

Intellectual Capital and Market Risk: A Literature Review

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Abstract

Purpose: The purpose of this research is to explore the potential dimensions of intellectual capital related to market risk by synthesizing insights from diverse literature sources, offering recommendations for future research in this area. Research design, data and methodology: analysis was performed utilizing the bibliometric approach aided by specialized software. Data was gathered from the Scopus database, which was systematically retrieved over a decade, spanning from 2012 to 2022, using the Harszing Publish or Perish tool. Results: The search results obtained 92 articles relating to the topics studied from various disciplines, including management, administration, banking, and others. After that, the harvested articles were analyzed and mapped using VOSviewer to obtain topics that are rarely researched. The results of the analysis and mapping obtained 4 articles that can be taken into consideration in research related to the topic raised in the future. Conclusions: This study presents an overview of the application of intellectual capital and market risk in business, which will become important knowledge for organizational actors in reducing risk in the future. In addition, this study is important for academics in viewing areas that are still rarely explored in relation to these two themes.

Keywords: Intellectual Capital, Market Risk, Bibliometric, Publish or Perish, VOSviewer

INTRODUCTION

Financial losses caused by fluctuations in the asset's value on the market may reflect market risk. Public companies value can reflect the availability of information related to the value of business capabilities referring to the efficient market hypothesis (Gerald I. White, Ashwinpaul C. Sondhi, 1997; Singh et al., 2021). Assessment of a public company's assets in the market is reflected in stock price, which is a description of all company information available in the capital market. Based on an efficient market context, stock prices in the capital market reflect fair value, so they will adjust quickly and on average without bias to new information, creating the possibility of overvalued or undervalued company shares. The efficient market hypothesis has received a lot of criticism in fact, which shows the occurrence of anomalies that shape stock prices in the capital market (Nasir et al., 2017; Rossi, 2016).

Since Galbraith (1969) introduced this important role of intellectual capital, several previous scientists have raised several objections. High costs are thought to be required to produce efficient intellectual capital (Bontis, 1999). Furthermore, measuring intellectual capital efficiency is difficult because it has a significant relationship with profit potential and can even be said to be almost hard to ascertain (Bontis et al., 1999). Furthermore, the issue of legal protection for intellectual property rights that are not entirely owned by the company can result in significant costs. Companies must incur additional high costs to have legal certainty over intellectual property rights (Lev, 2001), which may reduce the company's capacity to produce prospective earnings, increasing financial risk of the company's shares in the capital market.

The results of previous studies have shown that the value's market has enlarged around six times due to intellectual capital information (Lev, 2001). Intellectual capital information can also effectively shape stock prices (Abdolmohammadi, M., Simnett, R., Thibodeau, J.C. and Wright, 2006; Probohudono et al., 2021). In addition, several other studies also show that intellectual capital important role which is influenced by the formation of the stock market value of the capital market (Pulic, 2000; Tseng & Goo, 2005). Based on these findings, it is suspected that the intellectual capital information disclosed by the company will be able to influence stock price fluctuations, which in turn determine the level of market risk faced by market

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participants. Therefore, this research will emphasize an in-depth and comprehensive exploration of how intellectual capital and market risk are related, which is examined through a review of existing literature.

Academic research has been interested in the relationship between intellectual capital and market risk. However, the existing references give a limited view on the specific link between intellectual capital and market risk. As a result, further study is required to get a more thorough knowledge of this connection, taking into consideration numerous features and measuring methodologies, in order to give significant insights into the dynamics of intellectual capital and market risk. This study makes use of the Harszing Publish or Perish (PoP) and VOSviewer tools to generate topic recommendations about the relationship between intellectual capital and market risk, with the hope that these findings will help future researchers choose research topics about intellectual capital and market risk.

The following section includes literature review, research methods, analysis, conclusions and recommendations are shown, presented and discussed in depth based on theory and empirical findings from previous researchers and findings from this research in section 2, 3, 4, and 5.

