Smart Systems to Mitigate Failure of Strategic Alliances

Abstract

Despite the strategic importance of alliances and the numerous benefits that this corporate strategy brings to companies, success rates are still very low, with several causes of failure presented in the literature. On the other hand, the implementation of smart systems has proved to be very promising when applied to the different tools of business management. In order to find solutions to this problem, the main objective of this investigation was to study the impact that the use of smart systems has on the operational optimization of the company and in mitigating the causes of failure of strategic alliances in Portugal. This research used a qualitative approach, through the content analysis of 17 interviews with managers and professionals in the area. The study concludes that the implementation of smart systems has the potential to mitigate 7 of the 10 main causes of failure of strategic alliances. Also, concerning the future of the implementation of smart systems, it was concluded that the traditional models of strategic alliances are being questioned regarding their effectiveness and adequacy in dealing with the new market challenges brought about by technological development and should therefore be rethought and adapted to a more collaborative and integrated model.

Keywords: Artificial Intelligence, Strategic Alliances, Smart Systems

1. Introduction

Most current organizations live in an increasingly competitive and globalized context, which forces them to rethink their growth strategies, adapting them to the turbulent and unpredictable environment that characterizes today. In an era in which the market is rapidly and constantly changing, companies are no longer holding permanent competitive advantages, being forced, if they want to survive, to innovate and search for alternatives.

The growing number of strategic alliances and the consequent exponential record of failures in this area have generated a great deal of interest and concern among managers and the academic community (Gomes *et al.*, 2011). Despite the extensive literature on the many key benefits and success factors of forming alliances (Aldakhil & Nataraja, 2014; Day, 1995; Ferreira & Franco, 2019; Goerzen, 2007; Lazzarini *et al.*, 2013; Martynov, 2017; Sarkar *et al.*, 2001; Varadarajan & Cunningham, 1995; Wang *et al.*, 2012), some authors warn of the high failure rates of alliances, which can have disastrous results for the company's competitive advantage (Day, 1995; Lazzarini *et al.*, 2013; Pearce & Robinson, 2007; Varadarajan & Cunningham, 1995). In this article, we list the 10 main causes of failure in strategic alliances, according to the literature review.

The use of smart systems has grown exponentially in recent years, namely due to the era of big data in which we live, and to developments in the area of knowledge of the human mind (Cummings & Stimpson, 2019). The literature on the use of smart systems is extensive and very recent, meaning that research in this area has developed considerably in recent years (Simon, 2019; Son et al., 2019; Wasilow & Thorpe, 2019). Some of the main advantages for companies include reductions in cost and processes, time savings, and faster response time (Simon, 2019; Stone et al., 2016; Tucker et al., 2018).

There are several articles, reports and books that deal with practical problems related to the application of smart systems in companies in numerous sectors, addressing the advantages that technology could bring to each one. However, as far as we know, there are still no studies that address the applicability of these systems as a means of closing potential gaps in the formation and maintenance of strategic alliances.

In this sense, the theoretical objective of this study is to investigate whether the implementation of smart systems can help companies to optimize their activity by mitigating the risks of failure of strategic alliances. Empirically, this article aims to understand how managers can use smart systems tools to help their businesses bridge the gaps of failure of their alliances, increasing their chances of success. Finally, we also aim to contribute to the development of the state of the art by discussing a set of knowledge around the topic of smart systems, addressing the main benefits and risks, as well as the potential consequences that these can have on the failure of strategic alliances.

This article is organized as follows: 1) literature review on the themes of strategic alliances and smart systems, 2) methodology used, namely a qualitative approach, through interviews and content analysis, 3) results' presentation and discussion in the light of the literature, and 4) main conclusions of the study.

2. Literature Review

2.1. Strategic alliances

The popularity of strategic alliances in a business context has increased exponentially in the last decades (Lambe *et al.*, 2002), becoming an obvious component of the competitive environment in which companies live today (Day, 1995). There are several benefits that lead companies to seek to establish strategic alliances. Among the main ones are the possibility of accessing new markets, the sharing of research and development costs, greater strategic flexibility in responding to market requests, the expansion (or filling in gaps) of the product line and the learning of new competences (Aldakhil & Nataraja, 2014; Goerzen, 2007; Varadarajan & Cunningham, 1995).

However, and despite the collaborative efforts and market growth opportunities that lead so many companies to form strategic alliances, studies claim that most partnerships do not meet the expectations created by the partners, which results in the failure of the alliance (Makino *et al.*, 2007). Estimates of failure rates vary between 50 and 70% (Das & Teng, 2000; Day, 1995; Lunnan & Haugland, 2008) and, therefore, this is a topic that

has attracted the attention and interest of the scientific community and managers (Gomes *et al.*, 2011; Greve *et al.*, 2010; Shah & Swaminathan, 2008).

There are several reasons that justify the instability and failure of alliances. The 10 main factors responsible for these results, with no particular order between them, are: 1) the rigidity of some companies, 2) the poor degree of communication between them, 3) the presence of unsuitable objectives, 4) unexpected changes in the business environment, 5) different levels of technological intensity, 6) rivalry and tensions between partners, 7) potential changes in business strategy, 8) the entry of new competitors in the market, 9) lack of value creation for the client, and, finally 10) great cultural differences between partners (Aldakhil & Nataraja, 2014; Anand & Khanna, 2000; Beamish & Inkpen, 1995; Cui *et al.*, 2011; Dan & Zondag, 2016; Das & Teng, 2000; Kogut, 1989; Lokshin *et al.*, 2011; McCutchen *et al.*, 2008; Nakamura *et al.*, 1996; Rahman & Korn, 2014; Reuer & Zollo, 2005; Sadowski & Duysters, 2008; Swoboda *et al.*, 2011).

