

Enhancing policies and measurements of intellectual capital: macro, meso or micro analysis

Knowledge is a major source of competitive advantage with intangible assets being more important than tangible ones. As innovative disruptions occur in all industries (e.g. manufacturing, technological, Industry 4.0, pharmaceutical, medical, etc.), intellectual capital is a primary creator of value (Obradović *et al.*, 2021). Intellectual capital has many foci units of analysis varying from the individual, organizational and interorganizational to the constellation of networks of firms developing competitive advantage. Intellectual capital can be embedded within an individual as tacit knowledge or developed both through organization and interorganizational processes and through established strategic partnerships and alliances (Lee *et al.*, 2017). Leveraging these knowledge drivers has been shown to differentiate successful firms from those that are left behind (Kianto *et al.*, 2017; Bellucci *et al.*, 2020).

A human-level or micro-level approach to research into intellectual capital suggests that human expertise is superior to financial and physical assets, and expenditures on education and training are necessary. The micro-level focuses on both the broad interconnectedness of a workforce and individual competencies such as knowledge, skills and attributes of the employees. The intellectual capital is often tacit and is mobile as it can leave a firm. Although a source of strategic innovation, the difficult nature of tacit knowledge can be difficult to measure, assess or utilize (Saint-Onge, 1996; Konno and Schillaci, 2021). Research suggests that even if an individual may have valuable intellectual capital as tacit knowledge, they may not be willing to share their knowledge as it is a source of their power base within the firm.

Firm-level or meso-level research into intellectual capital has been described as knowledge, information, intellectual property and experience utilized by a firm for a competitive advantage and resulted in innovation with a focus on value-added (Li *et al.*, 2021). There are three components of meso-level intellectual capital research: human capital, structural capital and relational capital. The human capital is each individual in the workforce and their training and expertise, structural capital is the routines and explicit knowledge such as handbooks and databases, and relational capital focuses on the firm and all the relationships developed with customers, competitors, suppliers, trade associations or government bodies. Measurements of meso-level intellectual capital are: (1) direct (monetary value of intangible assets), (2) scorecard (using indicators or indices), (3) market capitalization (difference between a firm market capitalization and stockholder's equity) and (4) return on assets (ROA) (pre-tax earnings divided by average tangible assets).

National level or macro-level research focusing on intellectual capital has been defined as all intangible resources available to a country, particularly all the knowledge, wisdom, capability and expertise measured by a country's success compared to other countries. There have been many models introduced for measuring national and regional intellectual capital (Edvinsson and Lin, 2009). However, there are inherent limitations in measuring macro-level intellectual capital, such as the international comparisons are limited by the availability of published data, use of a combination of quantitative and qualitative scores on a scale may attenuate the variance and that the data only explains the past and not the current status or future expectations. Research focuses on the macro-level because policymakers understand its importance for national economic growth, human development and quality of life. Countries high in intellectual capital are more successful than countries whose strategic assets are focused on land, tools and labor.



Intellectual capital has traditionally been measured through human, relational and structural factors (Buenechea-Elberdin, 2017; Teece, 2000; Dabić *et al.*, 2019, 2020). However, with the increased digitalization of the economy, there has been a shift in how intellectual assets are defined and conceptualized (Chesbrough *et al.*, 2018; Cortinovis *et al.*, 2017). This is evident with the change in emphasis on intellectual property from a mostly product or service innovation perspective to a design element (Agostini and Nosella, 2017). This has meant the way we measure and consider intellectual property needs to be reexamined at different levels of analysis (Rossi and Magni, 2017). One way to do this is to focus on the macro-, meso- or micro-level, thereby enabling a closer look at how firm activities, the economy and societal attitudes are changing (Secundo *et al.*, 2017; Chou and Zolkiewski, 2018). This is important as intellectual capital can be difficult to evaluate, so taking a triadic approach to its measurement is helpful in order to build a more progressive and contemporary understanding of the topic. In addition, policy makers need to stay current with emerging technological innovations and ways of thinking that influence intellectual capital developments (Obeidat *et al.*, 2017). Thus, by acting as an entrepreneur in measuring intellectual capital, it can enable a more proactive and futuristic way of thinking to take place that enables a better understanding of the topic (Roos, 2017).