LITERATURE REVIEW

Market Risk

Financial risks are financial losses or gains caused by unexpected changes in the underlying risk factors (Rahoitustarkastus, 2009). In this research, market risk is employed as a proxy for financial risk. The market risk discussed in this study is defined as the risk of loss in the capital market as a consequence of fluctuations in stock market prices. The stock market is always volatile, and at times extremely volatile, so almost every company listed on the capital market experiences price fluctuations, resulting in the emergence of potential losses for capital market participants. Any security's risk is classified into two categories: market risk was referred to as systematic risk, while idiosyncratic risk was referred to as non-systematic risk. Diversification helps investors reduce the non-systematic risk possibilities. Investors are generally rewarded for taking on risk. If the investment provides a higher return, it will be regarded as less risky than stocks that provide lower returns (Elton et al., 1994).

Market risk is defined by IFRS 7 and Ernst & Young (2008:24) as the risk that the fair value or future cash of a financial instrument may fluctuate owing to changes in market pricing. The component of market risk includes currency risk, interest rate risk, and pricing risk (Al-Hadi et al., 2016; Savvidou, 2012). For enterprises operating in foreign markets, exchange rate risk is induced by volatility in exchange rates. Interest rate fluctuations induce interest risk, especially if the corporation engages fixed-income assets in financial markets. Price risk is classified into two types: price variations of financial assets caused by probable price variations of financial assets is different from fixed income assets, and price variations from commodities caused by losses caused by unexpected commodity price variations. This is the most prevalent sort of market risk affects all sorts of enterprises, regardless of their financial market success or currency transactions (Savvidou, 2012).

Intellectual Capital

The three components of corporate knowledge are human capital, structural capital, and relational capital, and they are supposed to interact with one another and contribute to the company's enhanced performance (Chen et al., 2014; Meritum, 2002). The knowledge foundation of the whole company is referred to as intellectual capital. Intellectual capital denotes the value generated from knowledge from within an organization (Limon et al., 2021). It will greatly assist analysts by providing them with the most recent economic knowledge and information (Duho, 2020). According to Onumah and Duho (2019), the literature divides intellectual capital into three categories: human capital efficiency, structural capital efficiency, and capital used efficiency. Human capital is a critical source of intangible assets such as services, and intellectual capital is a critical component of human capital (Cabrita & Vaz, 2005; Edvinsson & Malone, 1997; O'Donnell et al., 2003; Stewart, 1997). Cabrita and Vaz (2005) define structural capital as an organization's capacities in terms of culture, procedures, protocols, processes, technological infrastructure, and accessible frameworks for

dealing with internal and external concerns. Relational capital or capital used refers to an organization's relationship with its stakeholders (Duho, 2020).

According to Lev (2001), intangible assets, also known as intellectuals, are currently driving wealth and economic growth (Chen et al., 2014). Research employs intellectual phrases to describe intangible assets owned by a bank (Chen et al., 2014). A manager's ability to comprehend the significance of intellectual capital performance on the strategic decision-making process is very useful in improving bank performance (Duho, 2020). While Naidenova et al. (2015) examine intellectual capital from the perspective of an individual manager in a company. According to them, a manager's intellectual capital, particularly that of a finance manager, can be measured by the knowledge and skills he or she possesses in influencing mutual fund performance (Naidenova et al., 2015).

Intellectual Capital and Market Risk

The capital market serves an economic function because it provides facilities or media to unite two interests, those with surplus assets and those in need of finances. Every investment decision has risks that investors must bear, whether they invest in bonds or stocks. Stocks known for their high risk, high return characteristics offer opportunities for high profits but also carry a high risk of loss. Stock price fluctuations cause investors to profit as well as lose. This is known as speculative risk. Speculative risk is a subset of a larger risk category. The uncertainty of events that can result in gains or losses is referred to as speculative risk. Gupta (2013) classifies speculative risk as market risk, credit risk, strategic, business, and reputational risk. Companies must properly manage these risks so that they do not have an impact on the company's income as well as the profits distributed to investors.

Dockner (2015) believes that by investing in intellectual capital, management has the ability to enhance the risk of accomplishing innovations. The level of danger in progress is the likelihood that it will occur during the next time interval for the unfinished innovation. It is clearly demonstrated that the likelihood of this conditional settlement must be dependent on the company's stock of intellectual capital. Intellectual capital is described as a company's knowledge-based equity, which is the combination both human capital and structural capital (Dockner & Siyahhan, 2015; Tan et al., 2007). They discovered that technological uncertainty is the main source of risk during the research and development phase of innovation. Market risk derives from the unknown value of the patent both before and after the breakthrough. While Salemink et al. (2017) discuss the Dutch experience with rural broadband, which took the initiative to enter the market but raised pros and cons between national market participants, as well as the activities of regional and municipal governments under government control, and local capacities which include social capital, intellectual capital, and financial capital (Salemink et al., 2017). This case demonstrates the importance of social capital, intellectual capital, and financial capital, particularly for volunteers, in avoiding market risk.

