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ENTREPRENEURSHIP 4.0: CONCEPTS AND DEFINITIONS

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Abstract:

The entrepreneur is the person capable of inducing a new conception or invention into a successful innovation. Entrepreneurship 4.0 is the agent capable of creating bridges and generating connections, gathering and adding productive resources, technology and physical efforts. The purpose of this article is to conduct a discussion on the theme of entrepreneurship 4.0, seeking to contribute to the theoretical construction, on entrepreneurship supported by innovation and information and communication technology (ICT) resources. When analyzing the literature, it was noticed the absence of works that spoke more about the entrepreneur of Era 4.0. The study used the exploratory research methodology of bibliographic nature, based on references already published from 2000 to 2019. Entrepreneurs 4.

Key words: Entrepreneurship, Innovation, ICT, Entrepreneurship 4.0.

1. INTRODUCTION

It is notable that, over the decades, entrepreneurship has changed, influenced by the development of technologies and more recently by the development of the internet, with the emergence of big data, artificial intelligence and the internet of things, which cause great changes in future business models (OECD, 2016; OECD, 2015). The nexus of innovation, entrepreneurship and competitiveness represents a real challenge for the economy (HERMAN, 2018) and for the entrepreneur not only in the way of creating a business, but also of making it sustainable.

In recent years, the visibility and importance of Small and Medium Enterprises (SMEs) for the national economy and for job growth is increasing (MOUROUGANE, 2012). Based on

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knowledge and its ability to be flexible and easy to adapt to constant market changes, it makes this category a dynamic and important part of the country (MATTHEWS, 2007; GOVORI, 2013). According to Alam and Noor (2009), regardless of size, the application of ICTs is a way that allows companies to be more efficient and have closer relationships with suppliers and customers, being recognized as an essential condition to have more competitive advantages in global markets. , optimizing the growth and survival potential of SMEs (PINHO et al., 2014).

The use of ICTs is closely linked to the use of the organization's resources in general, not only with the implementation of systems or equipment, but also as a tool capable of accelerating the innovation process (PAVLOU; EL SAWY, 2006). Thus, institutions that want to survive the challenges of the market must be able to adapt to the constantly changing environment (GONÇALVES et al., 2010). Making adjustments to the structure, internal changes, such as personnel training. Changes that lead to a new entrepreneurial profile in organizations, which in Era 4.0, can be called Entrepreneur 4.0.

It was observed during the research carried out in the national and international databases - Database of Institute for Scientific Information (ISI Web of Science); Scopus; Coordination for the Improvement of Higher Education Personnel (CAPES); Academic Search Premier (ASP); Elton B. Stephens Co (EBSCO), ScienceDirect (Elsevier), in publications from 2000 to 2019. In Brazil, there are not so many studies about entrepreneurship 4.0, so this study takes a preliminary step towards a broader understanding of the theme , seeking to understand the theme and contribute to the theoretical construction, on entrepreneurship supported by innovation and information and communication technology (ICT) resources, these being the objectives of this study. And as a suggestion for future work to investigate the aspiration capacity of Entrepreneur 4.0, as a profile of growth and development, which are the objectives of this study. For this, the methodology used was exploratory research of a bibliographic nature, based on theoretical references already published.

2. THEORETICAL FOUNDATION

2.1 THE ENTREPRENEUR

It is important to study entrepreneurship at the expense of being a mechanism that drives and develops society, enabling the innovation of both products, services and processes, thus emerging new markets and developing value generation. For Churchill (1992), entrepreneurship can be defined: “[...] as the process of discovering and developing an

opportunity to create value through innovation and take advantage of that opportunity without taking into account resources (human and capital) or location of the entrepreneur in a new business or existing company ".

Entrepreneurship has been a positive driving force for regional economic growth and development (ACS; ARMINGTON, 2004). Low and MacMillan (1988) emphasize that entrepreneurship is a process that can be carried out in a variety of contexts. In general, we can perceive entrepreneurship as a dynamic activity that helps in making changes and process innovation (GANGWAR; VISHWAKARMA, 2013).

For Filion (2000), it is the nature of the entrepreneur to perceive and take advantage of all new opportunities in the scope of business, starting to be seen as one that seeks the best possible arrangement composed of different resources, which may be inside or outside the organization, giving originating a productive unit with better conditions to negotiate in the market, thus generating new routes and expanding the market (VALE et al., 2008).

