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Intellectual Capital and Innovation: A Systematic Literature Review

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Abstract

Innovation is considered a cornerstone of firms' performance and survival. Despite previous literature indicating a connection between Intellectual Capital and Innovation, this relationship has been analysed using multiple approaches and different methodologies and there is no dominant view, which raises the question where the study of the relationship between intellectual capital and innovation currently stands. Deploying on a systematic literature review with a final sample of 178 full text papers on Intellectual Capital and Innovation, this study synthesizes the scholarly contributions that have been published on ISI Web of Knowledge – Current contents between 1998 and January 2021 on the Intellectual Capital-Innovation nexus, identifies the main areas of research and opens doors of opportunity for future research in the area.

Keywords: Human Capital; Innovation; Intellectual Capital; Relational Capital; Structural Capital; Systematic literature review

1. INTRODUCTION

The connection between intellectual capital and innovation is currently underexplored. Some isolated contributions have been made by scholars part of the intellectual capital community or to the innovation community (e.g., Agostini and Nosella, 2017, Chen et al., 2015, Engelman et al., 2017), yet there is no common framework to integrate the knowledge and provide a comprehensive perspective of what is currently known and what are the areas to study so that we may better understand the different dimensions of this connection.

Innovation is considered a cornerstone of firms' performance and survival (Ruiz-Jiménez and Fuentes-Fuentes, 2018). Therefore, there is a need for continuous innovation in order to overcome competition in a challenging and dynamic business environment.

Intellectual capital contributes to firms' innovative capacity (Sardo and Serrasqueiro, 2018). Intellectual capital is a new source of competitive advantage, since it is difficult to replicate or to use it efficiently (FitzPatrick et al., 2013), and it is a source of firm value (Bontis, 1999), firm earnings (Liu and Wong, 2011) and firm wealth (Guerrini et al., 2014). Intellectual capital also affects the dynamics of a firm's growth opportunities due to the capacity to produce technological innovations (Liu and Wong, 2011) through investment in research and development activities (Chen et al., 2005).

The majority of previous papers that analysed the Intellectual Capital-Innovation nexus decomposed Intellectual Capital into the three following components: human capital, which refers to the sum of employees' knowledge, competence, innovativeness, commitment and wisdom (Sardo and Serrasqueiro, 2018); structural capital, which can be seen as the basic structure of a firm that supports and empowers human capital (Bontis, 1998) and is considered the support infrastructure for the establishment and maintenance of relationships with key external stakeholders (Molodchik et al., 2014); and relational capital, which refers to the knowledge embedded in the identification, development and maintenance of external relationships (Bontis, 1999).

Despite previous literature indicating a connection between Intellectual Capital and Innovation (e.g., Agostini and Nosella, 2017, Chen et al., 2015, Engelman et al., 2017), this relationship has been analysed using multiple approaches and different methodologies and there is no dominant view, which raises the question where the study of the relationship between intellectual capital and innovation currently stands.

Our paper aims to tackle that issue and develop a comprehensive framework based on the scholarly contributions that have been published on ISI Web of Knowledge since 1998 on Intellectual Capital and Innovation, showcasing the different knowledge areas that have been researched from the perspective of the Intellectual Capital components (human capital, structural capital and relational capital).

Due to the importance of Intellectual Capital to promote an innovative environment in firms, it is important to consolidate the knowledge produced by previous studies related to the Intellectual Capital-Innovation nexus. To accomplish this, this paper performs a systematic literature review. We analyse previous papers to know what main topics are debated in this filed and to identify future lines of research in this field (Tranfield et al., 2003).

The remainder of the paper is structured as follows. Section 2 describes the methodological approach used to perform this study. The findings of this study are presented in the Section 3. Section 4 draws the conclusion..

2. METHODOLOGY

In order to answer the research question, we perform a systematic literature review, following the Tranfield et al. (2003) and Saur-Amaral et al. (2018) procedure: definition of the search protocol, search execution and results analysis and presentation, using two academic software to support the research: Endnote X9 and NVivo 12. We build upon the approach previously used by Buenechea-Elberdin (2017) to explore the relationship between intellectual capital and innovation, upscaling the analysis performed in her seminal paper.

Our search took place on the 26th of January 2021 on the Current Contents Connect database of ISI Web of Knowledge. We applied the search equation "intellectual capital" AND innov* IN Topic, filtered on Social & Behavioural Sciences Edition and Business Collection, with a timeframe of 1998 to the date of the search.

We then filtered the results by: Document Type = (Article or Review) AND Research Areas = (Business Economics) AND Languages = (English). We obtained an initial sample of 247 results, which we exported to Endnote X9. Further, all abstracts were manually analysed and all the papers that did not have an abstract or were not related to the topic under study were eliminated, leading us to a final sample of 178 papers whose full text papers were collected.

This final sample undertook two levels of analysis. The first one included a bibliometric-like study showing the key journals related to the topic, as well as top authors in the field, using a descriptive statistics approach. The second one included a qualitative analysis performed with NVivo 12 on the results imported from Endnote, which reveals the research questions, the methodologies, and the future research directions, and allowed the development of a theoretical state-of-the art framework which reveals the focus area of intellectual capital in innovation, as well as the way the different components of intellectual capital have been studied along the years when linked to innovation.