Meanwhile, Zaini et al. (2018) discovered a low influence on the company's voluntary disclosure practices in developing countries in his research. According to their research, intellectual capital or risk and human capital are the least popular categories (Md Zaini et al., 2018). Tikhomirov and Komshilova's (2019) takes a stock price analysis method to two assets in their research: physical assets and market premiums associated with intangible assets, which are also a type of intellectual capital. According to them, stock prices with a significant share of intangible assets or intellectual capital will result in additional risk in the form of significant market capitalization due to changes in the factors that comprise intangible assets (Tikhomirov & Komshilova, 2019).

Most earlier studies on intellectual capital focused at the influence of intellectual capital on corporate performance, but only a few looked at the link between intellectual capital and market risk. As a result, the goal of this study is to map prior studies that examine the link between intellectual capital and market risk so that it may be used as a reference for future research.

METHODS AND MATERIALS

articles (Britto et al., 2014; Dockner & Siyahhan, 2015; Gupta et al., 2016; Mkumbuzi, 2016), contained the relation between intellectual capital and market risk, it is from Britto et al. (2014) research, which was cited 30 times; Dockner & Siyahhan (2015), which was cited 9 times; Mkumbuzi (2016), which was cited 2 times; and Gupta et al. (2016), which was cited 30 times. Table 1 contains detailed information on these four articles.

The research area topics of the 92 articles are divided into each area, including Accounting, Management and Banking topics, Management topics, Management and Innovation topics, Economics, Management and Business topics, Economics, Politics, Law and Technology topics, and Socio-Economic topics. and Health, more details can be seen in Diagram 1. This indicates that the subject of intellectual capital and market risk is not just discussed in accounting, management and economics broadly, but more than has reached other disciplines.

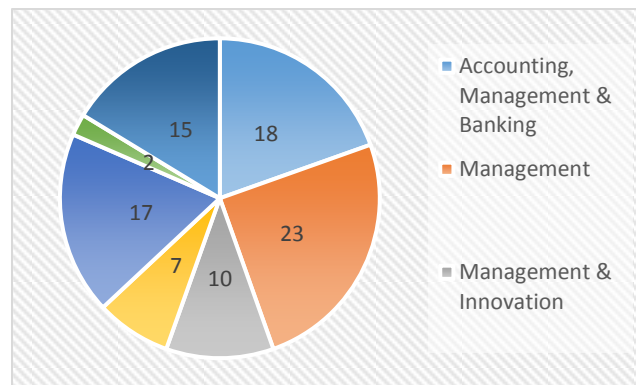


Figure 2: Research Area

Source: VOSviewers output (2023)

Due to the scarcity of articles containing the relationship between intellectual capital and market risk from Scopus journals in last ten years, publication mapping in this study includes conference papers and book chapters in addition to articles. Diagram 2 contains additional information.

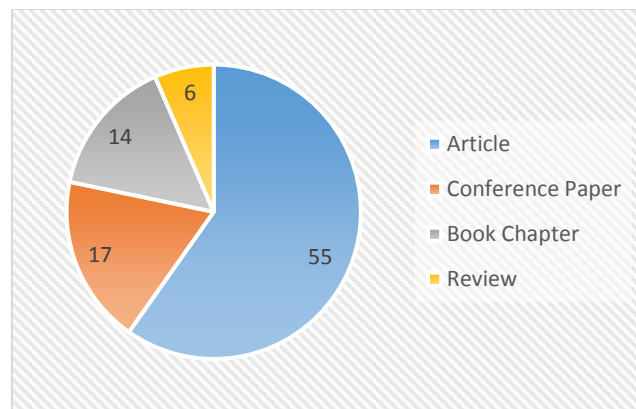


Figure 3: Article Type

Source: VOSviewers output (2023)

Map of the Publication Network

The map of the publication network related to intellectual capital and market risk was created using the VOSviewer 1.6.15 application. The VOS analysis demonstrates the terms' similarities. The equation is determined by the distance between the items (Bellucci et al., 2021). The smaller the distance between terms, the stronger the relationship between them (Bellucci et al., 2021; van Eck & Waltman, 2014).