2.2 INFORMATION AND COMMUNICATION TECHNOLOGIES

The adoption and use of ICTs represent a fundamental source of competitiveness and growth for companies and countries that are able to exploit them, as the authors point out (JORGENSON et al., 2000). The adoption of ICTs is no longer a choice, but an obligation between different types of companies operating in different sectors. Small and Medium Enterprises (SMEs) are playing an increasingly important role in the economy and are increasingly encouraged to adopt new technologies (PARKER; CASTELMAN, 2007).

Information and Communication Technologies can be used in different ways, used to create, produce, analyze, process, retrieve, store and transform information (PINHO et al., 2014). That allow them to achieve differentiation from the competition with lower costs and greater productivity (GONÇALVES et al., 2010; RAYMOND et al., 2005). The legitimation of ICTs together with the internet enables new opportunities for companies in terms of larger trade, making SMEs able to sell their products in larger markets, favoring competition with large companies (RAMSEY et al., 2003).

Melville et al. (2004) states that the use of ICTs has positive impacts on the performance of companies in terms of efficiency, effectiveness, market value and market share, that is, the adoption of ICT is no longer a choice, but an obligation among different types of SMEs, it is

essential that companies are innovative, regardless of the sector to which they are inserted, so that they can succeed in today's markets, which are increasingly competitive (SALMERON; BUENO, 2006).

2.3 ENTREPRENEURSHIP 4.0 RELATED TO INNOVATION

The dynamics of the environment increasingly demands the quality of adaptation of organizations both through the entrepreneur and through innovation (MIGUEZ; LEZANA, 2018). It is indisputable that being innovative is essential for a company to remain competitive (ROSENBUSCH et al., 2011). Schumpeter's early works (1911) conceptually established the 'entrepreneur as an innovator' as a key figure in driving economic development that is still valid today.

The entrepreneur plays a significant role in identifying innovation (GEM, 2016), strengthening the essence of his relationship with entrepreneurship, which is based on the perception and taking advantage of new business opportunities, creating new ways of using resources, aiming at opportunity to transform ideas into new / improved products (ROSENBUSCH et al., 2011; TEECE, 2016). Transforming innovative managerial work into an important source of competitive advantage, especially in smaller companies (VACCARO, 2012).

The combination of entrepreneurship and innovation results in new companies based on innovative ideas (STEFAN et al., 2012). Therefore, the figure of the entrepreneur is configured as a creative person, who imagines, develops and realizes visions, detecting business opportunities through systematic actions and proactive attitudes (TEECE, 2016; MIGUEZ; LEZANA, 2018).

The entrepreneur's behavior is influenced by the institutional environment, which, when concerned with the way that people and organizations protect and legitimize their positions in the market (TEECE, 2016), promotes the adhesion of innovative activities, which influence the strategic behavior of companies in response to institutional changes (GOME-ZHARO et al., 2011). Making entrepreneurial activity grow due to the increased possibilities of perceiving and acting in relation to the factors that influence innovation (MIGUEZ; LEZANA, 2018).

2.4 THE IMPACT OF ENTREPRENEURSHIP 4.0 ON ECONOMIC DEVELOPMENT

The changes resulting from the introduction of ICTs affect almost all aspects of the economy, including the dynamics of innovation, productivity and growth, company performance, the development of market structures and the demand for work (KOSSAÏ; PIGET, 2014). What influenced the increase in investments in ICTs, on the part of managers, was the possibility of using it as a competitive tool, adopting existing technologies or making incremental improvements (PINHO et al., 2014; ABID; AKHTAR, 2016). This makes the adoption of ICTs a means of innovation and an important driver of growth and development (OECD, 2015).

SMEs and entrepreneurship are key sources of dynamism, innovation and flexibility in developed economies, as well as in emerging and developing economies (ORTEGA-ARGILÉS et al., 2009). The use of ICTs represents the foundations of competitiveness and economic growth for countries capable of exploiting them (OLLO-LÓPEZ; ARAMENDIA-MUNETA, 2012). It is valid to show that according to Porter et al (2002) there are three stages of development of SMEs, the factor-oriented stage, the efficiency-oriented stage and the innovation-oriented stage. According to the Global Competitiveness Report 2015-2016 WEF, (2015) Brazil is in the transition from stage II to stage III, therefore migrating fromthe efficiency-oriented internship to the innovation-oriented internship.