Though we see a plethora of research published in journals and conferences, so far we do not see a reliable framework that places the research in perspective such as matching methods with objectives, methods and data sources. The objectives of this special issue are to focus on policy recognition; identifying best practices, actors and opportunities; visualizing the research and knowledge landscape; and detecting the knowledge flows.

The first article of this special issue *Multilevel approaches to advancing the measurement of intellectual capital research field – What can we learn from the literature?* by João, J. Ferreira, Christina Fernandes and Pedro Veiga systematically review multilevel approaches to advancing the measurement of the intellectual capital research field and providing a future research agenda. Deploying an ontological thematic analysis, the authors identify the main theories and methodological orientations within a set of intellectual capital dimensions across three different analysis levels: micro, meso and macro. The study is a first attempt to analyze the emerging literature on intellectual capital measurement integrating the most relevant theoretical contributions in the field.

The second article by Sun Zhongjuan, Massimiliano Matteo Pellegrini, Cizhi Wang and Zhu Yu “*How does government support promote firms’ intellectual capital? An empirical analysis of micro-mechanisms*” analyzes the role of government support (GS) as an institutional signal which may support the IC development process. However, this development only arises if these additional resources are properly managed and orchestrated inside a company. A fixed effect panel analysis of 3,211 high-tech companies operating in China from 2008 to 2015, confirms a significant that the effect of GS on IC development is mediated by previous performance of the company. These results enrich the IC debate highlighting the institutional influences of GS to develop a company’s IC and the micro-mechanisms to achieve it.

Mihaela Mikić, Tin Horvatinović and Ivana Kovač in the third article titled “*Climbing up the regional intellectual capital tree: an EU entrepreneurial ecosystem analysis*” attempts to answer how intellectual capital is formed under the influence of the entrepreneurial ecosystem by viewing intellectual capital through the Knoware Tree by focusing on regional innovation capital. The authors conducted a cross-sectional analysis on NUTS 2 regions of selected EU and countries. Multiple linear regression approaches were carried out using secondary data.

Maribel Guerrero, Fernando Herrera and David Urbano in the fourth article: “*Does policy enhance collaborative-opportunistic behaviors? Looking into the intellectual capital dynamics of subsidized industry-university partnership’s*” pointed out that little is known about how

subsidies enhance both collaborative and opportunistic behaviors within subsidized industry-university partnerships, and how partners' behaviors influence the intellectual capital dynamics within subsidized industry-university. Based on these theoretical foundations, this study expects to understand IC's contribution as a dynamic or systemic process (inputs → outputs → outcomes) within subsidized university-industry partnerships. This research especially contributes to the ongoing academic debate as this research analyses how collaborative and opportunistic behaviors within industry-university partnerships influence the intellectual capital dynamics (inputs, outputs and outcomes) of the subsidized projects. By combining two sources of information about 683 Mexican subsidized industry-university partnerships from 2009 to 2016, this study utilized structural equation modeling (SEM) to analyze the effect of collaborative vs opportunistic behaviors in intellectual capital dynamics within subsidized projects. Results show three tendencies about the bright/dark side of subsidies within the Mexican industry-university partnerships.

In the fifth article "*The reverse transfer of knowledge in MNEs: the perspective of foreign subsidiaries in a post-transition country*" by [Barbara Jankowska](#), [Małgorzata Bartosik-Purgat](#) and [Iwona Olejnik](#) investigated the factors of the marketing and managerial knowledge transfer from a foreign subsidiary located in a post-transition country to its headquarters among 231 manufacturing foreign subsidiaries established in Poland. The determinants of reverse knowledge transfer are often underutilized from the corporate perspective. The authors provoke the question about the proper level of strategic autonomy of a foreign subsidiary. The implications relating to autonomy is much about the proper strategy for human resources management. The obtained results indicate that the intensity of innovation in a foreign subsidiary translates to the outflows of knowledge from a foreign subsidiary to its headquarters. Thus, encouraging headquarters to let their subsidiaries innovate while still monitoring their power.