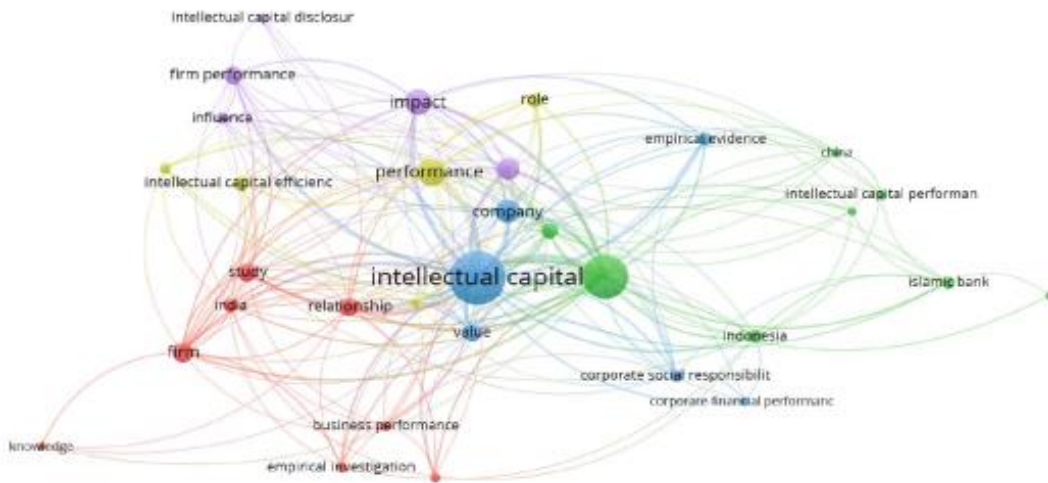


Figure 4. Publication Network Map

Source: VOSviewers output (2023)

The program also categorizes articles based on their commonalities. Each cluster indicates a different line of inquiry or issue. The point size denotes the relevance of the citation value produced from the normalization of the unit of analysis in the plot and field under research (Bellucci et al., 2021; van Eck & Waltman, 2014).

Table 2. depicts the VOS analysis findings

Red Cluster		Blue Cluster		Green Cluster		Purple Cluster		Yellow Cluster	
Keyword	OC	Keyword	OC	Keyword	OC	Keyword	OC	Keyword	OC
Firm	18	Financial performance	88	Intellectual capital	127	Performance	33	Impact	30
Relationship	16	Effect	11	Company	24	Intellectual cap. efficien.	10	Evidence	23
Study	15	Indonesia	8	Value	13	Role	10	Firm performance	15
India	8	Islamic bank	7	Empirical evidence	8	Investigation	6	Influence	6
Business performance	5	Intellectual cap. perfor.	5	Corporate soc. respon.	7	Corporate governance	4	Intellectual cap. disclos.	5
Empirical investigation	5	China	4	Corporat. fin. perfor.	4				
Empirical study	5	Competitive advantage	4						
Knowledge	4	Intellectual cap. perspec	4						

According to the findings of the VOS analysis (shown in Figure 2), the publication network of intellectual capital topics is divided into five clusters: red clusters, blue clusters, green clusters, purple clusters, and yellow clusters. The five main research themes represented by each cluster are: (1) Research and knowledge (red cluster), (2) Intellectual capital and company performance (blue cluster), (3) Financial performance and intellectual capital performance (green cluster), (4) Performance, role, and efficiency of intellectual capital (purple cluster), and (5) Impact and evidence of intellectual capital disclosure (purple cluster) (yellow cluster).

This cluster classification is based on keywords and occurrences in articles, with a minimum classification of four terms divided into clusters. Table 2 contains the specifics. According to Table 2, the intellectual capital theme has the highest occurrence value of 127 terms, followed by financial performance and performance, which occur 88 and 33 times, respectively. This demonstrates that the articles harvested using meta data mostly contain the connecting between intellectual capital and firm’s performance, and its application mostly carried out from Asian region.