Research that assesses the role of entrepreneurship in economic growth in developed countries, suggests that a good business environment leads to sustained economic progress, leading to market expansion and innovation (STEL; THURIK, 2004; STAN; STEL, 2011; AFGHAH et al. 2014; MRABET AND ELLOUZE, 2014; FONTENELE, 2010; ALMEIDA et al. 2015; BARTOLOMEU, 2015). Driving companies to develop cutting-edge products and processes, advancing to activities with higher added value (WEF, 2015).

Although some surveys have not found the same optimistic results for countries with low levels of economic development (STEL; THURIK, 2004; STAN; STEL, 2009; MRABET; ELLOUZE, 2014; FONTENELE, 2010). Bosma et al., (2010) emphasize that entrepreneurship in the least developed countries should not be discouraged, since sustainable businesses can generate better living conditions and in the long run generate benefits for the next generations.

The relationship between entrepreneurship and economic growth is far from fully understood. According to the GEM report (2007), as the scientific evidence for this relationship has emerged, institutions have become increasingly important in the composition of this

relationship. Therefore, it is necessary to do more than quantitative measures of entrepreneurship, but also qualitative measures (BOSMA et al, 2008).

3. METHODOLOGY

The research started with a search for publications on the topic addressed, using both national and international databases, such as the Database of Institute for Scientific Information (ISI Web of Science); Scopus; Coordination for the Improvement of Higher Education Personnel (CAPES); Academic Search Premier (ASP); Elton B. Stephens Co (EBSCO), ScienceDirect (Elsevier) and Google Scholar. Seeking publications from 2000 to 2019. Making this study a qualitative and descriptive research (VERGARA, 2014). According to Gil (1999), it aims to describe the characteristics of a particular phenomenon or establish a relationship between variables.

In the search, key expressions on the theme were used, namely: ["innovation entrepreneurship"], ["information technology"], ["innovation in small and medium-sized companies"], ["adoption of tics"], ["industry4 .0 "] and [" entrepreneurship 4.0 "], present in any part of the work. Providing contact with articles that use the most diverse techniques related to this topic, generating more variety for the research, and then, the state of the art in this area was verified. As the objective of this work is to carry out a discussion on the theme of entrepreneurship 4.0, seeking to contribute to the theoretical construction, on entrepreneurship supported by innovation and information and communication technology (ICT) resources.

Publications in English and Portuguese were considered between the years 2000 and 2019. Studies in the English language were selected for the scope and relevance of the research and Portuguese was chosen for the opportunity to learn about regional solutions and studies with the same theme. The time interval was stipulated due to constant changes in the concepts worked on "entrepreneurship 4.0", "innovation in small and medium-sized companies" and "entrepreneurship and innovation". In total, 30,918 jobs were found, as highlighted in Table 1:

Table - 1

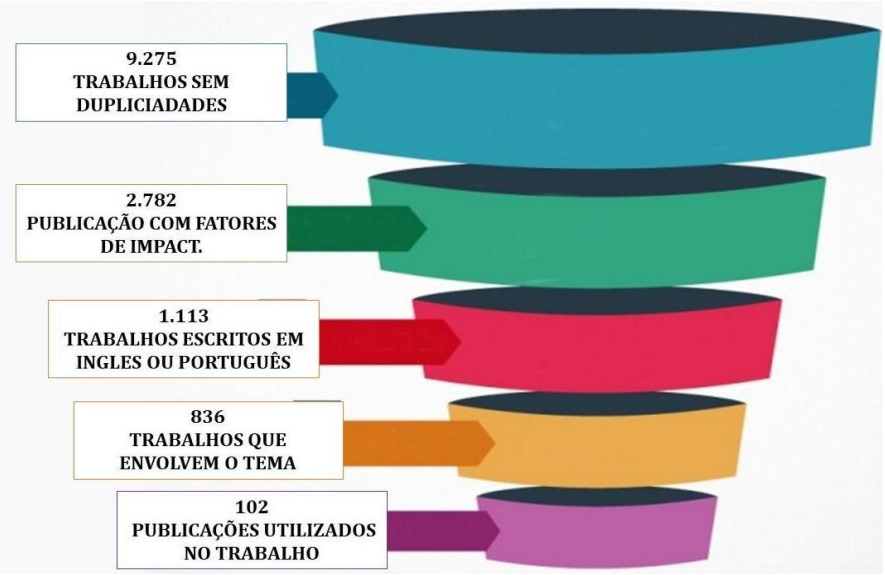
Digital Libraries	Number of Works	Search string
Scopus	191	["entrepreneurship innovation"], [entrepreneurship 4.0], ["innovation in small and medium enterprises"] and [“ICT adoption”]

