judgment, and common sense, remain many; considering that, in many cases, machines replace and complement human work.

For Bravo et al., (2014, p. 269) who make an analysis of the relationship between automation and the usefulness of information systems, state that a system can have two roles, the first is to produce information (computerize) and the second, to automate activities replacing people, and both cases apply to any area of the organization, although they add that due to the impact of technology, the one that has mostly grown is the first.

The digital transformation by the hand of automation is transforming the organizational systems of companies, making them more efficient and dynamic. One of the main reasons for automating processes in an organization is to reduce the possibility of human error, by reducing the high physical and mental workload that is demanded (Parasuraman & Riley, 1997, p. 235). Automation has allowed organizations to evolve according to their institutional background and to deploy a variety of ways complementing or linking each other (Tunal, 2005, p. 99).

The thought of Coriat (1992, 68) cited by Gerardo Tunal (2005, p. 99) is confrontational when states:

> Do not forget that the factory of tomorrow is not a factory without men and that the future, in no way is the one of the integrated automation of tasks and functions, because total automation is impracticable, for both scientific and technical and financial reasons, and that applies to the entire horizon of the foreseeable future of any country.

The relationship between man-machine is a tradition that has been spun for decades. The first confrontation according to Idoia Salazar (2018, p. 331) was made when human force was replaced by steam engines. From that moment until nowadays, the relationship won't be lost.

The inevitable is, that future societies will use information technologies to achieve their objectives, spread their values, and expand the opportunities of citizens, communities and organizations (Barber et al., 2004, p. 11). And now, with the technological growth, this digital transformation, to which companies are called to join, has already begun to live.

According to a research carried out by experts in the field of technologies, the next technological package for companies are composed of four letters, *DARQ*, and by its acronym in English (Technology Vision & Accenture Research, 2019, pp. 10–11):

- Distributed Logging Technologies (DLT), which refers to the expansion of networks without the use of a trusted third.
- Artificial intelligence (AI), which will lead to process optimization and strategic decision-making attached to automation.
- Extended Reality (XR), through immersive technology where new experiences will come to people and actively engage
- Quantum computing, which is mainly linked to providing solutions through novel methods to solve complex computational problems.

Considered the basis of digital transformation for companies, where each one brings with it a great opportunity to offer differentiated products or services in the market.

The technology industry is moving very fast and in this sense Mark Patrick, states that in the "intelligent factory model of Industry 4.0" two key elements are combined: human experience and automation (Mark, 2019). Mark himself, makes a projection of 5G technology that is growing rapidly and that will change "the production, shipping and service of goods and products throughout its life cycle… causing new and better levels of quality and quality. consumer choice "(Mark, 2019). This fully aligns with the automation processes where companies are in the process of development.

The least strong impact of automation, or where it is expected that it will not grow on a large scale, will be in sectors of the population that have lower educational levels (Hualde, 2015, p. 9). According to a report by McKinsey Global Institute (2017, p. 4), it is estimated that automation will allow global productivity to grow from 0.8 to 1.4 percent annually and for this to happen, human beings will continue to be necessary in the workforce and this will be achieved only if joint work between machines and humans is achieved.

For David Autor (2015, pp. 3-5) the last two centuries of automation and technological progress have not made human labour obsolete, he considers that the employment-population relationship increased during the 20th century. He agrees that automation replaces labour, but also complements labour and increases production. There are journalists and commentators who tend to exaggerate the degree of substitution of machinery for human work and ignore the strong complementarities between automation and work that increase productivity, increase income and increase the demand for work, says Author.

The McKinsey Global Institute report (2017, pp. 8-9) states that within organizations, many collaborators will continue and others will need to start interacting to work and double with machines to develop their daily activities, especially those that require physical activity. Besides, the same collaborators must acquire new skills to function in the current environment of automation growth.

Although Acemoglu and Restrepo (2019) say that since the beginning of the industrial revolution automation has meant a growth engine, they believe that unfortunately, the current trend in the development of commercial intelligence is towards increasing automation and that new technology allowed to create value to the work of human beings. For Maurizio Ferraris (2011) cited in (Baldi, 2017, p. 195), declares that we have finished living in the communication society and enter into the registry. New technologies keep track of us through the data we leave, both in what we generate and what we consume.

Taking a retrospective look at everything that is analysed regarding automation in organizations and the thinking of different critics, it is evident that mechanization is a previous stage to reach automation and that, if you look to the future, this stage it will be full of artificial intelligence and new inventions and in better versions seen until now.

This is confirmed by the authors named Parasuraman, Sheridan, and Wickens, (2000), who think that automation has been involved in almost all aspects of the systems. Bravo, Santana, and Rodón, (2014), point out that the automated role is linked when technology replaces the workforce of the human being. Barber et al., 2004; Mark Patrick, 2019; David Autor, (2015); Acemoglu and Restrepo, (2019), believe that future and existing societies will use technologies and automation in an accelerated way since they are a growth engine for daily living and organizations.