In the sixth article entitled "*Keeping the wheels of the automotive industry turning the use of tacit knowledge by product development workers in a multinational automotive manufacturer*" by [Rene Schmidt](#), [Robin Bell](#) and [Vessela Warren](#) recognize the forms of tacit knowledge repeatedly requested in a multinational automotive manufacturer's product departments for the knowledge workers' job descriptions. It then investigates how and why the most requested forms of tacit knowledge are used in practice to accomplish organizational goals.

[Isabel Sanchez-Hernandez](#) and [Francisca Castilla-Polo](#) in the seventh article "*Intellectual capital as predictor of cooperative prominence through human capital in the Spanish agri-food industry*" gave an innovative empirical contribution based on recent advances in the predictive structural equation model assessment, demonstrating the crucial role of intellectual capital, and the specific role of human capital, in promoting competitive success among cooperatives by fostering responsible research and innovation, reputation and performance. This work opens a line of research to revise and reconsider the role played by intellectual capital in cooperative arrangements.

In the last article of this special issue [Ankur Kulshrestha](#) and [Archana Patro](#) in the article "*Intellectual capital reporting and mandatory adoption of post-IFRS – an empirical analysis using computational linguistic tools*" based on content analysis discussed adoption of International Financial Reporting Standards (IFRS) in India where intellectual capital reporting (ICR) is measured using the disclosure of "keywords" in the narrative of the annual report. The study also tests the effect of term-weighting schemes used for information retrieval studies in the domain area of ICR. The word counts were used to construct two distinct measures of ICR, quantity and quality, deploying different term-weighting schemes, equal weighting and the TF-IDF weighting, respectively. A combination of parametric and nonparametric tests has been employed to examine the different hypothesis.

From a practitioner viewpoint, firms must focus on the processes in which they can generate and implement intellectual capital to increase revenues and serve in accomplishing

organizational goals. However, the routines and methodologies available to measure effectiveness are inadequate, and, as such, new appraisals and evaluations of this problem are continuously needed. Organizational tasks and positions have been considered necessary tools concerning data and knowledge flow and intellectual capital expansion. Researchers can also use patent indicators to establish new business models and life cycles and estimate and reevaluate previously investigated topics, such as core competencies, main pillars, knowledge flow appearances and innovate cycle curves in terms of alternate periods of intellectual contribution on macro, meso or micro levels of analysis.

Complementing the existing academic literature, the research articles in this special issue propose a common theme with an emphasis on the core aspects of an organization, encouraging companies to reconsider their intellectual capital, and that MNCs sharing strategies depend on their place within the market. For example, some of these papers utilize knowledge management and intellectual capital theories in ecosystem analysis and analyze the role of the university or the importance of governmental support. Intellectual capital, on every level, forms the basis of an organization's sustainable competitiveness. Businesses must strive towards innovation, building upon their core intellectual competencies, values and strategic goals to encourage and sustain an economical and knowledge advantage. Barrena-Martínez *et al.* (2020) suggested to integrate intellectual capital theory and the open innovation paradigm. Future research in this area should – following the immediate threat of COVID-19 – consider how our behavior and thinking patterns have changed, how continents, countries, companies and individuals assigned and divided relevant expertise, how workplaces have changed and how digital models might enhance the links between innovation, technology, knowledge management and intellectual capital and teams when it comes to an understanding future streams of research.