Coordination for the Improvement of Higher Education Personnel (CAPES)	401	["entrepreneurship innovation"], [entrepreneurship 4.0], ["innovation in small and medium enterprises"] and [“ICT adoption”]
Academic Search Premier (ASP)	8,489	["entrepreneurship innovation"], [entrepreneurship 4.0], ["innovation in small and medium enterprises"] and [“ICT adoption”]
ScienceDirect (Elsevier)	62	["entrepreneurship innovation"], [entrepreneurship 4.0], ["innovation in small and medium enterprises"] and [“ICT adoption”]
Google Scholar	25,100	["entrepreneurship innovation"], [entrepreneurship 4.0], ["innovation in small and medium enterprises"] and [“ICT adoption”]

Source: Prepared by the authors, 2020.

Of the total of researched works, 102 studies were used based on the following criteria: the duplicity of articles found in digital libraries (i), being present in digital libraries with the impact factor A1, A2, B1 and B2 (ii), the language used to write the papers, only papers in Portuguese and English will be selected (iii), and the title and abstract must present discussions, debates, or business decisions on the themes “entrepreneurship, innovation, information and communication technology and SMEs” (iv), as seen in Graph 1.

Graphic 1



Source: Prepared by the authors, 2020.

Since all the selected documents do not focus on solutions or business decisions, but demonstrate the problem and its respective solutions and consequences of the use of various information technologies, on changes in the meaning of entrepreneurship, new innovative

techniques, the adoption of ICTs in small and medium-sized companies, the dimensions that impact the development and innovation of companies and the new profile of entrepreneur 4.0.

The theme addressed in this work, Entrepreneurship 4.0, is still recent, and there are not many national studies on the subject, this justifies the classification of this research as an exploratory study, because according to Gil (1999) a research is considered as exploratory when the theme chosen is little explored, as it seeks to know the subject in greater depth, which makes it difficult to formulate precise and operable hypotheses. This research takes place through a bibliographic analysis, from theoretical references already published, in order to collect information and recognition of the knowledge already raised by other authors, as explained by Gil (1999).

4. RESULTS AND DISCUSSION

In this section we bring together the topics covered in the theoretical basis of this article so that we can understand the emergence of entrepreneur 4.0, which was born motivated by the revolution of industry 4.0, a recent concept of industry that comprises the main technological innovations in the fields of automation, control and technology information and communication (ICT), applied to the manufacturing process (LEE et al., 2015), or in a comprehensive view, represents the change in production processes and business models, (SANTOS et al., 2018).

This new Era 4.0, is marked by the mixture of Cyber-Physical Systems, Internet of Things and Internet of Services, Big Data, among others (HERMANN et al., 2016). For example, Big Data is a tool capable of transforming the way companies operate, allowing them to collect accurate information about customers, competitors and suppliers and use it to make strategic decisions. So with the Internet of Things (IoT), omnipresence on mobile devices through sensors connected to the Internet and GPS, which also enable the generation and collection of data (BIANCHINI; MICHALKOVA, 2019).

This new era can be seen as a consequence of the introduction of ICT in everyday life, in processes and products, which promote innovative solutions by mobilizing and mapping resources, at the disposal of the ability to make decisions. It is not just about sophisticated resources, since for most SMEs, as well as new companies, there is no possibility to invest in technology, skills and data management necessary for an Artificial Intelligence (AI) system. The use of the internet to send e-mails to customers, the creation of a website, can both

contribute to improving customer service, as well as increasing the number of customers, in addition to expanding their reach, being able to reach customers in other cities , states (OECD, 2018; MATTHEWS, 2007; RAYMOND et al., 2005).

The author Consoli (2012) observed that Entrepreneur 4.0 seeks to manage the changes motivated by the adoption of ICTs, in order to obtain the best performance results through the alignment between investments in ICTs, internal capacities and organizational processes, acquiring a competitive advantage. .

For entrepreneur 4.0, it is extremely important according to Manochehri et al., (2012), to satisfy three conditions: adequate infrastructure, qualified ICT personnel and budget to invest in ICT. Already authors such as Taruté and Garautis (2014), propose that if there is some infrastructure, qualified personnel and sufficient budget for investment, it is possible to obtain a positive impact with the simple adoption of mobile resources (cell phones, PCs, internet) as a dynamism of operations, dissemination of knowledge, impact on company management improving entrepreneurial activity.