3. FINDINGS

3.1. DESCRIPTIVE STATISTICS

The data related to the sample, more specifically information on the journal where each paper was published, the publication year and the authors of each papers were used to analyse the publication trends, as well as top journals and top authors.

As it may be seen in Figure 1, there is an increase of interest in the Intellectual Capital-Innovation nexus registered from 1998 onwards, reaching its peak on 2020 with 19 published papers on ISI Web of Knowledge. While there has not been an exponential increase, there is a tendency of growth.

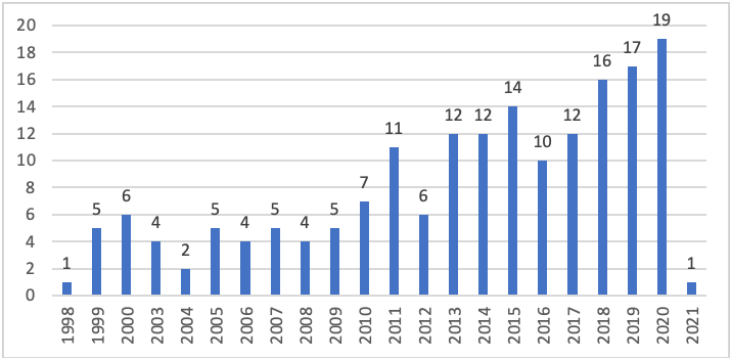

Figure 1 Paper distribution by year.

The most prolific authors (see Figure 2) are Kianto, A. (6 papers), Amores-Salvado, J. and Delgado-Verde, M. (5 papers each one of the authors), and Maylor, H., Navas-Lopez, J.E., Saenz, J., Swart, J. and Turner, N. (4 papers each one of the authors). However, considering the period of our sample (1998 to January 2021), we may note that there is no consolidated author with regular publications in the field.

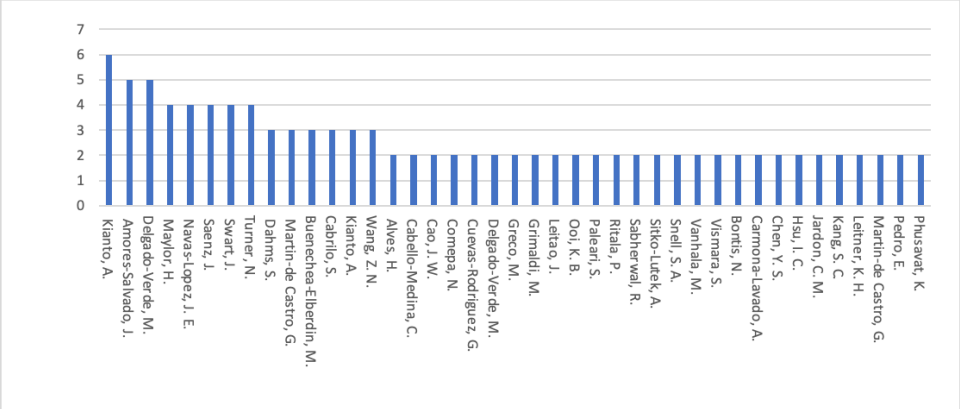

Figure 2 Number of papers per author (authors with at least 2 papers).

Regarding paper distribution per journals and per year during the analyzed period (see Figure 3), the most influent publications are Journal of Intellectual Capital (29 papers) and Knowledge Management Research & Practice (20 papers), which occupy at a certain distance the top positions.

They are followed by International Journal of Technology Management (13 papers), Management Decision (10 papers), Journal of Knowledge Management (9 papers), R & D Management (6 papers), Journal of Business Research (5 papers), and International Journal of Human Resource Management (4 papers).

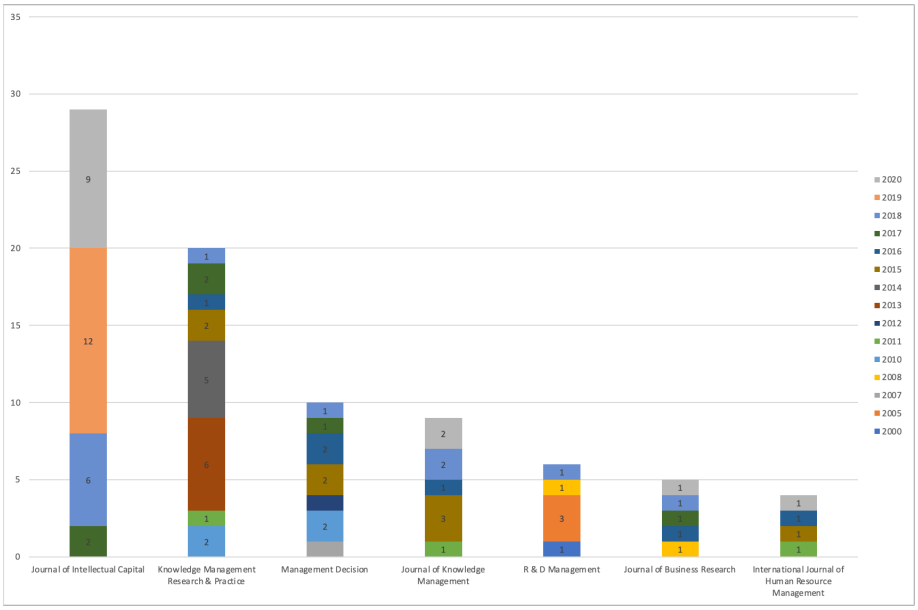

Figure 3 Number of papers per top journals (minimum 4 papers): 1998 - 2020.