On the other hand, Davis, (1986); Kaber and Draper, (2004); Tunal, (2005); state that it is the highest representatives of the organization who have the decision to reconfigure the management processes and make decisions to automate internal processes and to differentiate the activities that humans and machines will perform.

Parasuraman, Sheridan, and Wickens, (2000), are optimistic in thinking about the economic benefits that automation can bring. In contrast to them, Coriat, (1992) thought that the future is not that of the integrated automation of tasks and functions, because it requires several elements to consider both scientific, technical and financial. For his part, Gerardo Tunal, (2005), who is very critical of the automation process, believes that the impact of technological change on some organizations and social groups has been more harmful than beneficial.

Finally, Parasuraman and Riley, (1997); David Autor, (2015), consider that the advantage that the human being has over the machines makes them take care of routine and non-cognitive tasks, which generates a differentiating element of high value for humans.

And what about automation in communication management?

Technological changes are causing a worldwide techno-scientific mutation in society, which rethinks communication (Cuadras, 2009, p. 23) due to the immersion of technologies and the new language with which they speak to us and with which we speak.

5. Automation in communication management

The new technologies create new environments, both human and artificial, of communication, some discovered and others not yet known, and establish new forms of user interaction with machines where they play different roles, to the receiver and transmitter classics of information; and, contextualized knowledge is built on the interaction that subject and machine establish (Cabero Almenara, 1994, p. 14).

The possibilities of communication and connection between people with technological advances have multiplied at an unimaginable speed. "The interconnected world that gives us the internet, artificial intelligence, robotics [and other sciences] will soon modify the routine of our lives, if it is not already doing it" (Salazar, 2018, p. 304). This is due to the high level of internet penetration, which is already part of our lifestyle (Perlado, 2013, p. 430), although there are more and more experiments that alter the communication field of organizations.

With the appearance of these technologies, the management and institutional organization models (Fernández-Torres, Gutiérrez-Fernández, & Palomo-Zurdo, 2019, p. 15) break down, especially transforming the classic communication models and leading them to digital conversion inasmuch as:

> Communication is not a linear process: it cannot be reduced to the cause-effect or stimulus-response relationship, because the human being always constructs meaning –interprets– from his world. Hence, communication can never be completely faithful because it occurs between humans, not between machines, and less we think that it is about making man as a machine so that he always responds the same to the same stimulus (Restrepo, 1995, p. 92).

Communication processes help create and/or develop more participatory forms of interrelation and organizations feel more committed and rely on communication to generate permanent transformation (Restrepo, 1995, p. 92).

Considering the strong impulse of technologies and the high value of communication in organizations, automation in communication management has not emerged like other fields. According to Ponsa and Ramon (2005, p. 11), the strongest industries related to automation are manufacturing and process industry, the first is closely linked to the presence of machines for the large-scale production process and quality and in the second one the automation of advanced control algorithms is applied, thus focusing on the support with rooms with distributed control systems. Both care for quality and cost processes. Therefore, "automation should be understood as a tool to improve management ..." (Rodríguez Gutiérrez, 1999, p. 75) and it is considered that communication is included within this management of organizations.

Another sector that has achieved a leap in automation is that of banking institutions, which have faced technology as a challenge and have taken with interest the competitiveness of their financial model (Akkizidis & Stagars, 2015), including artificial intelligence technology in several fields of its communicational strategy as operational. However, small financial institutions such as cooperatives are not yet prepared for this change and even so, it is the user experience that determines this evolution, which allows them to be transformed from a product model to a business model of clients. (Fernández-Torres et al., 2019, p. 16).

One of the most aligned to communication, which has a strong growth is journalism, where the media is the key factor. According to an investigation by Carreira & Squirran (2017, p. 75) the use of algorithms to produce news automatically, is

already happening in several newsrooms, it is done through platforms developed by external technology companies or by technical teams of the Own media. The origin of automated narration is over 40 years old and since the 1960s automatic text summaries have been applied, for example, in weather forecasts and since 1990, in sports, medical and financial reports (Carl-Gustav, 2017, p 124). Therefore, the way of producing and disseminating news has been absolute, where the news are prepared and published from processes executed by machines and where there is no intervention of any journalist to write the text (Túñez-López, Toural-Bran & Valdiviezo -Abad, 2019).

Actually, this new field of journalism has several denominations: robot journalism, automated journalism, algorithmic journalism, typed news, computational journalism (Carl-Gustav, 2017, pp. 123-125), cognitive journalism (Túñez López & Toural -Bran, 2018, p. 1885) or artificial journalism (Túñez-López, Toural-Bran & Valdiviezo-Abad, 2019) and is perhaps the improvement of journalists in these automation processes, which is based on using algorithms or application of processes of abstraction and automation of information to create news and facilitate it to readers or users of the network quickly.