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References

- Agostini, L. and Nosella, A. (2017), "Enhancing radical innovation performance through intellectual capital components", *Journal of Intellectual Capital*, Vol. 18 No. 4, pp. 789-806.
- Barrena-Martínez, J., Cricelli, L., Ferrándiz, E., Greco, M. and Grimaldi, M. (2020), "Joint forces: towards an integration of intellectual capital theory and the open innovation paradigm", *Journal of Business Research*, Vol. 112, pp. 261-270.
- Bellucci, M., Marzi, G., Orlando, B. and Ciampi, F. (2020), "Journal of Intellectual Capital: a review of emerging themes and future trends", *Journal of Intellectual Capital*. doi: [10.1108/JIC-10-2019-0239](https://doi.org/10.1108/JIC-10-2019-0239).
- Buenechea-Elberdin, M. (2017), "Structured literature review about intellectual capital and innovation", *Journal of Intellectual Capital*, Vol. 18 No. 2, pp. 262-285.
- Chesbrough, H., Lettl, C. and Ritter, T. (2018), "Value creation and value capture in open innovation", *Journal of Product Innovation Management*, Vol. 35 No. 6, pp. 930-938.

- Chou, H. and Zolkiewski, J. (2018), "Coopetition and value creation and appropriation: the role of interdependencies, tensions and harmony", *Industrial Marketing Management*, Vol. 70, pp. 25-33.
- Cortinovis, N., Xiao, J., Boschma, R. and van Oort, F.G. (2017), "Quality of government and social capital as drivers of regional diversification in Europe", *Journal of Economic Geography*, Vol. 17 No. 6, pp. 1179-1208.
- Dabić, M., Lažnjak, J., Smallbone, D. and Švarc, J. (2019), "Intellectual capital, organisational climate, innovation culture, and SME performance: evidence from Croatia", *Journal of Small Business and Enterprise Development*, Vol. 26 No. 4, pp. 522-544, doi: [10.1108/JSBED-04-2018-0117](https://doi.org/10.1108/JSBED-04-2018-0117).
- Dabić, M., Vlačić, B., Scutto, V. and Warkentin, M. (2020), "Two decades of the Journal of Intellectual Capital: a bibliometric overview and an agenda for future research", *Journal of Intellectual Capital*. doi: [10.1108/JIC-02-2020-0052](https://doi.org/10.1108/JIC-02-2020-0052).
- Edvinsson, L. and Lin, C.Y.-Y. (2009), *National Intellectual Capital: A Comparison of 40 Countries*, Springer, New York, NY.
- Ferreira, J.J.M., Fernandes, C. and Veiga, P. (2020), "Multilevel approaches to advancing the measurement of intellectual capital research field—what can we learn from the literature?", *Journal of Intellectual Capital*, Vol. 22 No. 6, pp. 971-999, doi: [10.1108/JIC-07-2020-0221](https://doi.org/10.1108/JIC-07-2020-0221).
- Jankowska, B., Bartosik-Purgat, M. and Olejnik, I. (2020), "The reverse transfer of knowledge in MNEs: the perspective of foreign subsidiaries in a post-transition country", *Journal of Intellectual Capital*, Vol. 22 No. 6, pp. 1082-1105, doi: [10.1108/JIC-07-2020-0247](https://doi.org/10.1108/JIC-07-2020-0247).
- Kianto, A., Sáenz, J. and Aramburu, N. (2017), "Knowledge-based human resource management practices, intellectual capital and innovation", *Journal of Business Research*, Vol. 81, pp. 11-20.
- Konno, N. and Schillaci, C.E. (2021), "Intellectual capital in society 5.0 by the lens of the knowledge creation theory", *Journal of Intellectual Capital*, Vol. 22 No. 3, pp. 478-505, doi: [10.1108/JIC-02-2020-0060](https://doi.org/10.1108/JIC-02-2020-0060).
- Kulshrestha, A. and Patro, A. (2021), "Intellectual capital reporting and mandatory adoption of post-IFRS—an empirical analysis using computational linguistic tools", *Journal of Intellectual Capital*, Vol. 22 No. 6, pp. 1147-1179, doi: [10.1108/JIC-07-2020-0249](https://doi.org/10.1108/JIC-07-2020-0249).
- Lee, I.C., Lin, C.Y. and Lin, T.Y. (2017), "The creation of national intellectual capital from the perspective of Hofstede's national culture", *Journal of Intellectual Capital*, Vol. 18 No. 4, pp. 807-831.
- Li, X., Nosheen, S., Haq, N.U. and Gao, X. (2021), "Value creation during fourth industrial revolution: use of intellectual capital by most innovative companies of the world", *Technological Forecasting and Social Change*, Vol. 163, 120479, doi: [10.1016/j.techfore.2020.120479](https://doi.org/10.1016/j.techfore.2020.120479).
- Mikić, M., Horvatinović, T. and Kovac, I. (2020), "Climbing up the regional intellectual capital tree: an EU entrepreneurial ecosystem analysis", *Journal of Intellectual Capital*, Vol. 22 No. 6, pp. 1030-1054, doi: [10.1108/JIC-07-2020-0258](https://doi.org/10.1108/JIC-07-2020-0258).
- Obeidat, B.Y., Tarhini, A., Masa'deh, R.E. and Aqqad, N.O. (2017), "The impact of intellectual capital on innovation via the mediating role of knowledge management: a structural equation modelling approach", *International Journal of Knowledge Management Studies*, Vol. 8 Nos 3-4, pp. 273-298.
- Obradović, T., Vlačić, B. and Dabić, M. (2021), "Open innovation in the manufacturing industry: a review and research agenda", *Technovation*, Vol. 102, 102221, doi: [10.1016/j.technovation.2021.102221](https://doi.org/10.1016/j.technovation.2021.102221).
- Roos, G. (2017), "Knowledge management, intellectual capital, structural holes, economic complexity and national prosperity", *Journal of Intellectual Capital*, Vol. 18 No. 4, pp. 745-770.
- Rossi, M.V. and Magni, D. (2017), "Intellectual capital and value co-creation: an empirical analysis from a marketing perspective", *Electronic Journal of Knowledge Management*, Vol. 15 No. 3, pp. 147-158.
- Saint-Onge, H. (1996), "Tacit knowledge the key to the strategic alignment of intellectual capital", *Planning Review*, Vol. 24 No. 2, pp. 10-16, doi: [10.1108/eb054547](https://doi.org/10.1108/eb054547).