However, when we analyse the period 2015-2020 (see Figure 4) for these top journals, we observe that Journal of Intellectual Capital continues to be the journal with most papers published in the field, but in the second position we have Journal of Knowledge Management, with a recent interest in the topic. Knowledge Management Research & Practice and Management Decision have no papers published in 2019 and 2020, which may indicate a loss of interest from the editorial team in the topic. Also, R&D Management published only one paper.

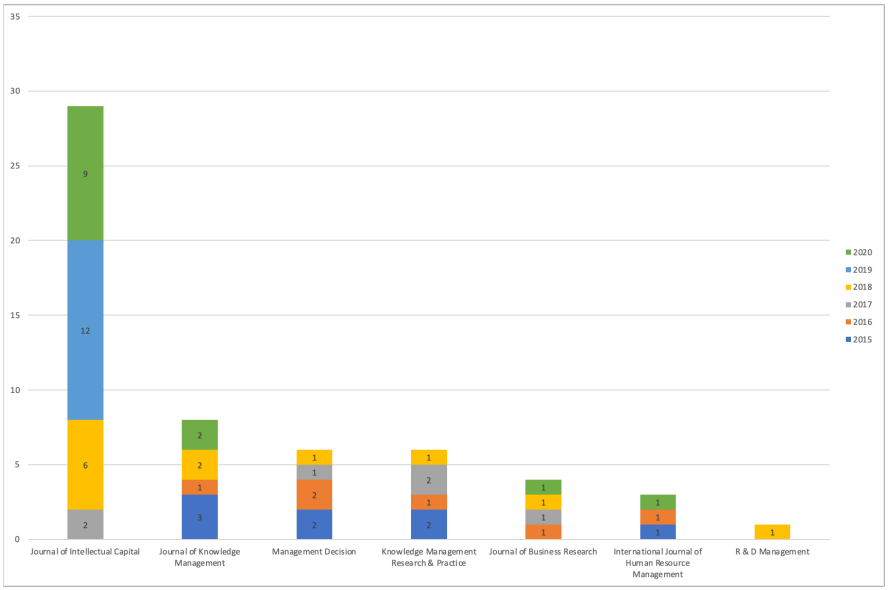

Figure 4 Number of papers per top journals: 2015 - 2020.

3.2. QUALITATIVE ANALYSIS

After the descriptive statistical analysis was performed, all full text papers and corresponding information were imported in NVivo 12, where a thorough content analysis was performed. Based on the specific literature on Intellectual Capital and experience from previous systematic literature reviews, the authors developed a preliminary framework that was used as a starting point for coding (See Figure 5).

Figure 5 Preliminary coding structure used for content analysis in NVivo

The preliminary structure was enriched during the coding, which was performed by two researchers and we present the main results in the following pages.

ARTICLE TYPE

Most of the papers are empirical, with the large majority of the papers using quantitative methods, with a specific focus on questionnaire-based surveys (e.g. Buenechea-Elberdin et al., 2017, Beltramino et al., 2020), mainly performed on a sample of firms extracted from specific databases (e.g. SABI for Spanish or Portuguese firms). Studies with secondary data (e.g. Molodchik et al., 2019) occupy the second position, however longitudinal studies are rather rare. Note that from the top journals, only Journal of Intellectual Capital published a relevant number of studies using secondary data, others prefer the surveys.

In term of statistical analysis, the two most used approaches are practically at a tie: regression (e.g. Ting et al., 2020) and structural equation modelling (e.g. Gurlek, 2021), used in the papers published in all top journals.

The qualitative papers use mainly a case study approach (e.g. Pedro et al., 2019). From the top journals, only Journal of Intellectual Capital and Knowledge Management Research & Practice published qualitative papers, while proportionally it was very rare, as the preferred approach is quantitative.

Taking the lenses of the national context studied by the authors in the empirical papers, the context most studied is Spain (e.g. Buenechea-Elberdin et al., 2017), followed by Taiwan (e.g. Cabrilo et al., 2020), China (e.g. Wang et al., 2019), United States (e.g. McDowell et al., 2018) and Italy (e.g. Agostini and Nosella, 2017). Remaining countries presented in Figure 6 have lower numbers.

In the top journals, Journal of Intellectual Capital has a wide variety of national contexts, followed by Knowledge Management Research & Practice, while the remaining top journals have less than a dozen countries in the papers they published on the topic.