Carl-Gustav (2017, p. 126) after a strong investigation concludes that it was Zuboff who introduced the concept of computer-mediated work in factories and offices in the 70s and 80s. However, the same author refers that the story Automation in the newsroom shows that everything has not been (yet) automated. Although for Shoshana Zuboff (1988) through (Carl-Gustav, 2017, p. 126) mentions that "everything that can be automated will be automated."

Right now, the news are being produced automatically in various countries, including United States, Germany, United Kingdom, France, Sweden, Denmark, Norway, Russia, China and South Korea and among the groups offering automated news are German SID (Sports Information Service); the Americans Yahoo / Los Angeles Times, Washington Post, Bloomberg, Forbes, ProPublica, Associated Press, the French Le Monde; the Swedish Mittmedia; the MeteoGroup group in the United Kingdom, the Chinese Xinhuae agencies and the Russian Interfax, among others (Carreira & Squirra, 2017, pp. 74-75).

Returning to the integral management of the communication of organizations, social networks, the cloud, the machine learning, the internet of things, big data, among others, are just some manifestations of a profound transformation of the markets and the way of doing business. The use of these technologies or platforms, break down barriers in organizations, transform business models and propose new ways of relating to both internal and external audiences. "To capture the interest of the different types of target audience, the use of digital communication tools that allow organizations to create direct and personalized contact tactics with each of the organizations has been established in recent years with each one of the users that make up their potential audience "(Navío-Navarro & Puebla-Martínez, 2019, p. 509).

One of these tools that facilitates personalized contact with audiences is automation. As well as it can improve the performance of almost any business process (McKinsey Global Institute, 2017, p. 17) seen even with a focus from communication and marketing.

In this sense, automation in communication management has two fronts of action, on the one hand, that of organizational communication understood from the perspective of the brand and public management, and on the other, marketing. According to the literature review, the latter with greater growth.

Around the automation from the organizational communication, there is little research that deepens on the advances in this field of communication. However, one of them is the Latin American Communication Monitor, carried out during

2016-2017 and applied to several directors of the communication, corporate or organizational department, agency CEO, team leaders, unit managers, team members and communication consultants, all of them from Latin America where it deals with automation in Public Relations and communication management. Although the study is initial, one of the results shows that there is a gap between what communication professionals think about automation and the actual implementation that occurs in organizations. In this regard "seven out of ten respondents believe that the adaptation of online services algorithms as search engines is important, but only 37.5% implement it in their own departments" (Moreno et al., 2017, p. 34).

The same study expresses that, "more than half of the respondents consider the algorithmic tools programmed for distribution (61%) and content creation (55.4%) important. However, only a minority have implemented these tools: 49.6% and 39%, respectively" (Moreno et al., 2017, pp. 34–35).

For Alberto Rodríguez, an e-commerce expert, "automation allows defining behaviours and guiding communication actions based on those milestones that the brand considers relevant. Every technological solution should be aimed at enriching the strategy with customer data, improving customer knowledge and meeting their expectations" (Business and Business, 2019).

Regarding automation from marketing, new changes and digital trends change the way things are done and have led to rethinking new work dynamics and results achievements for the sustainability of organizations with projections to remain in the market and be competitive against the competition.

Automated marketing was first proposed by John DC Little (Heimbach, Kostyra, & Hinz, 2015, p. 129) during his speech at the 5th Invitational Choice Symposium in Asilomar on June 1, 2001, under the motivation that there are many aspects that are being programmed on the web, an orientation of where the organization should go is needed and for this there are fundamental models that support these actions the data had already began to be collected automatically and to a large extent, the result of all these changes there appeared more opportunities to improve the work.

Under these arguments, Little (2001, p. 3) proposes marketing automation based on performance levels. The same as evidenced in the following figure:

Figure 1. Automation operating levels. Source: Little, J. D.. (2001). Marketing automation on the internet. In 5th Invitational Choice Symposium (pp. 1–8). Asyloma
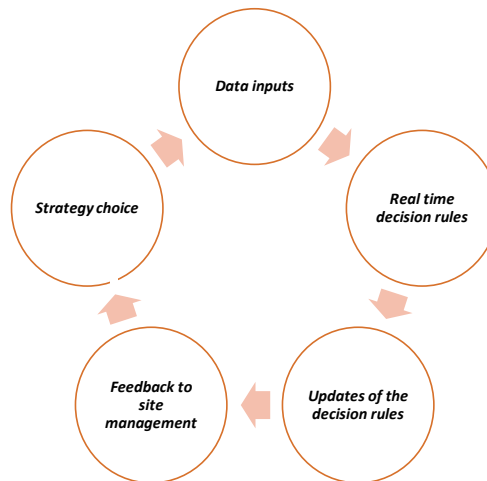
Source: Self- elaboration

This first marketing automation proposal was very generic (Heimbach et al., 2015, p. 129). However, it is valid until today, where profiles and adaptations are carried out in each of its stages for better administration and data management and especially better customer service for products or services.