2.2. Smart Systems

Although the theme is not new, its use has grown exponentially in recent years, namely due to the era of big data in which we live, and to developments in the area of knowledge of the human mind. The implementation of smart systems in the sectors of medicine, transport and manufacturing has been of great order and, as such, there is an increased need to understand how these systems should be designed to promote effective interactions between users and technology (Abdallah; & Ayoub, 2020; Cummings & Stimpson, 2019).

There are several advantages that can be achieved with the implementation of smart systems in companies: improving the quality of life of the general population, decreasing production costs, streamlining processes in the supply, distribution and retail chain, optimizing processes for the purchase and use of public services, among many others yet to be discovered (Antonova, 2014; Russell *et al.*, 2015; Simon, 2019; Son *et al.*, 2019; Stone *et al.*, 2016). The use of these technologies focuses essentially on positive tasks, such as helping children to learn, making driving safer, helping in the diagnosis of diseases and improving the quality of life of each individual (Singh et al., 2020; Stone et al., 2016).

According to the authors, another key factor is the possibility to use artificial intelligence (AI) to create new markets, lowering barriers to entry and increasing participation, resulting in an alternative with the potential to drastically reduce production costs and, consequently, prices to the consumer (Kamble & Wankhade, 2021).

However, and despite these advantages, in some sectors, it is feared that advances in AI are so rapid that they replace all human work in a single generation, including those that are largely cognitive or that involve judgment (Naidoo & Ramphal, 2020; Stone et al., 2016). Other risks and fears are also raised by the growing development of this area, among which are important ethical and social issues, including concerns about user privacy, public security, transparency of information and regulation by governments (Simon, 2019; Tucker *et al.*, 2018; Wasilow & Thorpe, 2019).

The literature on the use of smart systems is extensive and very recent, meaning that research in this area has developed considerably in recent years. During this research, and within the universe of the authors studied, several articles, reports and books were found that deal with these problematic practices of application of smart systems in companies from numerous sectors, addressing the advantages that technology may bring to each one. However, as far as we know, there are still no studies that address the applicability of these systems as a means of bridging the potential flaws in the formation and maintenance of strategic alliances, which leads us to the research question of this work: *How can the implementation of smart systems can help companies to optimize their activity and mitigate the risks of failure of strategic alliances? What are the future consequences of such actions?*

3. Methodology

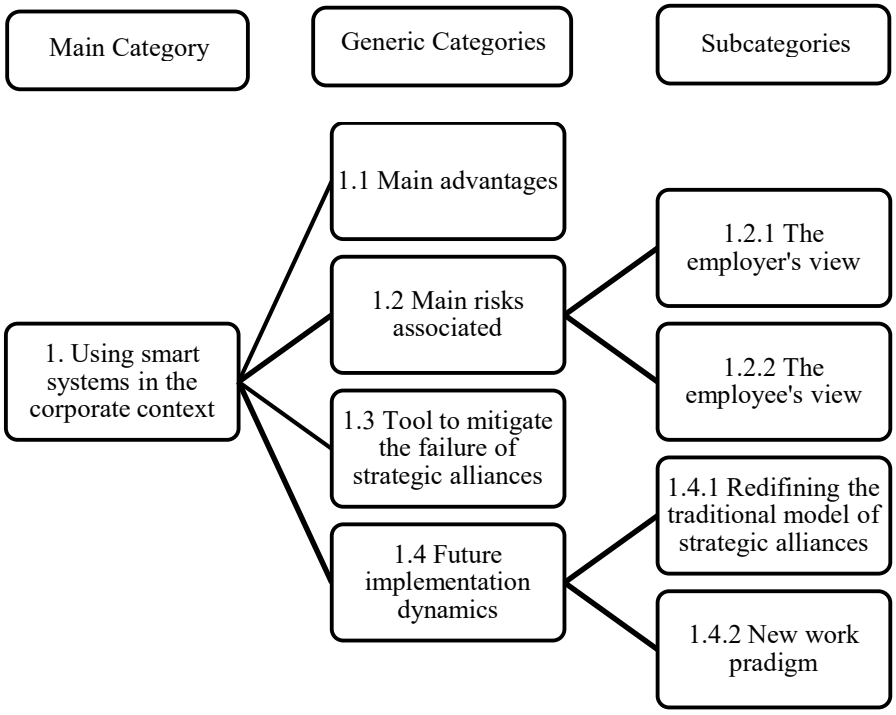
The research question that motivates this article was answered using a qualitative methodology, that is, the content analysis of a set of interviews, which sought to measure the phenomenon of the impact of smart systems on the failure of strategic alliances. Given the objectives of this thesis, the interview was considered the most appropriate tool for collecting primary qualitative information, because, although the

analyzes may be implicit in a certain degree of subjectivity associated with the answers given, it is a method that allows the actors themselves to provide data on the phenomenon under study (Carmo & Ferreira, 2008). 17 interviews were carried out. After interview number 14, the results were found saturated and repetitive, so it was decided to stop at 17. Nevertheless, this number still guarantees a good degree of reliability (Vilelas, 2009).

Before being interviewed, participants were invited to attend an online lecture through the Zoom platform, where relevant information on the topic was transmitted. The lecture had the theme "The Impact of Smart Systems on Business Management" and was sponsored by ISCTE Business School and the Business Case Institute, with the participation of speaker Bernardo Gomes Pinto, Coordinator of ISCTE AI Business Hub. The lecturer shared with the public the main advantages that smart systems have brought to the business world, as well as the topics that have been on the top of scientific development on the subject. In total, 36 experts in the field were present who actively participated in the discussion of the topic, having generated very interesting insights for the present research. That being said, and after attending the lecture and interacting with their peers, the participants were better equipped to answer the interview questions, namely how the use of these technologies could help mitigate the risk of unsuccessful alliances.