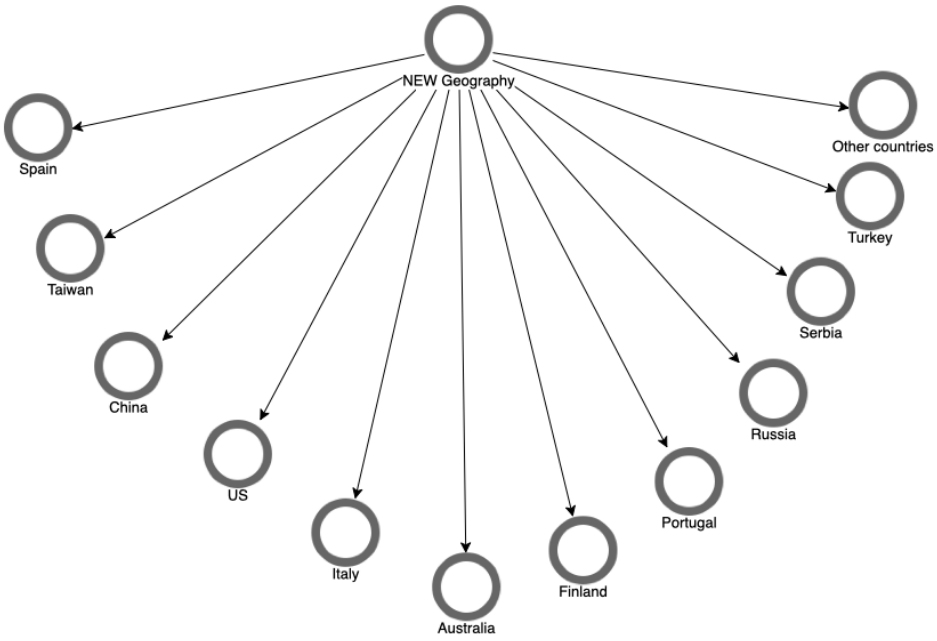

Figure 6 Geographical contexts studied by the authors

Regarding the conceptual papers, they seldom mention the type of methodology used for developing the research, which we consider a weakness. Some studies use systematic literature reviews (e.g. Paoloni et al., 2020) while other use bibliometric studies (e.g. Cezanne et al., 2019, Martin-de Castro et al., 2019), however most of them do not clarify the search process used to select the sample for the analysis, nor the process used to analyse them. From the top journals, Journal of Business Research and International Journal of Human Resources Management did not have any conceptual paper in our sample.

Figure 7 presents a simplified version of the final coding structure in NVivo on the elements associated with Article Type.

Figure 7 Simplified version of the coding structure for Article Type

RESEARCH GOALS

The research goals are rather varied and encompass different topics. Some examples for quantitative papers (the majority in our sample) are presented in Table 1.

Table 1 Example of research goals for the quantitative papers included in the sample

Research goal	Author
"*impact of human, organisational and relational capital on RIP, whether the organisational and relational capital act as mediators in the relationship between human capital and RIP and whether organisational capital moderates the relationship between relational capital and RIP*[1]"	(Agostini and Nosella, 2017)
"*relationship between social capital and innovation through knowledge sharing and intellectual capital*"	
"*analyze the influence of the structural capital of SMEs in the capacity of innovation and organizational performance, in the context of an emerging country*"	(Allameh, 2018)
"*the role of human attributes, including knowledge, skills and motivation (i.e. traditional HC), learning capability (i.e. renewal capital) and entrepreneurial attitude (i.e. entrepreneurial capital) on innovation in high-tech versus low-tech companies*"	
"*reconstructs the measurement model of intellectual capital, expanding the concept to include both internal and external dimensions, both of which have the same three elements: human, structural, and relationship capital. To test the reliability and validity of this new model, we explore the impact of each element on innovation performance*"	(Beltramino et al., 2020)
"*examines how IC and KM affect each other, and also investigates their consequences, viewing three intermediate consequences (dynamic capabilities, efficiency, and innovativeness) to mediate their effects on firm performance.*"	
"*To analyse the impact of the company's technology innovation strategy on the three components of IC; To analyse the relations among the three components of IC; To analyse how IC impacts on technology innovation performance; To verify the influence of context-specific variables such as firm size, technology intensity, geographical area and experience of the company on the above-mentioned relations.*"	(Buenechea-Elberdin et al., 2017)

Source: own elaboration

[1] RIP means Radical Innovative Performance

INTELLECTUAL CAPITAL COMPONENTS

Regarding the Intellectual Capital Components, our initial coding framework contemplated human capital, which refers to the sum of employees' knowledge, competence, innovativeness, commitment and wisdom (Sardo and Serrasqueiro, 2018); structural capital, which can be seen as the basic structure of a firm that supports and empowers human capital (Bontis, 1998) and is considered the support infrastructure for the establishment and maintenance of relationships with key external stakeholders (Molodchik et al., 2014); and relational capital, which refers to the knowledge embedded in the identification, development and maintenance of external relationships (Bontis, 1999).

While this is still the dominant classification, we observed that authors use alternative classifications (see Figure 8), sometimes overlapping the dominant ones, which turn difficult the comprehension of the components and exactly what is being studied.