Automated marketing is associated with customer relationship management systems (CRMS) and tends to be very easily confused with other fields that have points in common, but that have characteristics which make them differentiate between one another, so are the: database marketing, interactive marketing, electronic marketing, direct marketing, dialogue marketing or email marketing (Heimbach et al., 2015, p. 130).

For Irina Heimbach, Daniel S. Kostyra and Oliver Hinz (2015, p. 130) when referring to marketing automation they express that the centre of this is personalization or as they would also be called automatic personalization, where customers are made a communication based on personalized content and offers, complementing interactive or direct marketing with automated processes.

Automated marketing overcomes disciplines such as CRM (Customer Relationship Management) or email marketing, since it uses multiple data sources that are gradually incorporated in real-time and generates different contact points with the user through email, website, smartphones, mobile applications and many more channels that can be identified (Heimbach et al., 2015, p. 130).

With automation, even traditional channels are also prone to improvement. Technical configurations can be made to improve communication with target audiences, including the elapsed time or hours of sending messages, dates, IP

address (especially for location-based marketing), the device or the browser to which it is sent. Besides, being able to use individual information such as keywords entered in a search engine, purchase history, previous and current browsing behaviour or account configuration information (Heimbach et al., 2015, p. 131).

"The algorithms are even more relevant, or at least more useful in the day-to-day organizations when they are used for the planning of messaging routines, adaptation or even automatic content creation" (Moreno, Athaydes, & Navarro, 2018, p. 89).

Bucklin, Lehmann, & Little (1998, pp. 236-237) believe that automation will continue to grow, but they do not believe that all marketing decisions should be automated. Likewise, they believe that thanks to automation, the marketing manager will be able to occupy a role that leads to solve much deeper difficulties that could be aligned with this same automation process or other tasks of marketing, achieving greater productivity in the company. Bucklin et al. (1998, pp. 236-240) state that three key elements will enhance decisions in marketing automation:

Figure 2. Elements that enhance an automation process. Source: Bucklin, R. E., Lehmann, D. R., & Little, J. D. C. (1998). From decision support to decision automation: A 2020 vision. Marketing Letters, 9 (3), 235–246.
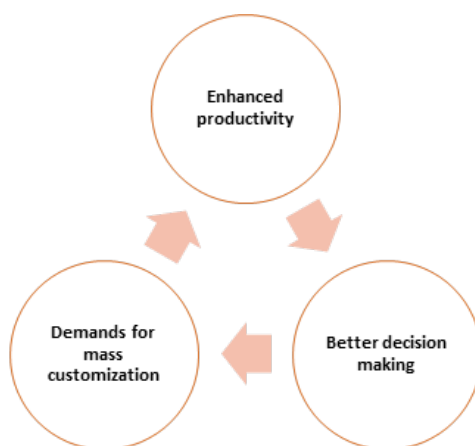
Source: Self-Elaboration

- **Improved productivity**, where the marketing manager stops participating in simple and repetitive decision making
- **Better decision-making**, using certain models can generate better effectiveness in decision-making than those made by the same managers, considering that the models can process a large amount of information, establish patterns and then predict certain elements for making decisions.
- **Mass personalization demands**, where automation allows the personalization of information for different marketing activities.

In communication, to establish the automation in any of its areas, it is necessary to review the communication structure of the organization and apply changes in its structures and processes. Optimally implemented automation provides the opportunity to improve the organization's performance by generating medium and long-term operational savings, strengthens the communication team, secures existing markets and allows finding new ones, gives you the possibility to refocus the business, ensures A better experience for the consumer or customer, makes visible the value of the organization and each of its products or services for the public. The automation of various activities can improve the performance of almost any business process (McKinsey Global Institute, 2017, p. 17).

However, there are also risks in automating communication, such as when starting a process of digital transformation at the institutional level. For Paulina Rodríguez Werner (2019) there are several reasons why companies do not achieve the expected results, including: lack of clarity in objectives, underestimation of process costs, individual work in certain areas, a communication that does not align to the action plan, the digital transformation plan does not consider training for its internal public, but especially it emphasizes that the human being is not taken into account as the main responsible for the implementation of the whole process, beyond the technological equipment .