Since the main objective of this question is to generate a new theory based on specific instances of empirical observations and to make sense of the answers provided, without resorting to a previously defined code in the literature, an inductive approach was used, as affirmed by Gioia and his colleagues (2013, p. 16) *"Advances in knowledge that are too strongly rooted in what we already know delimit what we can know."*. Figure 1 shows the categorization and codification of the *corpus* of the interview that gave rise to the qualitative analysis.

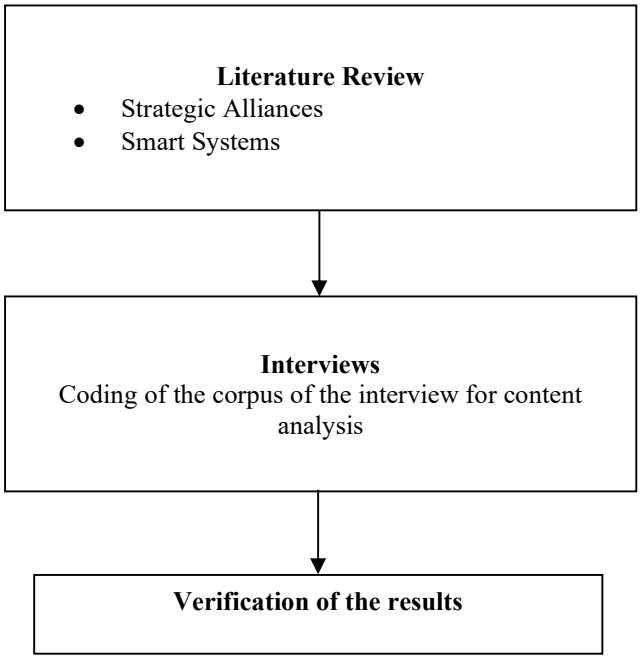
Figure 1. Categorization and codification of the interview corpus for qualitative analysis



In terms of software, this content analysis was performed using the MAXQDA 2020 program, a software package for qualitative data analysis used specifically for content analysis. Of the 17 interviews carried out, 4 (24%) were made to female participants, and 13 (76%) were made to male participants, with 5 (29%) having a bachelor's degree, 9 (53%) having a master's degree and 3 (18%) having a PhD. As for the activity sector of the participants, 3 (18%) work with financial and insurance activities, 4 (23%) are engaged in wholesale and retail trade, 3 (18%) work in the area of transport and storage, 5 (29%) work with information technologies and, finally, only 2 (12%) work in other sectors. On the other hand, 3 of the interviewees (18%) work in a micro company with up to 10 workers, 5 (29%) work in a small company with up to 50 workers, 6 (35%) work in a medium company with up to 250 workers and, finally 3 (18%) work in a large company with more than 250 workers. Finally, and with regard to the position they occupy in the respective company, 7 interviewees (41%) occupy the role of specialists, 6 (35%) perform team leader roles and 4 (24%) have a position as manager or director.

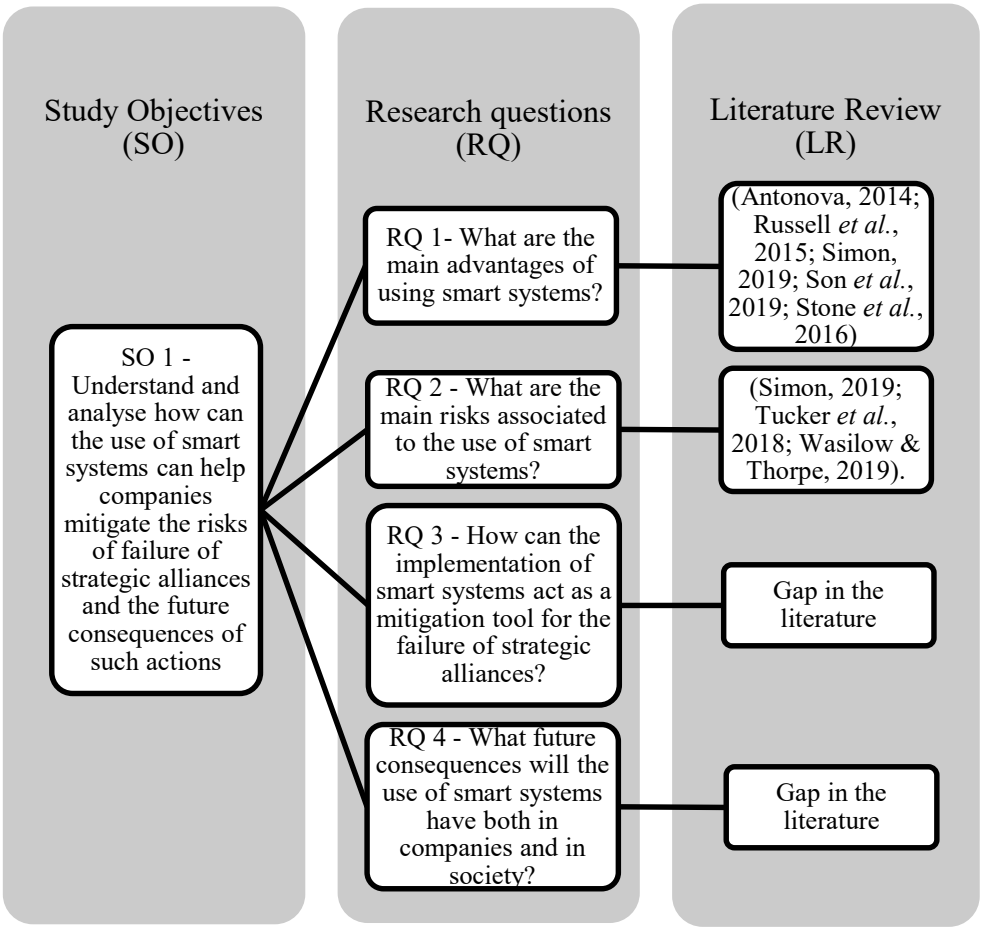
This research was divided into four phases, namely: 1) literature review and information processing; 2) the transfer of the theoretical construct to the field of observation, in order to obtain the best possible confidence in terms of results; 3) fieldwork and data collection and 4) qualitative analysis of the data collected from the interviews, in order to contribute to new theoretical conceptual approaches combined with empirical data. Figure 2 shows the research design used in this study.