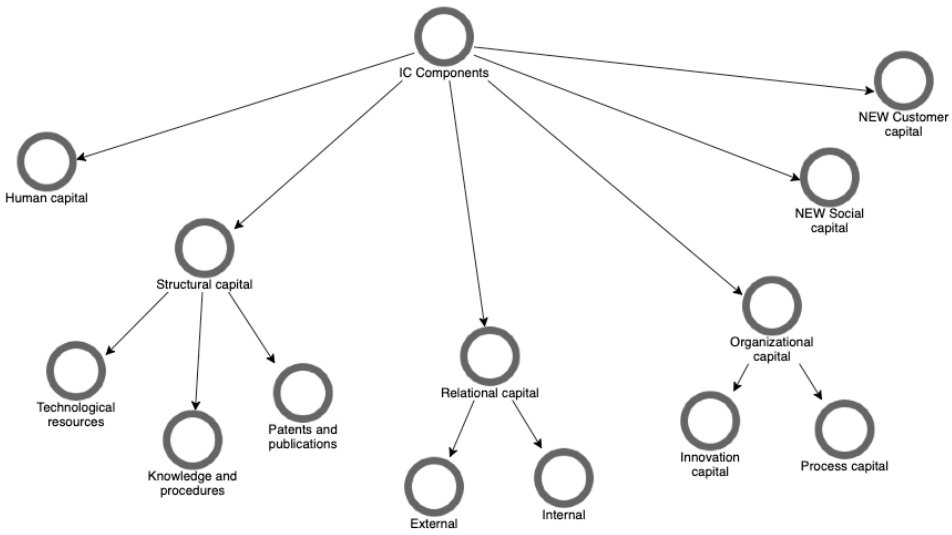

Figure 8 Intellectual Capital Components: taxonomies used in the sample

Although the classification of intellectual capital into the three components, human capital, structural capital and relational capital, is the dominant one, other components have been discussed recently in the literature with regards to the relationship between intellectual capital and innovation, such as organizational capital (Ahmed et al., 2019, Duodu and Rowlinson, 2019), innovation capital (Jardon et al., 2018, Ng et al., 2014), process capital (Cappellin, 2003, Phusavat et al., 2013), operational capital (Menor et al., 2007), customer capital (Chatzoglou and Chatzoudes, 2018, Verbano and Crema, 2016) and social capital (Ahmed et al., 2019, Martinez et al., 2019). Also, some authors split relational capital into external relational capital and internal relational capital (Jardon, 2015, Zaragoza-Saez et al., 2016), and trust capital (Oliveira et al., 2020).

The dominant classification of the intellectual capital components is also assumed by authors publishing in the two top journals with more paper publications, i.e., Journal of Intellectual Capital and Knowledge Management Research & Practice.

RELATIONSHIP BETWEEN INTELLECTUAL CAPITAL AND INNOVATION

The relationship between Intellectual Capital and Innovation was the key focus of our systematic literature review. After concluding the analysis, we identified different perspectives taken by the authors. It is difficult to identify a dominant approach and the field of study is, in our view, unconsolidated. More, differences have been identified by scholars according to the type of firm (new ventures, SMEs, incumbent, international), geographical context or industry.

Some authors will link intellectual capital to the innovative performance of the firm (e.g. Phusavat et al., 2013, McDowell et al., 2018, Wu et al., 2007), while others will consider all or specific intellectual capital components as antecedents of the development of innovative capabilities for the firm (e.g. Subramaniam and Youndt, 2005, Jardon, 2018) or influencing factors of the degree of firm innovativeness, which will eventually lead to innovative performance.

Barrena-Martinez et al. (2020), for instance, developed and tested a model relating human capital, structural capital, relational capital and absorptive capacity with open innovation success. Their results indicate that the three intellectual capital components have a positive impact on open innovation success, and the absorptive capacity plays a role in the relationships observed between human and structural capital.

Similarly, Oliveira et al. (2020) explored the relationship between knowledge sharing, intellectual capital, absorptive capacity, innovation and organizational performance and their results show that the relationship between intellectual capital and innovation is partially mediated by absorptive capacity. Relationships have been identified among all the analysed dimensions. Soo et al. (2017) also studied the role of intellectual capital in the development of absorptive capacity, which was seen to be mediating its relationship with innovation performance. Lazzarotti et al. (2015) had already studied in the past intellectual capital components as an antecedent to absorptive capacity, showing they enhanced innovative performance resulting from collaboration. In this line of research, Ahmed et al. (2019) studied the mediating role of potential and realized absorptive capacity in intellectual capital and business performance. Their results reveal that contrary to potential absorptive capacity, the realized absorptive capacity positively mediates the relationship between intellectual capital components and business performance. Furthermore, human capital and organizational capital had a major positive influence in this relationship.

Agostini and Nosella (2017) investigated the impact of intellectual capital components on radical innovation performance, and results show that human capital is directly associated with radical innovation performance, and that organizational and relational capital mediates the relationship between human capital and radical innovation performance.

Subramaniam and Youndt (2005) analysed the impact of intellectual components on incremental and radical innovative capabilities. Results show that human capital by itself negatively impacts on radical innovative capability but when interacted with social capital its effects are positive on radical innovative capability. Organizational capital positively influences incremental innovative capability.

Phusavat et al. (2013) take another perspective and conclude that innovation positively impacts intellectual capital, in contrast with other authors that indicate that it is intellectual capital that positively impacts innovation. This may indicate the existence of endogeneity in the relationship between intellectual capital and innovation, which could be explored in future studies.

Jardon (2018) focused on SMEs and his results indicate that human capital indirectly affects innovativeness, and that the effect of relational capital is performed through the structural capital. McDowell et al. (2018) studied SMEs, as well, and their results indicate that innovativeness partially mediated the relationship between intellectual capital (specifically human capital and organizational capital) and firm performance.

Liu et al. (2020) used intellectual capital as mediator, studying the impact of organizational learning on the capacity for new service development. Their results show that intellectual capital plays a mediator role between organizational learning and new service development.

Duodu and Rowlinson (2019) studied the relationship between intellectual components and exploratory and exploitative innovation. Findings reveal that while social capital and organizational capital have a positive effect on both type of innovation, this effect was not verified for human capital.