According to the study by Tan (2009) in Malaysia, what led SMEs to adopt ICTs were the benefits provided such as access to information and knowledge about the market, new business opportunities and a form of communication within and between organizations and its stakeholders.

In an analysis of the scientific literature, the author Consoli (2012), realized that the main effects caused by the implementation of ICTs, can be classified into 4 groups: development, growth, expansion and new products. Therefore, in order to better understand the relationship between the adoption of ICTs and the growth of the company, it is necessary to understand how it can contribute, what factors will allow or prevent contributions, and how growth can be sustained and supported in through the diversification of ICTs (MATHEUS, 2007).

In the analysis model developed by Albertin and Albertin (2008), the authors highlight as dimensions to be analyzed the way of using ICT, business performance, governance and administration of ICTs. The authors, Li and Chen (2011), suggest the analysis of ICT impact dimensions, such as: technology, organization, culture, strategy, production and marketing, as described in Chart 1.

Table 1

DIMENSIONS	DESCRIPTION	APPLICATIONS	AUTHORS
Technological	It is the ability to transform technological resources into technological advantages, that is, the capacity for technology developments and R&D, product development, production process, manufacturing and technological change.	A practical application can be observed in the case of manufactures, where managers use advanced techniques to analyze historical production data, identifying the patterns and the relationship between the steps and discrete inputs of the process, optimizing for greater yield effect (Bianchini, Michalkova, 2019).	CMRichard, Yam, JCGuan, KFPun and PY Tang. China. Research Policy, vol. 33 (2004), pp.1123-1140. C. Anthony et al. Ieee Transactions On Engineering Management, Vol. 55, no.3 (2008), pp.20-433. Powell, TC, Micallef, AN, 1997.Strategy Management Journal 18 (5), 375–405. Burgelman, R., Maidique, MA, Wheelwright, SC, 2004.McGraw-Hill, New York, pp. 8–12.
Organization	It is the ability to coordinate all activities towards shared objectives promoting cross-functional interaction, connecting different functional departments in the process of innovation and product development.	Grossman and Siegel (2014) presents a solution to relate the implementation of ICTs in the organizational environment, called “center of excellence”, where the ICT specialist from all business units can obtain information and knowledge from a central team. However, it is worth mentioning that this is not a standard solution, as the type of model depends on the business (Bianchini, Michalkova, 2019).	LWang and PKAhmed. Learning Organization, Vol.10, no.1 (2003), pp.8-17. I.Jeong, JHPae and D.Zhou.Industrial Marketing Management, Vol. 35 (2006), pp.348-358. Lu, Q., Lazonick, W., 2001. Research Policy 30, 55–77.
Culture	Competence to develop a system of shared actions, values and beliefs in a way that involves members to participate in the actions of creation and innovation.	The organizational culture is an operational competence shaped to guide the company's innovation. According to the model of Cameron and Quinn (1999), the type of culture that most favors the orientation towards innovation is that of adocracy, since its most characteristic values are flexibility, creativity and external orientation.	McAfee, A. and E. Brynjolfsson (2012), Vol. 90/10, pp. 60-68. RKChandy and GJTellis.Journal of Marketing Research, Vol.35 (1998), pp.474–487. MGMartinsons and RIInformation & Management, Vol. 32 (1997), pp. 215-228.
Strategy	Ability to adapt to the competitive environment, with the help of successful innovations in products and processes, adjusting resources, products, processes and systems.	The introduction of ICT practices in the decision-making process also causes an increase in productivity and performance. In the study by Brynjolfsson, Hitt and Kim (2011), a positive impact on performance measures was confirmed, such as production, use of assets, return on equity and market value.	CMRichard, Yam, JCGuan, KFPun and PY Tang. China. Research Policy, vol. 33 (2004), pp.1123-1140. Brockhoff, K., Guan, J., 1996. R&D Management 26 (1), 49–56. SDSaleh and CKWang. EEE Transactions on Engineering