Figure 2. Research Design



Below, Figure 3 illustrates the link between the research goal, the research questions and the literature review.

Figure 3. Link between the research goal, the research questions and the literature review



4. Presentation and Discussion of Results

4. 1. Main advantages of using smart systems

The first generic category of this research aimed to ask what the main advantages are and gains that the interviewees associate with the implementation of smart systems in the business context. During the interviews, the vast majority of participants in this study recognized that the treatment of large amounts of data by companies is the main source of information that assists decision making based on a credible record. Table 1 presents some of the main arguments mentioned by the participants about the advantages attributed to the use of smart systems. As it can be seen, in the perspective of the majority of the respondents, the use of this type of systems has a strong potential

to reduce the cost structure, to speed up processes, and to reduce human error, generating more transversal benefits throughout the company's operational management.

Table 1. Main advantages of implementing smart systems

Text	Generic Category	Number of times	Interviewees
The treatment of data by companies is the main source of relevant information that helps decision making	1.1	14	1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17
The use of smart systems helps greatly to reduce the structure of operational costs, through the identification and reduction of errors	1.1	12	1, 2, 3, 4, 5, 6, 12, 13, 14, 15, 16, 17
Promotes the raising of extra income, greatly streamlining all the company's financial processes and assisting treasury management	1.1	11	2, 3, 4, 5, 6, 12, 13, 14, 15, 16, 17
Assists in attracting, maintaining and managing customers, as well as attracting new business	1.1	9	2, 3, 4, 5, 8, 9, 14, 15, 16
Causes increased quality on the production line, saving time and money on repairs	1.1	7	1, 2, 6, 7, 11, 12, 15
Savings in salaries: it is not necessary to have as many human resources to perform certain tasks.	1.1	5	2, 4, 5, 8, 13
Increases customer satisfaction by eliminating bureaucratic steps and thereby reducing the response time	1.1	5	5, 7, 11, 15, 16
AI can help companies generate insights and develop solutions linked to innovation	1.1	3	2, 7, 9
Allows you to redirect people to other tasks related to the feeling economy	1.1	2	4, 8

Based on the analysis of table 1, the three most mentioned reasons are highlighted throughout the interviews regarding the main advantages of implementing smart systems in the business context, in order to meet the needs of an increasingly demanding market. The first one concerns improving decision making based on a history of relevant information. As one of the interviewees affirms, *“the development of the market depends 100% on technological advancement, because this way we can be more organized as organizations and work with a volume of data that, humanly, would be impossible to decipher”.* In addition, *"the fact that we have access to more and more credible information, enables us to make better decisions and ensure that we act in accordance with the interests of the organization to achieve our goals more quickly and effectively",* says another interviewee.

The second added value pointed out by managers, highlights the reduction in operating costs as another of the advantages brought by smart systems. In the voice of one of the

participants in the study, smart systems *"make it possible to reduce various production processes and thereby increase quality in the production line"*. The participant shared his experience of working in a factory where some machines already had Internet of Things technology, referring that *"the machine itself told us when we should stop it because it was in the process of needing some mini repair, instead of escalating the problem and cause a major upset later on. As you can calculate, this translates into enormous savings in time and money"*. Still in this segment, another interviewee is of the opinion that *"from the perspective of the company, they are only advantages. The installed capacity of smart systems allows us to streamline hundreds of internal processes, eliminating several bureaucratic steps and, thus, cutting many costs and reducing the response time to customers"*.

The third most emphasized advantage in the interviews, is the raising of extra income, as the implementation of smart systems *"allows to leverage the capture, maintenance and management of customers, as well as assists in the acquisition of new business and revenue companies"*, as described by one of the participants. Another interviewee adds that *"AI can help with the procurement issue, that is, opening strategic horizons for companies and making management of purchasing processes more efficient",* which consequently can bring more revenue to the company.

Thus, it is possible to affirm, through the content analysis of the interviews carried out, that the results are in line with the theory proposed by the authors studied, as the implementation of smart systems has the ability to contribute to the improvement of decision making, to drastically reduce the cost structure and human error, and to make more agile the productive and bureaucratic processes, increasing the productivity of tasks (Antonova, 2014; Atkinson, 2019; Cummings & Stimpson, 2019; Simon, 2019; Stone *et al.*, 2016). In addition, the growing use of these technologies also allows companies not to need as much human labor, providing them with the opportunity to redirect their human resources to other types of tasks (Huang & Rust, 2018; McAfee, 2019; Russell *et al.*, 2015).

4. 2. Risks associated with the implementation of smart systems

The second generic category of research is related to the potential risks associated with the implementation of smart systems, according to the interviewees' view. This being an

inductive study, it was possible to distinguish the content resulting from the interviews in two subcategories: the risks related to the employer and the risks to the worker. Table 2 illustrates the result of the managers' responses regarding the main risks and fears that companies face, resulting from the growing use of smart systems, and the main challenges from the employer's perspective are related to the lack of investment capacity that this technology needs and with concerns related to information security and data protection.