Martinez et al. (2019) analysed the relationship between the diversity in alliance portfolios and innovation performance, and results suggest that human capital and social capital partially mediates this relationship.

KEY CONTRIBUTIONS

A sample of the key contributions from the last three years is included in Table 2.

Table 2 Example of key contribution from the papers published between 2018 and 2021

Contributions	*Author*
"*the three dimensions of social capital, namely the structural, relational, and cognitive social capital, had positive effects on knowledge sharing; knowledge sharing had positive effects on three components of intellectual capital (human capital, structural capital and relational capital); and intellectual capital dimensions, which in turn, lead to innovation.*"	(Allameh, 2018)
"*both firm's technology level and type of innovation affect how IC influences innovation performance*"	(Buenechea-Elberdin et al., 2018a)
"*necessity of considering the technological level of the firm as a contingency variable affecting the IC–innovation relationship*"	(Buenechea-Elberdin et al., 2018b)
"*the role of human attributes, including knowledge, skills and motivation (i.e. traditional HC), learning capability (i.e. renewal capital) and entrepreneurial attitude (i.e. entrepreneurial capital) on innovation in high-tech versus low-tech companies*"	(Buenechea-Elberdin et al., 2017)
"*human capital generates relational capital. The relational capital needs structural capital to improve the innovativeness of subsistence small businesses.*"	(Jardon, 2018)
"*results suggest the presence of at least a partial mediating influence operated by innovation on human and organizational capital and firm performance. Alternatively, social capital does not significantly influence innovation levels and firm performance, in contrast with the results of most prior research. In addition, human capital positively influences both innovation and performance, although its effect on performance is partially mediated by innovation.*"	(McDowell et al., 2018)
"*potential absorptive capacity does not intervene in the relationship between the components of IC and those of business performance. However, realized absorptive capacity, measured as the transformation and exploitation of knowledge, played a positive mediating role in the relationship between the dimensions of IC and those of business performance. Social capital was also noted as a weak predictor of business performance, while human capital and organizational capital had a profound positive influence.*"	(Ahmed et al., 2019)
"*Social capital (SC) and organisational capital (OC) each have significant positive linear effects on exploratory and exploitative innovation, while human capital (HC) has no direct linear effect on either innovation type. HC, however, affects both exploratory and exploitative innovation through*	(Duodu and Rowlinson, 2019)

Contributions	*Author*
SC or OC. None of the three IC dimensions has a significant quadratic effect on exploratory or exploitative innovation."	
"findings from a sample of drug development trajectories show that human, structural, and social capital decrease the likelihood of discontinuation, indicating that NPD projects rich in intellectual capital take longer to be terminated"	(Subramanian and van de Vrande, 2019)
"the three IC constructs positively affect OI performance, with relational and human capital subject to diminishing returns."	(Barrena-Martinez et al., 2020)
"human, renewal, and entrepreneurial capital all positively affect organizational learning practices. Furthermore, organizational learning practices contribute to innovation performance on their own and in combination with the tested human-based intellectual capital dimensions."	(Cabrilo and Dahms, 2020)

Source: own elaboration

The intellectual capital components have been reported as key elements for firms' innovation performance. Previous studies have established interesting links between intellectual capital and various types of innovation, which opens new doors of opportunity to further investigate.

FUTURE RESEARCH DIRECTIONS

Future research directions are not particularly innovative. Most authors suggest expanding the sample or including other industries and other geographical contexts. Also, alternative statistical methods are suggested, yet there are no specific elements worth mentioning in this point. Authors seem to be mostly focused on validating their models in different contexts.

That said, it may appear rather contradictory to focus on the validation, when the field is unconsolidated. One food for thought for the scholars in this field.

4. CONCLUSIONS

First of all, it is needed to enhance that the relationship between Intellectual Capital and Innovation is a field of research that has secured the interest of researchers over the years. Although the existence of a considerable number of papers published on the area, we found it unconsolidated in terms of research goals and methodologic approaches. The major topics related to the intellectual capital-innovation nexus under analysis were the influence of intellectual capital on (1) innovation performance; (2) radical and incremental innovation; (3) absorptive capacity; (4) innovation ambidexterity.

The authors realize that there are a lot of contributions regarding the use of different intellectual capital components, when analyzing the relationship between intellectual capital and innovation, such as, customer capital, social capital, trust capital, and so on. Nevertheless, the dominant classification is still human capital, structural capital, and relational capital.

It was verified that the most influent publications are Journal of Intellectual Capital and Knowledge Management Research & Practice, which occupy the top positions at a certain distance from other journals/reviews. Most of the methodologic approaches are quantitative, however lacking the longitudinal perspective, where the questionnaire-based survey was the main source of data.

Future research directions provided in the analyzed publications are not particularly innovative, and authors seem to be mostly focused on validating their models in different contexts. Therefore, this may be an indication that further studies should focus on the major topics identified above.

BIBLIOGRAPHICAL REFERENCES

Agostini, L. & Nosella, A. 2017. Enhancing radical innovation performance through intellectual capital components. *Journal of Intellectual Capital,* 18**,** 789-806.

Ahmed, S. S., Guozhu, J., Mubarik, S., Khan, M. & Khan, E. 2019. Intellectual capital and business performance: the role of dimensions of absorptive capacity. *Journal of Intellectual Capital,* 21**,** 23-39.