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- Sánchez-Hernández, M.I. and Castilla-Polo, F. (2021), "Intellectual capital as a predictor of cooperative prominence through human capital in the Spanish agrifood industry", *Journal of Intellectual Capital*, Vol. 22 No. 6, pp. 1126-1146, doi: [10.1108/JIC-06-2020-0201](https://doi.org/10.1108/JIC-06-2020-0201).
- Schmidt, R., Bell, R. and Warren, V. (2021), "Keeping the wheels of the automotive industry turning: the use of tacit knowledge by product development workers in a multinational automotive manufacturer", *Journal of Intellectual Capital*, Vol. 22 No. 6, pp. 1106-1125, doi: [10.1108/JIC-07-2020-0257](https://doi.org/10.1108/JIC-07-2020-0257).
- Secundo, G., Del Vecchio, P., Dumay, J. and Passiante, G. (2017), "Intellectual capital in the age of Big Data: establishing a research agenda", *Journal of Intellectual Capital*, Vol. 18 No. 2, pp. 242-261.
- Sun, Z., Pellegrini, M.M., Wang, C. and Yu, Z. (2021), "How does government support promote firms' intellectual capital? An empirical analysis of micro-mechanisms", *Journal of Intellectual Capital*, Vol. 22 No. 6, pp. 1000-1029, doi: [10.1108/JIC-07-2020-0260](https://doi.org/10.1108/JIC-07-2020-0260).
- Teece, D.J. (2000), *Managing Intellectual Capital: Organizational, Strategic, and Policy Dimensions*, OUP, Oxford.