Table 2. Main risks associated with the implementation of smart systems: the employer's perspective

Text	Generic Category	Sub-category	Number of times	Interviewees
It is very difficult for a small company to have a budget for the implementation of such systems. Only large companies have this investment capacity	1.2	1.2.1	10	1, 3, 4, 6, 7, 11, 13, 14, 16, 17
The main concerns arising from this technological wave are the issues of information security and data protection.	1.2	1.2.1	8	2, 5, 6, 7, 8, 9, 12, 14
Knowledge about risks is not widespread, it is necessary to train people	1.2	1.2.1	5	3, 8, 10, 15, 17
Concepts like this take a long time to be absorbed by everyone. It is as if we are witnessing a gradual democratization of this type of technology	1.2	1.2.1	4	1, 4, 9, 16

After analyzing table 2, we can say that there is a strong percentage of respondents who have serious concerns regarding the challenges and risks associated with the implementation of this type of systems. On the one hand, and according to the interviewees, the high costs of implementation and the lack of financial resources to resort to this type of systems are the main reasons that delay demand and cause them to lose some of their value when leveraging the business productivity, as Atkinson (2019) argues in his study. In the words of one of the interviewees, *"unfortunately in Portugal it is very difficult to access a budget to invest in this type of technology. Only large companies have this capacity (...) and we must not forget that the majority of companies are small and medium-sized"*.

On the other hand, ethical and moral issues related to information security and data protection are also raised, following what the studied authors defend (Atkinson, 2019; Cummings & Stimpson, 2019; Evans, 2011; Kumar *et al.*, 2019; Simon, 2019; Stone *et*

al., 2016; Wasilow & Thorpe, 2019; Zhao & Flenner, 2019). According to one of the managers interviewed, *"with regard to information security and risk management, today there are many more threats than before digitalization"*. In other words, *"despite the robustness of the systems that companies use, the main current threat to cybersecurity is human action (...) most people are unaware of the risks they take when doing certain operations on the internet, when clicking on a certain unknown link, and the worst thing is that our knowledge about it is not increasing at the rate it should have"*, says another interviewee.

At the same time, it is also possible to associate some challenges in the implementation of smart systems in the perspective of workers, contemplated in the second subcategory. Some of the main risks refer to the increase in unemployment and the social impact that this technological wave may have on the general population. Table 3 summarizes, therefore, the opinions of respondents with regard to this topic.

Table 3. Risks associated with the implementation of smart systems: the worker's perspective

Text	Generic Category	Sub-category	Number of times	Interviewees
The increasing use of systems will lead to a significant increase in unemployment	1.2	1.2.2	11	1, 3, 4, 5, 7, 8, 12, 14, 15, 16, 17
Social impacts, such as depression, increased poverty and the difficulty of adapting to a new reality	1.2	1.2.2	8	4, 7, 9, 10, 12, 14, 15, 16
Loss of organizational identity due to standardization of processes	1.2	1.2.2	6	1, 2, 6, 9, 10, 11
There is a risk of loss of intellectual stimulation and mental gymnastics due to automation of tasks	1.2	1.2.2	4	8, 10, 14, 17

As shown in Table 3, respondents demonstrate their concerns about the risk of implementing smart systems for workers, with rising unemployment ranking first on that list. The automation of many of the companies' routine tasks is presented as one of the main factors of this outcome. As one of the stakeholders says, *"machines will replace many of today's jobs, as they will perform these tasks faster, more efficiently and with a minimal margin of error. In other words, companies will not need to have as many human resources and that can be problematic for people"*. It is also important to

highlight the potential social impacts that this scenario may have on the population, as many people may not have the necessary capacity to adapt to this new reality. One of the interviewees warns of the need to *"integrate the large number of people in their 40s and 50s whose profession will soon become obsolete and who do not have the personal and professional resources to turn the situation around. How are they going to live? It is important that companies and governments think about this"*.

That said, it is possible to see that, despite the many advantages associated with the implementation of smart systems, the results of the interviews conducted also show that there are several fears and associated risks, which is in accordance with the authors studied (Antonova, 2014; Atkinson, 2019; Simon, 2019; Stone *et al.*, 2016). Therefore, the way in which these types of issues are handled is very important, both at the organizational and governmental levels.

4. 3. The implementation of smart systems as a mitigation tool for the failure of strategic alliances

According to the authors studied, the 10 main factors responsible for these results, with no particular order between them, are: 1) the rigidity of some companies, 2) the poor degree of communication between them, 3) the presence of unsuitable objectives, 4) unexpected changes in the business environment, 5) different levels of technological intensity, 6) rivalry and tensions between partners, 7) potential changes in business strategy, 8) the entry of new competitors in the market, 9) lack of value creation for the client, and, finally 10) great cultural differences between partners (Aldakhil & Nataraja, 2014; Anand & Khanna, 2000; Beamish & Inkpen, 1995; Cui *et al.*, 2011; Dan & Zondag, 2016; Das & Teng, 2000; Day, 1995; Gomes, 2020; Greve *et al.*, 2010; Kogut, 1989; Lokshin *et al.*, 2011; Lunnan & Haugland, 2008; Makino *et al.*, 2007; McCutchen *et al.*, 2008; Nakamura *et al.*, 1996; Rahman & Korn , 2014; Reuer & Ragozzino, 2014; Sadowski & Duysters, 2008; Shah & Swaminathan, 2008).

In this way, the third generic category of this content analysis aimed to understand the extent to which the implementation of smart systems can help partner companies to mitigate the risks of failure of their strategic alliances. Table 4 presents the main points discussed by the managers during the interviews regarding this topic.