			Management, Vol. 40, no.1 (1993), pp. 12–20.
Production	It is the ability to transform the results of R&D into products meeting the demands of the market, in addition to transforming the technological resource into a technological advantage, including the capacity for product, process and manufacturing innovation.	Bianchini and Michalkova (2019) bring the case of a manufacture, where operations managers can use advanced techniques to analyze historical production data to identify patterns between stages and discrete inputs of the process, in order to optimize the factors that provide higher yield .	CMRichard, Yam, JCGuan, KFPun and PY Tang. China. Research Policy, vol. 33 (2004), pp.1123-1140. Guan, J., 2002. Production and Inventory Management Journal 43 (3–4), 30–46.
Marketing	It is the ability to convert the company's internal technology into an external competitive advantage and bring results, through the ability to price, advertise and sell, link customers and channels in addition to market detection and distribution channel.	In a survey by Qiang, Clarke & Halewood (2006), companies that use e-mail to communicate with customers, for example, can grow 3.4% more quickly in terms of sales than those that do not.	CMRichard, Yam, JCGuan, KFPun and PY Tang. China. Research Policy, vol. 33 (2004), pp.1123-1140. C. Anthony et al. Ieee Transactions On Engineering Management, Vol. 55, no.3 (2008), pp.20-433. Cooper, RG, 1980. Journal of Marketing 15 (5–6), 277–292 RKChandy and GJTellis.Journal of Marketing Research, Vol.35 (1998), pp.474–487.

Source: Adapted from Li and Chen (2011)

4.1 THE ENTREPRENEURIAL PROFILE 4.0

The adoption of ICTs by companies is allowing new perspectives for growth and changes in the management of organizations to emerge (ASHRAFI; MURTAZA, 2008). To obtain positive results, it is necessary that the entrepreneur of Era 4.0 knows how to interpret the data, as the authors claim Bakhshi et al., (2014) “raw data are not enough to generate value”, a good interpretation of the data provides a range of opportunities for SMEs that can range from improving the understanding of the internal process, from the needs of stakeholders to understanding the characteristics of the market to which it is inserted (BIANCHINI; MICHALKOVA, 2019).

In a study by Brynjolfsson et al., (2011) with 179 companies in the USA, the authors assessed that companies that adopted data-based decision making obtained a 5 to 6% increase in production and productivity in companies. This is because data analysis contributes to leaner

production, optimizing processes and reducing production deficiencies (AUSCHITZKY et al., 2014, BIANCHINI; MICHALKOVA, 2019).

Decision-making based on data is a form of innovative managerial work, considered a source of competitive advantage, especially in SMEs (VACCARO, 2012). The impact of analyzing data for decision-making can be perceived through five channels: improvement of R&D, production and new goods or services that can be products or inputs, optimization of production and delivery processes (OECD, 2013).

It is worth noting that this change in the form of decision-making, previously based on intuition for one based on data, may not be immediately for senior entrepreneurs (MCAFEE; BRYNJOLFSSON, 2012). Due to the resistance to trust the results obtained by the data analysis, as the authors Ross et al. (2013) argue, companies that do not trust the information from the data obtained, probably the adoption of these strategies will not bring significant benefits.

Entrepreneurs wishing to adopt this strategy need to improve their skills to understand the results to convert them into positive impact actions (BIANCHINI; MICHALKOVA, 2019). In addition to the challenge mentioned by the previous author, a survey conducted in 2015 in Japan, in the manufacturing sector, showed that the lack of human resources and planning were the main obstacles to the use of data, even though the benefits of the new strategy are aware, the entrepreneurs they do not have a strategy to overcome the obstacle (MOTOHASHI, 2017).

5. FINAL CONSIDERATIONS

Considering the objective of the research study was to seek to understand the theme Entrepreneurship 4.0 and contribute to the theoretical construction, supported by innovation and information and communication technology (ICT) resources, based on national and international data, in publications from 2000 to 2019.

The business environment is becoming increasingly dynamic, complex and unpredictable where technology, globalization, knowledge and competitive changes address the impact on overall performance. SBS (2001) suggests that this change is the reason why many companies are looking for new ways to drive wealth creation in their businesses.

Entrepreneurship 4.0: Concepts and Definitions

It is important to be aware of the performance potential that results from the adoption of ICTs by a company, it is common to see managers adopting the use of ICTs as a way to stand out in the midst of competitiveness. Since innovation is a substance for the economic development of SMEs, it becomes notable in the market as well as in the way of managing the business. Transforming SMEs that innovate, contributing to success and increasing their chances of growth.

Entrepreneurship is a legacy that endures, a positive global impact, an inspiration for others, its spirit lies in creating value by making a tangible contribution. Exploring new ideas, new products, new markets, contributing to the transformation of the future, capitalizing on emerging opportunities. Applying management thoughts and techniques, standardizing and simplifying products and processes worldwide, conceiving and designing processes and analyzes, setting standards and creating new ones (FERNANDEZ-SERRANO et al., 2018).

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