Victoria Alarcon, a marketing expert says, "Technology plays a fundamental role, but brands must find a balance between automation and emotions, integrating both, to offer a closer and more valuable message" (Business and Business, 2019). Therefore, it is necessary that the target audience is accurately identified and that the companies adjust their products to the type of audience they want to reach in order to make the impact of the messages really desired.

Nowadays, information and content become protagonists and value reference in this new communication cycle (Perlado, 2013, p. 430), where the use of various channels or multi-channels by users or consumers, makes it diversify the dissemination of information and demand for immediate organization and responses to the demands of the public. Therefore, automation would generate high productivity thanks to the ease of decision making and the configuration of the processes that allow optimizing communication with customers.

6. The automation of communication supported by technologies

The relationships with the digital world are designed and managed by computer programs that provide personalized suggestions based on the questions and answers we generate. "The computer algorithms are designed to transform the process and the result of any online operation into automatism, deluding with the supposed transparency and neutrality of its computational processes" (Baldi, 2017, p. 187)

The presence of communication processes and actions are not only an ornament of administrative work, but they are understood as essential components of the organizational framework. These communication processes - which exist even when they are not taken into account - are inherent in the business operation of any organization; they cross it by configuring it in what it is. Communication actions and processes become co-formatters of the identity and culture of any organization and, therefore, of the projection of its image (Restrepo, 1995, p. 92)

Responding to the research question, it is evident that for the automation to advance and be established in the management of communication in an organization, the support of several technologies is fundamental, that we consider four the ones with the greatest impact and that others could possibly increase according to advances in technological developments:

– Internet of things
– The big data
– Robots
– *Chatbot*

6.1. Internet of things

Internet of Things or IoT for its acronym in English and which translated into Spanish means the internet of things, has emerged by the Internet-based Business Solutions Group (IBSG, Cisco Internet Business Solutions Group). Its name is due to the fact that it is the point in time when more "things or objects" were connected to the Internet than people, as Dave Evans (Evans, 2011, p. 2) points out in his work the Internet of Things. How the next evolution of the Internet changes everything.

The internet of things, IDC (sometimes called the internet of objects) represents the next evolution of the internet, which is a huge leap in its ability to gather, analyse and distribute data that becomes information, knowledge and then become wisdom (Evans, 2011, p. 2).

This great technological revolution that is caused around the internet of things is one of the fields that will have a strong impact on people's communication. For Baldi (2017, p. 195), the internet of things through its new intelligent sensors will multiply the automatisms of everyday practices.

The internet of things, according to Marcelo Alcaraz (2014, p. 6), will allow two developments in communication, on the one hand, to analyse the behaviour of consumers following the preferences of their users and, as a result, generate new products to the market. In addition, on the other hand, generate personalized advertising according to the interests of consumers in a more interactive, specialized and focused way for each person.

With all the advances that the internet of things presents as a technology for worldwide use, it is estimated that it will contribute to the increase in sales of products from various traditional companies, leading them to hybridization between the traditional and virtual sales system.

The internet of things could represent the next evolution of the internet, which will be a huge leap in its ability to gather, analyse and distribute data that becomes information, knowledge and then become wisdom (Evans, 2011, p. 2), elements that become keys to generate a correct communication between organizations and different audiences.

This revolution is a fusion between technology and other sciences that allow advances in much broader areas seen and studied until now. It is a projection of the future with elements and advances never before experienced in humanity and that will contribute to automation.

6.2 Big data

The events developed during the process of revolution and industrial transformation and current technological change have been fundamental in history. Nevertheless, it is in the 20th century that it is a reaffirmation of automation through big data (Túñez López & Toural-Bran, 2018, p. 185) and other technologies such as the internet of things that has allowed automation smart arise. Possibly this is the technology that has generated the most contribution to automation.

Big data are two words in English that translated into Spanish refer to large amount of data, an immense set of information that is complex storage, analysis, and management. Right now, big data represents an opportunity for rapprochement with audiences for organizations. So companies begin to segment the databases according to their audiences of interest and thus avoid excessive accumulation of information that is very complex to administer.

Part of this big data growth, which has been caused in recent years, is due to the development of the capacity of computers and other machines aligned to electronics to store to analyse and use information generated by companies or the same internet platforms.

When the machine is used for the analysis of big data in communication, texts can be built and that is what journalism has done so far. For Carreira and Squirra (2017, p. 66) the value of big data is not only the exploitation of the data itself, but the possibility of building a narrative from it. And it is because of this that the automation of news is provoked where there are technologies and techniques joined through programming codes that yield the final result of the news.

It is important to keep in mind that the starting point to think about this moment in history and its communication objectives are not the data (Hammond, 2013). The data help communication and are support tools. The machine can provide us the human link between the world of big data and the final game we want, a world of evidence-based information and decision making.