Table 4. Implementation of smart systems as a mitigation tool for the failure of strategic alliances

Text	Generic Category	Number of times	Interviewees
More agile processes, making companies more flexible and improving the efficiency of alliance management	1.3	11	2, 3, 4, 5, 7, 8, 9. 11, 14, 16. 17
Communication becomes clearer and faster, without unnecessary noise	1.3	9	1, 3, 5, 6, 8, 9, 10, 12
Definition of clearer and more realistic objectives, due to the increase in the volume of data and its correct treatment	1.3	8	3, 4, 7, 9, 10, 11, 14, 16
Allows both companies to have identical levels of technological development, improving the fluidity of the partnership	1.3	6	2, 5, 8, 9, 10, 13
Mitigation of cultural differences between partners, making processes more uniform and globalized	1.3	5	4, 7, 9, 11, 14
These systems mitigate the risks of unsuccessful alliances by creating added value for the customer at the end	1.3	3	7, 10, 14
Digital channels open doors for adjustments to the business model more quickly and effectively	1.3	3	4, 10, 12

By analyzing table 4, it can be seen that all the 7 results of the table come to fill some of the reasons for the alliances' failure. Thus, and as this is a central point of the work, I proceeded to illustrate these 7 main points with quotes from the interviews. Firstly, and being present in more than 60% of the respondents' responses, we will look at the importance of reaching a level of balance with regard to business flexibility.

According to Das and Teng (2000b), the rigidity of organizations is considered a key factor in the failure of alliances. Therefore, according to the analysis of the data collected in the interviews, we can affirm that the implementation of smart systems presents itself as a viable measure in streamlining productive and operational processes, which in turn provide greater flexibility and fluidity to the alliance. As one of the interviewees says, *"smart systems will allow and facilitate the multiplicity of exchanges of information and processes between partner organizations, giving companies more flexibility and removing old obstacles when creating new ways of working".* Another participant adds that *"only the most agile companies and those that best adapt to disruptive environments will survive, and the use of these technologies is the best way to do so".*

Second, with regard to the degree of communication of the partnership, the authors associate weak degrees of communication with a higher failure rate (Aldakhil & Nataraja, 2014; Anand & Khanna, 2000; Day, 1995). When analyzing the contents of the interviews, it is possible to state that, in the opinion of the interviewees, the implementation of this type of systems also facilitates communication between the members of a strategic alliance. *"Nowadays the communication between partner companies becomes much clearer, more agile and faster, since the use of these systems causes less human interaction and, with this, reduction of error, optimization of results and reduction of response time. Companies have everything to gain from this",* says one of the study participants. Another interviewee shares a concrete example: *"If we are talking about a supplier, for example, and if I have access to an algorithm that helps me to better process customer information and stocks available through AI, it is clear that the communication with my supplier will improve. I will be able to optimize my orders, giving him more accurate information and saving on purchasing and storage costs. If he has access to that same information, even better, because he can foresee my needs".*

According to Aldakhil and Nataraja (2014), the presence of maladjusted objectives is one of the causes of alliances' failure. In this way, the third main point in which the implementation of smart systems can help mitigate the risk of failure of alliances is related to the ability to define clearer and more realistic objectives, due to the increase in the volume of data and its correct treatment. In the words of one of the participants, *"goal setting is a key issue for a successful partnership, otherwise, how can we determine whether we are on the right track? (...) as I have access to more information and a larger volume of data, I am able to make more credible predictions and, consequently, adjust my goals and better understand what I want to achieve with my partnership".*

The fourth question under analysis in the interpretation of table 4 is related to the level of technological development of the partner companies. According to Dan and Zondag (2016), different levels of technological intensity are also associated with a greater number of unsuccessful alliances. In other words, according to the results obtained in the interviews, we can say that the implementation of smart systems can contribute to mitigate this cause, as it provides companies with the opportunity to match their levels of technological development, through the use of platforms and specific software for

that purpose. As stated by one of the interviewees, *"two organizations that do not have the same level of development of their smart systems, are unlikely to collaborate, so it is important for both companies to have a baseline of technological development, and AI tools can help with that"*.

Fifth in the analysis, a topic was raised related to cultural differences between partner companies. For Sadowski and Duysters (2008), the more prominent the cultural differences between partners, the greater the degree of failure of the alliance. Thus, by reducing cultural gaps between partner companies, the implementation of smart systems can help to mitigate such risks of failure. *"One of the questions that the European Commission makes is precisely the loss of identity and cultural references due to the massive use of AI, which, despite being a negative effect for culture, will mitigate many business failures that occur due to cultural differences in companies and the way people work",* says one of the interviewees. In other words, *"in a more mechanized and global world, most of the processes will be standardized and we will no longer come across as the X or Y way that a given culture usually operates (...) we will lose a large part of the cultural indicators that are associated with the individuals of each country or society and this will allow us to end many misunderstandings, prejudices and biased interpretations that so often undermine commercial relations"*.

For some authors, losses in creating value for the client can also contribute to the failure rate of strategic partnerships (Cui *et al.*, 2011; Kogut, 1989). On the 6th place in table 4, and according to the information collected in the interviews, smart systems can help companies to generate substantial increases in value for the customer, as they open doors for information optimization and reduction of response time, as stated by one of the participants: *"some partnerships only work well because they generate and transfer value to the customer. In this case, AI helps a lot because it optimizes the management of the databases and allows the customer to have a better and more personalized service in their shopping experience"*. It is also worth mentioning the participation of another interviewee who mentions that *"smart systems bring unlimited opportunities to please the customer and, ultimately, this is our main stakeholder when we enter into a partnership (...) When we give more value to the customer, the more loyal he becomes and the more he recommends, increasing his satisfaction cycle"*.