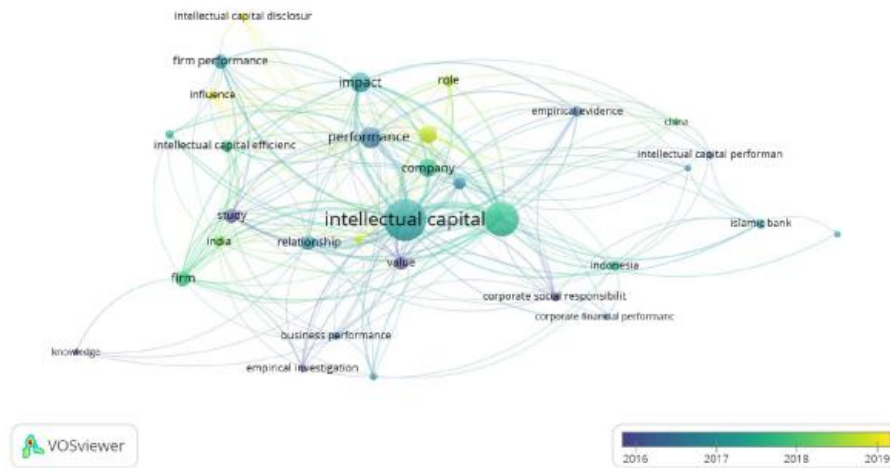


Figure 4. Publication Overlay Map

Source: VOSviewer’s output (2022)

Figure 4 shows that research on the theme of intellectual capital was mostly conducted in 2017, and that it tends to decline in the following years.

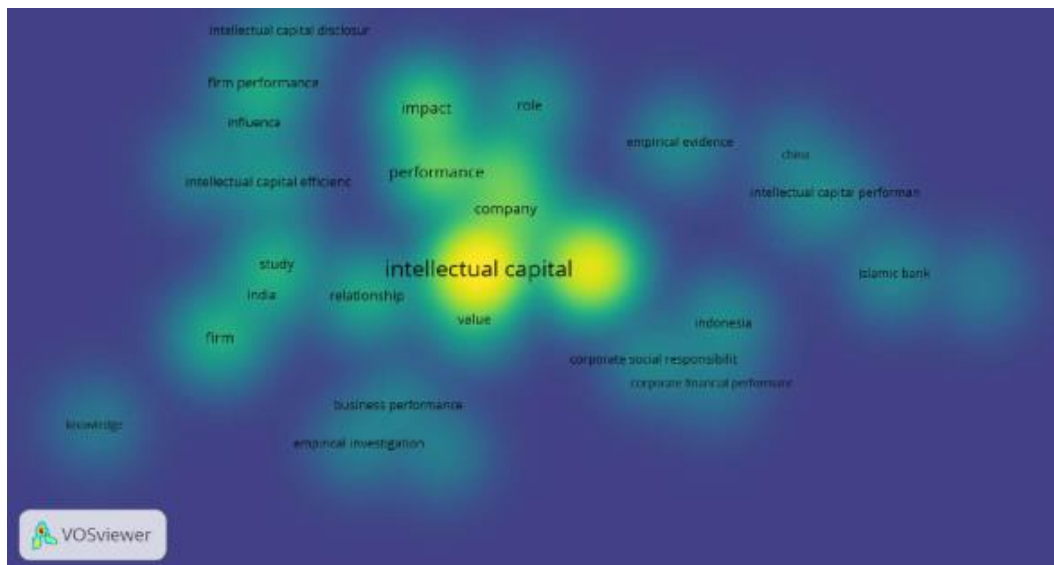


Figure 5. Publication Density Map

Source: VOSviewer’s output (2023)

Figure 5 depicts the density of publications on the discussed topics relationship of intellectual capital and market risk. Yellow color with darker and larger circle, the more the research topic has been studied previously; conversely, the fainter the yellow color, the more the topic has been raised by previous researchers. According to the density of publications, intellectual capital is the most researched topic, followed by financial performance.