With the appearance of the first databases, understood as what we now know and that occurs in the seventies, and from there, begins to manage relevant and appropriate information, which shows the impact of information systems and its value in work within institutions (Macau, 2004, p. 4)

Through big data, companies begin to perform data mining based on interpretations of the data obtained. For Ortega Mohedano and Coronel-Salas (2019, p. 826), the data mining technique allows data analysis to be used for predictive purposes. Even in commercial information, today it is a valuable resource for organizations. According to Moreno et al. (2017, p. 35) in companies the use of automation, data analytics and algorithms have a great tendency to link with various tools that allow creating several activities for the day-to-day activities of the organizations.

In communication, big data has generated high value for the areas of communication and marketing, but especially for the last one, where data is key to get to know and analyse the market, to know patterns, tracking sales, developing messages that contribute with value to products or services, make decisions and to know trends. In the field of public relations or strategic communication, the use of big data is relatively recent; however, in marketing it has had a greater rise (Moreno et al., 2018, p. 89).

Right now, this new field to be exploded poses new opportunities and challenges for strategic communication, opening countless possibilities and new challenges for professionals in this field of communication.

The combination of strategic communication, automation and big data is a challenge for organizations, as one of the main objectives would be to improve the dissemination of messages from the organization to different audiences. "The objective of automation is to use this data to feed algorithms that allow the creation and distribution of content and not only for analysis or decision making" (Moreno et al., 2018, p. 87).

"The algorithms are even more relevant, or at least more useful in the day-to-day organizations when they are used for the planning of messaging routines, adaptation or even automatic content creation" (Moreno et al., 2018, p .89).

"Big data and algorithms pose opportunities and challenges for strategic communication as a discipline and as a practice, as a specialized function within organizations" (Moreno et al., 2018, p. 90). Meanwhile, in marketing, big data becomes an opportunity where marketers use it to target advertising (Boyd & Crawford, 2012, p. 664).
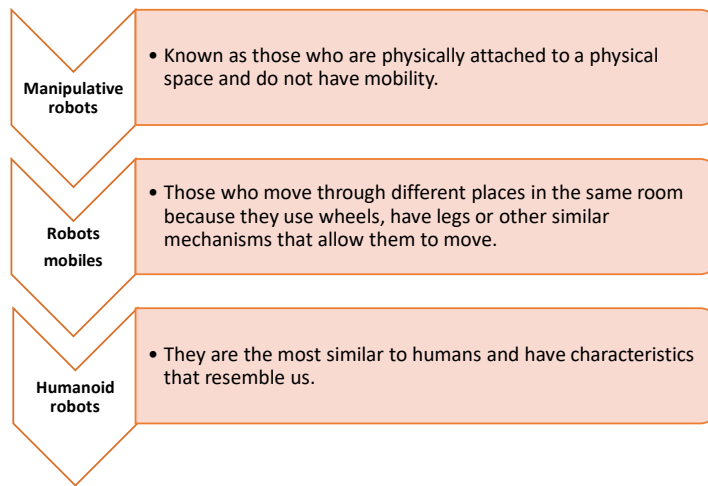
6.3 Robots

The term robot, is coined by the Czech, Karel Capek, through a melodrama more than a century ago, in 1920. Its meaning is mainly linked to work in slavery, in that they are automatons without soul, desires or feelings. The author in the same work allows them to evolve and become humanized robots (Capek, 1920, pp. 4-5).

In communication, the robots are being used in the journalistic exercise and have opened the possibility to a new market in the form of production and consumption of information (Sánchez Gonzales and Sánchez González, 2017, p. 65) and also to its application in other communication areas.

For Russell and Norvig (2008) "robots are physical agents that perform tasks through physical manipulation of the world. To perform these tasks they are equipped with effectors such as legs, wheels, joints and clamps. The effectors have only one purpose: to transmit physical forces to the environment" (p. 1023).

There are 3 categories of robots (Russell & Norvig, 2008, p. 1024):

Figure 3. Robot categories. Source: Russell, S., & Norvig, P. (2008). Artificial Intelligence A Modern Approach. Madrid - Spain: Pearson Prentice Hall.

Manipulative robots
- Known as those who are physically attached to a physical space and do not have mobility.

Robots mobiles
- Those who move through different places in the same room because they use wheels, have legs or other similar mechanisms that allow them to move.

Humanoid robots
- They are the most similar to humans and have characteristics that resemble us.

Source: Self-Elaboration

According to investigations conducted by Professors Frey and Osborne (2017, p. 265) from University of Oxford, artificial intelligence is expected to increase the presence of robots in various fields of society. One of them could be communicated to achieve a quick connection with the public.

Even the use of robots is linked to labour reports, so the McKinsey Global Institute report (2017, p. 4) presents an analysis of more than 2,000 work activities in 800 professions, where about half of the activities have the potential to be automated if proven technologies are adopted. Of this total of professions, few can be fully automated, less than 5%.