Finally, in 7th place in the table, we analyzed the last point mentioned by 3 interviewees, regarding the adjustments that need to be made to the business model, especially in times of great uncertainty. For Anand and Khanna (2000), unexpected changes in the business environment can also change the motivations of partners and substantially affect the relationship between companies. However, as shown in the interviews, here the implementation of smart systems can also help companies to close this gap. According to one of the interviewees, *"digital channels are an excellent tool to cope with major market changes, especially in environments as volatile and in times as uncertain as those we have been experiencing since the appearance of COVID-19". "As we are all watching, most companies are only surviving this global crisis because they dared to rediscover themselves, to question traditional business models and adapted (...) and this was only possible due to the large-scale use of smart systems",* adds another interviewee. In summary, as we can see in table 4 and in the interpretation of the results of the interviews, it is possible to affirm that the implementation of smart systems has the potential to mitigate 7 of the 10 reasons presented by the authors as the main failure factors of the strategic alliances, which translates into a very positive balance for this type of tools.

4. 4. Dynamics of future implementation of smart systems

During this inductive research, several references and suggestions were made by the interviewees on how these smart systems would be implemented in the future, which resulted in the creation of this last generic category dedicated to looking at the dynamics of the future implementation of smart systems. In order to organize the information collected in a more visible way, two subcategories were created: one that contemplates the redefinition of the traditional model of strategic alliances, and a second that addresses the new social paradigm of work. Table 5 shows the interviewees' observations regarding the redefinition of the traditional model of strategic alliances.

Table 5. Redefinition of the traditional model of strategic alliances

Text	Generic Category	Sub-category	Number of times	Interviewees
Partnerships are increasingly less formal and more electronic.	1.4	1.4.1	7	1, 6, 9, 10, 11, 13, 16
AI mitigates the need for strategic alliances in its traditional format, due to increased ease of access to information	1.4	1.4.1	5	2, 5, 6, 12, 16

Alliances will benefit greatly from network models, which are collaborative in nature, largely facilitated by AI	1.4	1.4.1	4	1, 4, 6, 9
Alliances are no longer the only solution for survival: AI has come to allow this	1.4	1.4.1	2	3, 16
Industry 4.0 brought autonomy to solve problems in an integrated manner, reducing the need for partnerships	1.4	1.4.1	2	4, 8

When analyzing table 5, it is possible to verify that part of the interviewees raises questions related to the adequacy of the current models of strategic alliances to the moment in which we live. In other words, for several participants in the study, the implementation of smart systems exposes the current mechanisms and protocols of strategic partnerships, questioning their effectiveness in dealing with the new market challenges brought about by technological development: *"Basically, integration of smart systems reduces the need to establish strategic alliances as we know them, not only because of them intrinsically, but because the market itself changes very quickly. (...) All of this is changing so quickly that even the traditional strategic alliances that we were used to are also losing relevance. It is necessary to redefine this model",* says one of the interviewees.

The truth is that the current reality has changed at an unimaginable pace, largely due to the democratization of technological progress, as stated by one of the participants: *"smart systems come to question many of the traditional models of partnership, as they currently exist, not only by technological means, but also because they are causing global geostrategic changes, beginning to question classic sectors and to revolutionize the way we live, as is the case with remote work and internet shopping "*. In other words, this phenomenon allows us to bring viable alternatives to companies that were on the verge of rupture: *"AI has allowed to open a range of infinite possibilities today, when a few years ago the only chance of survival for many companies was to make an alliance. Not today".*

However, despite the fact that this new smart wave has pointed out the need to rethink the traditional model of alliances, it does not mean that they are in danger of disappearing, but that they must adapt to a more collaborative and integrated model, *"fostering a new approach much more dispersed, fast, highly flexible and with completely different needs",* says one of the respondents. *"It doesn't mean that you*

don't have to have a much more sophisticated set of relationships, that is, instead of having a stable and lasting alliance, we'll have several "mini alliances" that can satisfy the needs of the market, ending up creating much more flexible and networked relationships".

During the codification of the interviews carried out, this last subcategory was analyzed, which aimed to highlight the integration of smart systems in the labor market. What consequences could the implementation of these systems have for workers? How can people adapt? What is the role of companies and governments in ensuring that there is a fair referral of these professionals? These are questions that were raised by the study participants and whose reflections are found in table 6.

Table 6. The new social paradigm of work

Text	Generic Category	Sub-category	Number of times	Interviewees
It is necessary to invest strongly in training people, in creating awareness and in assigning key tools to workers	1.4	1.4.2	9	1, 2, 4, 6, 8, 14, 15, 16, 17
Income distribution with a minimum level for each individual	1.4	1.4.2	8	1,3, 4, 5, 7, 8, 14, 15
Each employer has to pay an amount to the government for each robot	1.4	1.4.2	6	5, 7, 8, 13, 14, 16
Very mature organizations have to integrate security and data protection matters at the design stage	1.4	1.4.2	3	2, 3, 8
Time is becoming the most precious commodity	1.4	1.4.2	3	5, 7, 8
Many of the current jobs will disappear, but this will allow the creation of new jobs	1.4	1.4.2	3	4, 9, 13

As we analyze table 6, we can see that the implementation of smart systems comes to question the current labor paradigm, forcing society to think about factors that were previously nonexistent. Most respondents believe that it is pertinent to start thinking and formulating hypotheses about the social contribution of machines, for example. Since many people will be unemployed and companies will cut costs with the use of smart systems, some opinions suggest that *"the new social paradigm comprises an income distribution with a minimum level for each individual"*, as stated by one of the interviewed. Additionally, it was mentioned by another participant that *"all robots should pay social security, that is, each boss should pay an amount that contributes to a basic social income"*, a theory that has been increasingly spoken, although it's still just

an idea. One thing is certain, as stated in an interview, *"democratically elected regulators and governments are going to have to rethink how to redistribute wealth, as the use of smart systems will surely disrupt all the economic procedures we know".*