Allameh, S. M. 2018. Antecedents and consequences of intellectual capital: The role of social capital, knowledge sharing and innovation. *Journal of Intellectual Capital,* 19**,** 858-874.

Barrena-Martinez, J., Cricelli, L., Ferrandiz, E., Greco, M. & Grimaldi, M. 2020. Joint forces: Towards an integration of intellectual capital theory and the open innovation paradigm. *Journal of Business Research,* 112**,** 261-270.

Beltramino, N. S., Garcia-Perez-De-Lema, D. & Valdez-Juarez, L. E. 2020. The structural capital, the innovation and the performance of the industrial SMES. *Journal of Intellectual Capital,* 21**,** 913-945.

Bontis, N. 1998. Intellectual capital: an exploratory study that develops measures and models. *Management Decision,* 36**,** 63-76.

Bontis, N. 1999. Managing organizational knowledge by diagnosing intellectual capital: framing and advancing the state of the field. *International Journal of Technology Management,* 18**,** 433-462.

Buenechea-Elberdin, M. 2017. Structured literature review about intellectual capital and innovation. *Journal of Intellectual Capital,* 18**,** 262–285.

Buenechea-Elberdin, M., Kianto, A. & Saenz, J. 2018a. Intellectual capital drivers of product and managerial innovation in high-tech and low-tech firms. *R & D Management,* 48**,** 290-307.

Buenechea-Elberdin, M., Saenz, J. & Kianto, A. 2017. Exploring the role of human capital, renewal capital and entrepreneurial capital in innovation performance in high-tech and low-tech firms. *Knowledge Management Research & Practice,* 15**,** 369-379.

Buenechea-Elberdin, M., Saenz, J. & Kianto, A. 2018b. Knowledge management strategies, intellectual capital, and innovation performance: a comparison between high- and low-tech firms. *Journal of Knowledge Management,* 22**,** 1757-1781.

Cabrilo, S. & Dahms, S. 2020. The Role of Multidimensional Intellectual Capital and Organizational Learning Practices in Innovation Performance. *European Management Review,* 17**,** 835-855.

Cabrilo, S., Dahms, S., Mutuc, E. B. & Marlin, J. 2020. The role of IT practices in facilitating relational and trust capital for superior innovation performance: the case of Taiwanese companies. *Journal of Intellectual Capital,* 21**,** 753-779.

Cappellin, R. 2003. Territorial knowledge management: towards a metrics of the cognitive dimension of agglomeration economies. *International Journal of Technology Management,* 26**,** 303-325.

Cezanne, C., Krafft, J. & Saglietto, L. 2019. A Survey of the Literature on Human Capital-Intensive Firms. *Journal of Economic Surveys,* 33**,** 458-480.

Chatzoglou, P. & Chatzoudes, D. 2018. The role of innovation in building competitive advantages: an empirical investigation. *European Journal of Innovation Management,* 21**,** 44-69.

Chen, J., Zhao, X. T. & Wang, Y. D. 2015. A new measurement of intellectual capital and its impact on innovation performance in an open innovation paradigm. *International Journal of Technology Management,* 67**,** 1-25.

Chen, M., Cheng, S. & Hwang, Y. 2005. An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital,* 6**,** 159-176.

Duodu, B. & Rowlinson, S. 2019. Intellectual capital for exploratory and exploitative innovation Exploring linear and quadratic effects in construction contractor firms. *Journal of Intellectual Capital,* 20**,** 382-405.

Engelman, R. M., Fracasso, E. M., Schmidt, S. & Zen, A. C. 2017. Intellectual capital, absorptive capacity and product innovation. *Management Decision,* 55**,** 474-490.

Fitzpatrick, M., Davey, J., Muller, L. & Davey, H. 2013. Value-creating assets in tourism management: applying marketing's service-dominant logic in the hotel industry. *Tourism Management,* 36**,** 86–98.

Guerrini, A., Romano, G. & Leardini, C. 2014. Does intellectual capital efficiency affect financial performance in the case of Italian listed firms. *International Journal of Learning and Intellectual Capital,* 11**,** 127-148.

Gurlek, M. 2021. Effects of high-performance work systems (HPWSs) on intellectual capital, organizational ambidexterity and knowledge absorptive capacity: evidence from the hotel industry. *Journal of Hospitality Marketing & Management,* 30**,** 38-70.

Hsu, I. C. & Sabherwal, R. 2012. Relationship between Intellectual Capital and Knowledge Management: An Empirical Investigation. *Decision Sciences,* 43**,** 489-524.

Jardon, C. F., Molodchik, M. & Paklina, S. 2018. Strategic behaviour of Russian companies with regard to intangibles. *Management Decision,* 56**,** 2373-2390.

Jardon, C. M. 2015. The use of intellectual capital to obtain competitive advantages in regional small and medium enterprises. *Knowledge Management Research & Practice,* 13**,** 486-496.

Jardon, C. M. 2018. Moderating effect of intellectual capital on innovativeness in Latin American subsistence small businesses. *Knowledge Management Research & Practice,* 16**,** 134-143.

Lazzarotti, V., Manzini, R. & Pellegrini, L. 2015. Is your open-innovation successful? The mediating role of a firm's organizational and social context. *International Journal of Human Resource Management,* 26**,** 2453-2485.