In the same study, it was found that about 60% of all professions are made up of automatable activities and represent at least 30%. Likewise, the activities with the greatest potential to automate are:

– Predictable physical activities: 81%

– Data processing: 69%

– Data compilation: 64%

Where especially the processing and compilation of data are fields in which communication and marketing are linked.

For Nic Newman (2017, p. 29) several professional profiles are at risk of losing their jobs in the future while we advance to automation, including taxi drivers, personal assistants, factory workers and finance employees and many more. In the field of journalism there is no risk of the extinction of the profession, what will happen is that professionals must become proactive actors and generate more personal contribution in aspects that machines do not develop, as is the case of the cognitive part (Túñez López & Toural-Bran, 2018, p. 1886).

For the writer Hualde (2015, p. 7) is very emphatic stating, "Automated machines will not replace workers, but will perform complementary tasks." For Idoia Salazar (2018, p. 296) "robots and artificial intelligence will help in the automation and improvement of many of the manual processes we do today" and the communication field will not be unnoticed and we believe that it will also be part of this worldwide trend.

6.4 Chatbots

Chatbots are technological resources used in a variety of fields: communication of organizations (sales, business, electronic commerce), education, banking services, entertainment, services, and technological systems/equipment, media, and others. Defined by Herrero-Diz and Varona-Aramburu (2018, p. 743) as "a program that interacts with users using natural language to simulate a human conversation".

For Shawar and Atwell (2007, pp. 29–30) a Chatbot system is a software program that interacts with users informally, using natural language when trying to simulate a human conversation. There are different terms to refer to a Chatbot such as: machine conversation systems, virtual agents (virtual agents), dialogue systems (dialogue systems) and chatterbot (chatterbots).

At the discretion of Letheren and Charmaine (2017), Chatbots are artificially intelligent pieces of software, capable of having a conversation with a human. Up to now, there is no perfect Chatbot, but they are being perfected more and more, being able to do countless tasks, such as helping you schedule certain personal activities, attending online queries in various institutions and endless actions. These conversational agents that use natural language have increased their use in recent years due to the increase in technological personal devices. This is the case of Mika, Alexa, Siri and many more that are used for a variety of personal activities.

According to Shawar and Atwell (2007, p. 35), the initial objective of building Chatbot systems was to imitate human conversation and entertain users. For Weizenbaum (1966, 1967), cited in (Shawar & Atwell, 2007, p. 35) the first Chatbot built was Eliza, created in the 60s by Joseph Weizenbaum to imitate a psychotherapist in clinical treatment.

The idea is based on Eliza's understanding of the keywords that came to her and accordingly, responding to move forward in the conversation and if she didn't, she would recover a previous comment and return to the conversation, all using previously established protocols and rules. For example, if the entry includes the keyword "mother," ELIZA can answer, "Tell me more about your family." This rule is inspired by the theory that the mother and family are fundamental to psychological problems, so a therapist should encourage the patient to talk about family; but the ELIZA program does not really "understand" this psychological strategy, it simply fits the keyword and regurgitates a standard response. To maintain the conversation, ELIZA has to produce answers that encourage the patient to reflect and inspect, and this is done mechanically using some fixed phrases if there are not (Shawar & Atwell, 2007, p. 35).

In expressions of Shawar and Atwell (2007, p. 45), Chatbot should be created to generate new tools that help people, facilitate their work and improve interaction with computers, but not replace the human role and Perfectly imitate human conversation. Parallel to this, Colby (1999, p. 6) states:
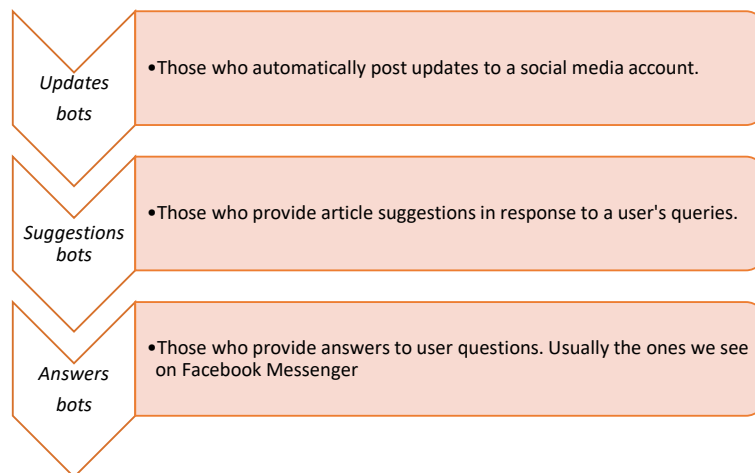
> We do not need to take the human-human conversation as the gold standard for conversational exchanges. If one had a perfect simulation of a human conversationalist, then it would be a human-human conversation and not a conversation with a computer with its sometimes strange but relevant properties. Before computers existed, we could distinguish people from non-people based on their ability to participate in conversations. But now we have hybrids that operate between people and not people with whom we can talk in common language. Pure machines can only be hit, but these new hybrids are interactive instruments with which you can communicate.