On the other hand, and according to the information collected, it is also important to note that companies will only be able to adapt if they invest heavily in training their employees, in order to face the new challenges. This training should aim not only at assigning new professional skills, but also at raising awareness of the risks that arise from these technologies: *"Unfortunately, there are many people who will actually lose their jobs and be replaced by machines, but we cannot forget the human resources that can be trained to gain new skills and perform new tasks, which can be very positive".*

In other words, the success of this technological transition will depend, in large part, on the ability of companies to quickly redirect their human resources to new tasks and functions, more linked to the intuitive and empathic component, and may even lead to the creation of new jobs. As one participant exemplifies: "*In the past, when we stopped having wagons and started to have taxis, people were quickly trained to know how to drive a car. However, nowadays the gap is much larger, and this can be an added challenge. Will we be able to convert a supermarket operator into a drone pilot just as quickly? I believe so, but it is necessary to take care of several social indicators (...) namely with regard to the integration of older generations, because the younger ones will already learn this at school".* In short, the savings that the implementation of smart systems can bring to companies, as seen above, can be invested in training and qualification of these human resources, as, as stated by one of the respondents, *"it is not enough to implement the systems, it is essential to constantly invest maintaining digital platforms and training people who manage those platforms".*

5. Conclusion

The main objective of this article was to investigate whether and how the implementation of smart systems can help companies to optimize their activity and mitigate the risks of failure of strategic alliances. To this end, a literature review was carried out on the themes of strategic alliances and smart systems and, subsequently, the research question of this study was elaborated: *How can the implementation of smart systems help companies to optimize their activity and to mitigate the risks of failure of*

strategic alliances? What are the future consequences of such an action? A qualitative approach took place through the content analysis of 17 interviews with managers and professionals familiar with the theme of smart systems.

Of the 10 main causes of failure of the strategic alliances listed by the authors in this article, the results of the study show that the implementation of smart systems has the potential to mitigate 7 of them. Since these 7 causes have a more operational and logistical character, it is concluded that smart systems are not the ideal tool to solve theoretical and strategic problems. That is, the use of this type of systems helps companies to streamline processes, making them more flexible; it makes communication between partners more fluid, as it uses a common language; it allows defining objectives more adjusted to the needs of the partnership, through more robust and credible data; enhances technological development so that companies have more similar levels of technologic intensity; mitigates the main cultural differences between partners, as it unifies protocols and ways of working; helps companies to generate substantial increases in value for the customer, as they open doors for information optimization and reduction of response time; and, finally, through digital channels, they also facilitate any adjustments that need to be made to the business model, especially in times of great uncertainty, such as the current moment of the pandemic in which we live.

Another relevant point of this study is related to the future of the implementation of smart systems. On the one hand, it was concluded that the traditional models of strategic alliances are being questioned regarding their effectiveness and adequacy in dealing with the new market challenges regarding technological development and should therefore be rethought and adapted to a more collaborative and integrated model. On the other hand, with regard to the labor market, it was concluded that the implementation of smart systems is questioning the current paradigm, forcing society to start thinking and formulating hypotheses regarding income redistribution and the social contribution of machines, and also making companies to invest strongly in the training and qualification of their employees, in order to face the new challenges.

6. Main contributions

This work contributes to the development of the state of the art by discussing a set of knowledge around the topic of strategic alliances and smart systems, addressing the main key factors, benefits and risks, as well as the potential consequences that these can have on performance levels and maintenance of companies' competitive advantage. As far as we know, this is the first study that addresses the applicability of these systems as a means of closing potential gaps in the formation and maintenance of strategic alliances.

In this sense, this research contributes to the development of the management field through three distinct forms: 1) framing this study in an analysis perspective focused on the establishment and definition of the main advantages and risks associated to the use of smart systems, 2) realizing the role that smart systems can play in terms of being a good tool to bridge the gaps of failure of strategic alliances, 3) seeking the main future consequences of this actions to assure that they can be recognized as an asset for companies, allowing the formulation of new questions that lead to the need for greater exploration in this area of research, applicability and results of the use of smart systems.

7. Limitations of the study

First, it is important to bear in mind that the findings presented in this article result from limitations inherent to a small research in terms of sample size (17 interviewees) and from the fact that data was collected only in a given country (Portugal). In this sense, in terms of external validity, that is, the possibility of generalizing the results found to other contexts or samples, although this study has reinforced some of the existing theory regarding strategic alliances and smart systems, this was only an exploratory study that cannot be generalized or representative.

It is essential to continue to carry out in-depth research that characterizes and analyzes these themes in detail, in order to allow the identification of the necessary knowledge that makes it possible to better understand the new ways of implementing smart systems.

8. Suggestions for future research

First, it would be very interesting to have the opportunity to observe and talk to some strategic managers and strategic alliances' decision makers, allowing a deeper collection

and analysis of valuable qualitative information. Second, data could be collected in different countries and some causality and transversality relationships may be established through the comparison of variables between geographic locations. Third, it would also be important to assess and study in more detail the need for greater investments in the small and medium sized companies, in order to foster the use of smart systems. Finally, future studies may also consider the use of a quantitative component when choosing the methodology used.

Finally, and following the questions raised during the interviews of this work, it would be extremely important to start the discussion about the relevance of traditional models of strategic alliances and their adequacy to the present moment. Technological development is changing the way we live, how we relate and how we work and there is an urgent need to rethink new, more integrated and flexible collaborative models. The same applies to the work paradigm, as the implementation of smart systems will change the way companies see their human resources, and it is crucial to start the discussion and elaboration of strategic plans in the medium / long term capable of responding to these new needs of companies and workers.

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