Liu, C. H., Gan, B. N., Luo, B. N. & Zhang, Y. C. 2020. Clarifying the effect of organization learning on service innovation: the mediating role of intellectual capital. *International Journal of Human Resource Management,* 31**,** 1207-1234.

Liu, Q. & Wong, K. P. 2011. Intellectual Capital and Financing Decisions: Evidence from the US Patent Data. *Management Science,* 57**,** 1861-1878.

Martin-De Castro, G., Diez-Vial, I. & Delgado-Verde, M. 2019. Intellectual capital and the firm: evolution and research trends. *Journal of Intellectual Capital,* 20**,** 555-580.

Martinez, M. G., Zouaghi, F. & Garcia, M. S. 2019. Casting a Wide Net for Innovation: Mediating Effect of R&D Human and Social Capital to Unlock the Value from Alliance Portfolio Diversity. *British Journal of Management,* 30**,** 769-790.

Mcdowell, W. C., Peake, W. O., Coder, L. & Harris, M. L. 2018. Building small firm performance through intellectual capital development: Exploring innovation as the "black box". *Journal of Business Research,* 88**,** 321-327.

Menor, L. J., Kristal, M. M. & Rosenzweig, E. D. 2007. Examining the influence of operational intellectual capital on capabilities and performance. *M&Som-Manufacturing & Service Operations Management,* 9**,** 559-578.

Molodchik, M. A., Jardon, C. M. & Bykova, A. A. 2019. The performance effect of intellectual capital in the Russian context Industry vs company level. *Journal of Intellectual Capital,* 20**,** 335-354.

Molodchik, M. A., Shakina, E. A. & Barajas, A. 2014. Metrics for the elements of intellectual capital in an economy driven by knowledge. *Journal of Intellectual Capital,* 15**,** 206-226.

Ng, A. W., Macbeth, D. & Southern, G. 2014. Entrepreneurial performance of early-stage ventures: dynamic resource management for development and growth. *International Entrepreneurship and Management Journal,* 10**,** 503-521.

Oliveira, M., Curado, C., Balle, A. R. & Kianto, A. 2020. Knowledge sharing, intellectual capital and organizational results in SMES: are they related? *Journal of Intellectual Capital,* 21**,** 893-911.

Paoloni, N., Mattei, G., Dello Strologo, A. & Celli, M. 2020. The present and future of intellectual capital in the healthcare sector A systematic literature review. *Journal of Intellectual Capital,* 21**,** 357-379.

Pedro, E., Leitao, J. & Alves, H. 2019. The intellectual capital of higher education institutions Operationalizing measurement through a strategic prospective lens. *Journal of Intellectual Capital,* 20**,** 355-381.

Phusavat, K., Comepa, N., Sitko-Lutek, A. & Ooi, K. B. 2013. Productivity management: integrating the intellectual capital. *Industrial Management & Data Systems,* 113**,** 840-855.

Ruiz-Jiménez, M. J. & Fuentes-Fuentes, M. 2018. Knowledge combination, innovation, organizational performance in technology firms. *Industrial Management and Data Systems,* 113**,** 523-540.

Sardo, F. & Serrasqueiro, Z. 2018. Intellectual Capital, Growth Opportunities, and Financial Performance in European Firms: Dynamic Panel Data Analysis. *Journal of Intellectual Capital,* 19**,** 747-767.

Saur-Amaral, I., Soares, R. & Proença, J. 2018. Business Model Innovation: Towards a Conceptual Framework. *Tourism Management Studies,* 14**,** 80-93.

Soo, C., Tian, A. W., Teo, S. T. T. & Cordery, J. 2017. Intellectual Capital-Enhancing HR, Absorptive Capacity, and Innovation. *Human Resource Management,* 56**,** 431-454.

Subramaniam, M. & Youndt, M. A. 2005. The influence of intellectual capital on the types of innovative capabilities. *Academy of Management Journal,* 48**,** 450-463.

Subramanian, A. M. & Van De Vrande, V. 2019. The role of intellectual capital in new product development: Can it become a liability? *Journal of Operations Management,* 65**,** 517-535.

Ting, I. W. K., Ren, C., Chen, F. C. & Kweh, Q. L. 2020. Interpreting the dynamic performance effect of intellectual capital through a value-added-based perspective. *Journal of Intellectual Capital,* 21**,** 381-401.

Tranfield, D., Denyer, D. & Smart, P. 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management,* 14**,** 207-222.

Verbano, C. & Crema, M. 2016. Linking technology innovation strategy, intellectual capital and technology innovation performance in manufacturing SMEs. *Technology Analysis & Strategic Management,* 28**,** 524-540.

Wang, Y. Y., Su, X., Wang, H. & Zou, R. Y. 2019. Intellectual capital and technological dynamic capability: evidence from Chinese enterprises. *Journal of Intellectual Capital,* 20**,** 453-471.

Wu, S. H., Lin, L. Y. & Hsu, M. Y. 2007. Intellectual capital, dynamic capabilities and innovative performance of organisations. *International Journal of Technology Management,* 39**,** 279-296.

Zaragoza-Saez, P., Claver-Cortes, E., Marco-Lajara, B. & Ubeda-Garcia, M. 2016. Influence of intellectual capital upon knowledge creation in Spanish subsidiaries: an empirical study. *Knowledge Management Research & Practice,* 14**,** 489-501.