RESULTS AND DISCUSSION

From the results of the analysis using the Harszing Publish or Perish application and VOSviewer, it can be seen that there are still few studies that contain the interaction between intellectual capital and market risk published on Scopus in the last 10 years. Only 4 (four) research articles were found that actually used intellectual capital and market risk, remaining 88 articles did not specifically contain these two topics, but were still related. This topic is not only raised in research in the field of economics, but also in research in the fields of law, social, health and technology. This means that when we talk about intellectual capital, it does not mean that we only see and examine its management in a company, but more than that how intellectual capital can be used for various goals that we want to achieve, both individually and organizationally.

Some future research on the topic of intellectual capital and market risk that can be considered based on recommendations from previous studies can be seen below:

1. Gupta et al. (2016) conducted research on open innovation theory. According to him, youth innovation clubs can provide opportunities to seek, disseminate, and celebrate innovation, as well as identify and address unmet social needs, which will pave the way for the development of an open innovation system. One can learn about an innovation not only at the artifactual level, but also at the analogical or metaphorical, heuristic or gestalt level (Gupta et al., 2016). This implies that intellectual capital is required to read future developments, and thus the role of intellectual capital in organizational innovation is required. In today's digital age, the ability to think critically and act quickly will be critical to achieving organizational goals.
2. According to Britto et al. (2014) research result's, IC has a substantial inverse relationship to market value. IC has no effect on market risk due to size and leverage (Britto et al., 2014). The time variables and proxies used in this study are the study's limitations. The VAIC model calculates IC using data from periods of high volatility. They urge that other variables be used as proxies for IC and that the results be compared to increase the robustness of the conclusions, since the VAIC model has significant shortcomings in measuring IC. Numerous investigations around what RE businesses should do to achieve competitive advantage were identified in their Real Estate (RE) research, however none of them addressed the importance IC in sectors that have high capital positions like RE (Britto et al., 2014). As a result, this topic can be considered for further study and research in the future.
3. Dockner and Siyahhan (2014) provide the idea of risk and return for R&D Innovation organizations. In their study, they distinguish two hypotheses: first, they assess the progression of a company's risk throughout the creative process, which begins with the project development and ends with the product's market launch. Second, for analysis, they used simulation of something like the R&D phase itself. They claim that having to look at the innovation cycle might help us determine which factors impact a company's risk. According to his research findings, the company is riskier during the R&D and pilot phases compared to the commercialization phase They also demonstrate a positive link among R&D commitment and returns (Dockner & Siyahhan, 2015). The intellectual capital field has largely focused on the assessment and definition of intellectual capital as well as its components, and there is growing awareness of the importance of relating intellectual capital components, structural capital and human capital, for R&D activities throughout their research phase. They suggest a unique method for connecting these elements to the success of new product innovation and the technical unpredictability that defines the company's Research and Development efforts (Dockner & Siyahhan, 2015). According to the findings of their research, training and development of human resources in the company can contribute to intellectual capital and reduce the risks that the company will face. As a result, as part of increasing organizational resources to anticipate future risks, this topic can indeed be considered in the nearish future by developing topic about intellectual capital in training and developing organizational resources.
4. Mkumbuzi (2016) investigate VDIC's merge influence on intellectual capital investment, financial sector size and corporation risk, industrial involvement, and corporate good governance (Mkumbuzi,

2016). According to the Harszing Publish or Perish search results, the topic of VDIC is still rarely studied, opening up opportunities for future research.

Some of the above research recommendations give us an idea of what topics we can investigate in terms of intellectual capital and market risk.

CONCLUSIONS

The topic of intellectual capital has been extensively explored in previous studies and research, but specifically studying how intellectual capital affects market risk is still minimal, especially research in reputable journals. This is illustrated by the search results on this topic in this study.

Previous studies on the topic of intellectual capital and market risk provide an overview of topic's research areas. There are several research areas that can and should be explored in the future, such as digitization technology, innovation, training, and human resource development, all of which cannot be separated from an organization's intellectual capital, because high intellectual capital is expected to reduce risks in the future.

With the lack of studies that explore more deeply the relationship between the two topics, this opens enormous opportunities for future researchers. This is realized to be a limitation in this research, where the filtered articles are only sourced from the Google Scholar database and only within a period of ten (10) years so that in the future they can use data sourced from other databases and a longer publication period.

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