The digital transformation has reached publicity, the Chatbots are connecting with artificial intelligence through large amounts of data or big data and machine learning to personalize their responses and attention to consumers, which has turned towards a change and remarkable growth of communication. According to Gartner (2011) by 2020, clients will be responsible or 85% of their relationship with the company will be in their possession, without needing to interact with a human being.

Artificial intelligence has made Chatbots very convincing, as long as they have enough data and time they can integrate technologies and functions for various devices (Letheren & Charmaine, 2017), thus providing many facilities and advantages for organizations.

For Herrero-Diz and Varona-Aramburu (2018, p. 744) "the purpose of Chatbots is to become conversational media and master digital rhetoric through the development of a natural language, the closest thing to a human, that generates emotions". There is a diversity of Chatbots, including two proposals by different authors. On the one hand, Pablo Bradshaw, a professor at Birmingham City University, (cited in Newman, 2017, p. 16) refers to three types of bots focused on the journalistic field:

Figure 4. Types of bots in the journalistic field. Source: Newman, N. (2017). Journalism, media, and technology trends and predictions 2017.

Updates bots — •Those who automatically post updates to a social media account.

Suggestions bots — •Those who provide article suggestions in response to a user's queries.

Answers bots — •Those who provide answers to user questions. Usually the ones we see on Facebook Messenger

Source: Self-Elaboration

On the other hand, Gartner (2019), mentions three types of virtual assistants:

– Virtual personal assistant (VPA)
– Virtual Client Assistant (VCA)
– Virtual employee assistant (VEA)

In the case of the VEA, for its acronym in English, at the discretion of the Director of Gartner, Annette Jump, it is expected that organizations in the next three years make great use internally, although it has been proven that they are also used for customer service and information inquiries. To all this is added that, by 2023 many of these applications will have interactions through voice (Gartner, 2019).

Angel Hernández, managing partner of Chatbot Chocolate states:

> Chatbots become an easy tool to introduce and use within companies, since they are based on a conversational format that all employees, regardless of their age, are accustomed to chatting. Besides, its implementation allows releasing part of the workload in these areas of the company that is sometimes dedicated to repetitive, low-value and easily automatable questions" (Diario Siglo XXI, 2018).

7. Conclusions

The technological revolution in which we are immersed is changing the way we see and understand the world. Moves the dynamics of communication and social interaction. It does not only transforms technological or physical aspects, but it is also moving deeper aspects of the human being.

During this process of technological revolutions it is the human being who has had the most capacity to adapt to changes and transformations and with the speed at which it grows, it will be the same man who must open his mind and engage in incalculable technological realities that even have not yet been discovered and predict an unimaginable future.

Given this technological growth, organizations must have a clear vision of where to walk, what is the change in corporate culture that they want to give the company by aligning their business strategy to technological, competitive, efficient, and sustainable standards so that they remain aligned to the trends and challenges of technological changes.

The current reality is that digital transformation is radically changing the helping processes or support of organizations. Therefore, the application of new technologies in organizations changes several fields of production and services, and organizations must be prepared for those changes. In this same sense, new technologies are a key factor in the progress of the implementation of automation in the communication management of organizations; However, its momentum or stagnation may also depend on other internal factors of the organizations themselves. However, it should be clear that the value of communication allows developing new forms of more participatory interrelation between the public and organizations.

The automation of communication and marketing management could be considered a strong and high-value pillar for organizations, as it is a field that has remarkably emerged in recent years and presents a visible projection of future and growth for organizations. Even indistinctly the field in which they are operating.

As we have seen, the state of the art of automation in communication and marketing highlights the need to generate new research. In a special way, about the role of the human being, knowledge, behaviour in front of the various advances in automation, the impact of automation and how audiences receive these changes and the level of satisfaction in front of them and even know the level of interest on the part of the organizations in automating certain actions within the communication management, which could lead to new research from the academic field.

Finally, it is considered that there are several factors that can influence the lack of success in the automation of communication management, on the one hand, the lack of a technical and real justification to automate a process, the lack of a real projection of economic investment and the lack of trained personnel to carry out the management of automated communication. However, this does not mean that it should not be limited to start automating communication management in organizations. On the contrary, if a correct application is achieved within organizations, it could mean and bring countless new favourable possibilities and make it more competitive and have differentiating elements that make the difference between brands. Therefore, the future projection that automation has in the field of communication could be of high impact.

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