

Article

The Relationship between Innovation Capital, Firm Value, and Firm Risk

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ABSTRACT

The purpose of this study is to examine two relationships: (1) innovation capital and firm value; and (2) innovation capital and firm risk. The population of this study was all companies listed on the Indonesia Stock Exchange from 2016-2020, and the required research sample was drawn using a purposive sampling technique. Data analysis technique used multiple linear regression. The result revealed that innovation capital had a positive and statistically significant effect on firm value, but innovation capital had a negative and insignificant relationship on firm risk. Based on the analysis, it can be concluded that innovation capital has a potential factor to increase company's value, only if companies have a competitive advantage by disclosing the R&D costs and investments in their financial statements. Because of each company is unique, innovation capital is not always related to a systematic risk measurement.

Keywords: Innovation capital; firm value; firm risk

JEL Classification: G32, M41

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INTRODUCTION

Today, innovation is crucial. The objectives of innovation are to create added value for the organization, gain a competitive edge, strengthen the organization's market position, shape demand responses, and increase customer satisfaction (Bardhan et al., 2013; Dotzel et al., 2013; Kijkasiwat & Phuensane, 2020; Rubera & Kirca,

2012; Ruggiero et al., 2021; Santosa, 2020; Sorescu & Spanjol, 2008). According to Kamasak (2015), the development of innovative products and services has become an important part of achieving and maintaining the competitiveness of organizations in the global market. When firms do not meet global market needs, they do not meet

the criteria for a competitive advantage in the market (Hsiao, 2014).

Innovation capital is defined in the RBT perspective as both the ability of a firm to create and commercialize innovations and a collection of assets and resources (Kijek, 2012). Innovation capital improvement can be achieved by increasing the flow of knowledge generated within or outside the organization. Given the aggressive nature of contemporary innovation, it is necessary to quantify innovation capital that can be used in non-financial and financial ways (Kijek, 2012). Innovation capital is usually thought of as research and development (R&D) expenses, costs, or investments. It is also part of intellectual capital, which is a type of organizational capital (Chang & Hsieh, 2011; Chen & Zhu, 2004; Günther, 2010; Wu et al., 2010).

This study is a development of previous work in particular, seeking to address shortcomings in Ehie & Olibe (2010), Kim et al. (2018) and Sorescu & Spanjol (2008) in terms of innovation capital measurement. According to Kijek (2012), there is a three-stage procedure for determining the value of innovation capital. First, determine the value of intellectual capital, focusing on the added value created by the firm. The second stage of innovation capital valuation is subtracting the value of innovation capital from the value of intellectual capital. The third stage is an evaluation of the innovation capital's efficiency. The efficiency coefficient results indicate effectiveness of an organization in utilizing its current innovation capital and can be used as a proxy for the quality of innovation capital assets in the third stage. But according to Ehie & Olibe (2010), Kim et al. (2018) and Sorescu & Spanjol (2008), innovation capital is measured at the second stage, where it is calculated as R&D expenditure divided by normalized total assets. We chose to use the efficiency coefficient of

innovation capital (third stage) as a proxy in this study. This study aimed to examine the relationship between innovation capital-firm value, and innovation capital-firm risk.

LITERATURE REVIEW

The theoretical perspective that discusses critical aspects of organizational resource management in the context of the organization's efforts to achieve competitive advantage is referred to as resource-based theory (RBT). RBT is a theory pioneered by Wernerfelt in 1984 to describe the role of a company's resources in confronting market competition. According to Wernerfelt, companies that can leverage their resources as strategic assets, both tangible and intangible, can gain a competitive advantage. Meanwhile, Barney et al. (2011) assert that RBT theory establishes a strategic framework for explaining and forecasting competitive advantage and company performance. According to this theory, competitive advantage is derived from the company's resources, including intangible resources, which is an important factor that can explain performance differences between companies in the same industry.

When a firm's resources are properly utilized, it can provide a competitive advantage for the firm. This is where innovation capital comes into play. Edvinsson and Malone in 1997 coined the term innovation capital to refer to a company's ability to create and market products and services using intellectual property and other intangible assets. This demonstrates how innovation can add value to firms in a variety of ways, including process and product innovation (O'Dwyer et al., 2009). According to Schumpeter, success factors for innovation and the development of new technologies affect the dynamics of competition and the external

environment of a firm. Additionally, Schumpeter explained how firm innovations can result in economic transformation, the development of new products and technologies, the discovery of new markets and sources of raw materials, and the introduction of novel organizational solutions.

According to the RBT literature, innovation is the most valuable component of intellectual capital (Bassi & Van Buren, 1999), and it even becomes the deciding factor in dealing with what we refer to as a knowledge-based economy (Hsiao, 2014). The fact that the firm environment has shifted to a knowledge-based economy demonstrates that innovation capital is critical for competitive advantage by leveraging existing company resources, particularly in today's industrial era. Because, ultimately, firms must continue to develop the products or services they market in response to inescapable market forces. For firms to conduct sustainable research and development, innovation is the best strategy (Lukovszki et al., 2020). This strategy can be implemented across multiple facets of firm operations, for example, through customer-centric product and service development innovation (Chatzoglou & Chatzoudes, 2018; Dotzel & Shankar, 2019), marketing innovation (Aksoy, 2017), and technological maturity (Garcia & Calantone, 2002).

According to Mehralian et al. (2013) one of the primary sources of innovation is investment in research and development (R&D), with the expectation that innovation can add value to the organization. Regardless of the potential for competitive advantage, any form of investment, particularly in R&D, is not without risk. According to Hsiao (2014) development can be viewed as a task that has a detrimental effect on expected performance compensation. Sorescu & Spanjol (2008) demonstrated empirically by conducting a survey in which they discovered that

approximately half of 940 corporate executives in the United States were dissatisfied with the returns generated by their company's investment activities.

This study focused on two central points on the relationship between innovation capital-firm value and innovation capita-firm value. The first objective was to investigate the relationship between innovation capital and firm value. The term innovation capital refers to the cost or investment made by a firm in research and development (Nadeem et al., 2017; Wu et al., 2010). Firms will struggle to gain a competitive edge over their competitors if they do not allocate innovation capital. In some industries, innovation is the primary driver of firm survival. Hsiao (2014) examining companies engaged in medical biotechnology revealed that innovation capital has a significant impact on company value and that the higher a company's innovation capital, the higher the company's value. Sorescu dan Spanjol (2008)'s study revealed similar findings that when a company achieves a breakthrough through innovation, its value increases. The study's first hypothesis is as follows:

H1: *Innovation capital has a positive effect on firm value*

The study's second objective was to examine the relationship between innovation capital and firm risk. It is expected that innovation will enable the company to achieve a favorable position, particularly in terms of reducing firm risk and the threat of bankruptcy due to the failure of continuous innovation (Santosa, 2020). On the other hand, all forms of innovation capital investment and development will invariably involve firm risks. For firms that prioritize R&D, this will increase firm risk (Chierici et al., 2020). According to Liu et al. (2021), innovation that is based on something already existing (imitative

innovation) is positively correlated with the financial risk of the firm. This risk is greater compared to ground-breaking, inventive, or exploratory innovations. Meanwhile, Sorescu & Spanjol (2008) argue that innovation in the form of a breakthrough is risky because it is associated with a low probability of product adoption.

Additionally, the risk of innovation failure occurs when managers overestimate the benefits of new products while most consumers prefer familiar products. The second hypothesis is as follows:

H₂: Innovation capital has a positive effect on firm risk.

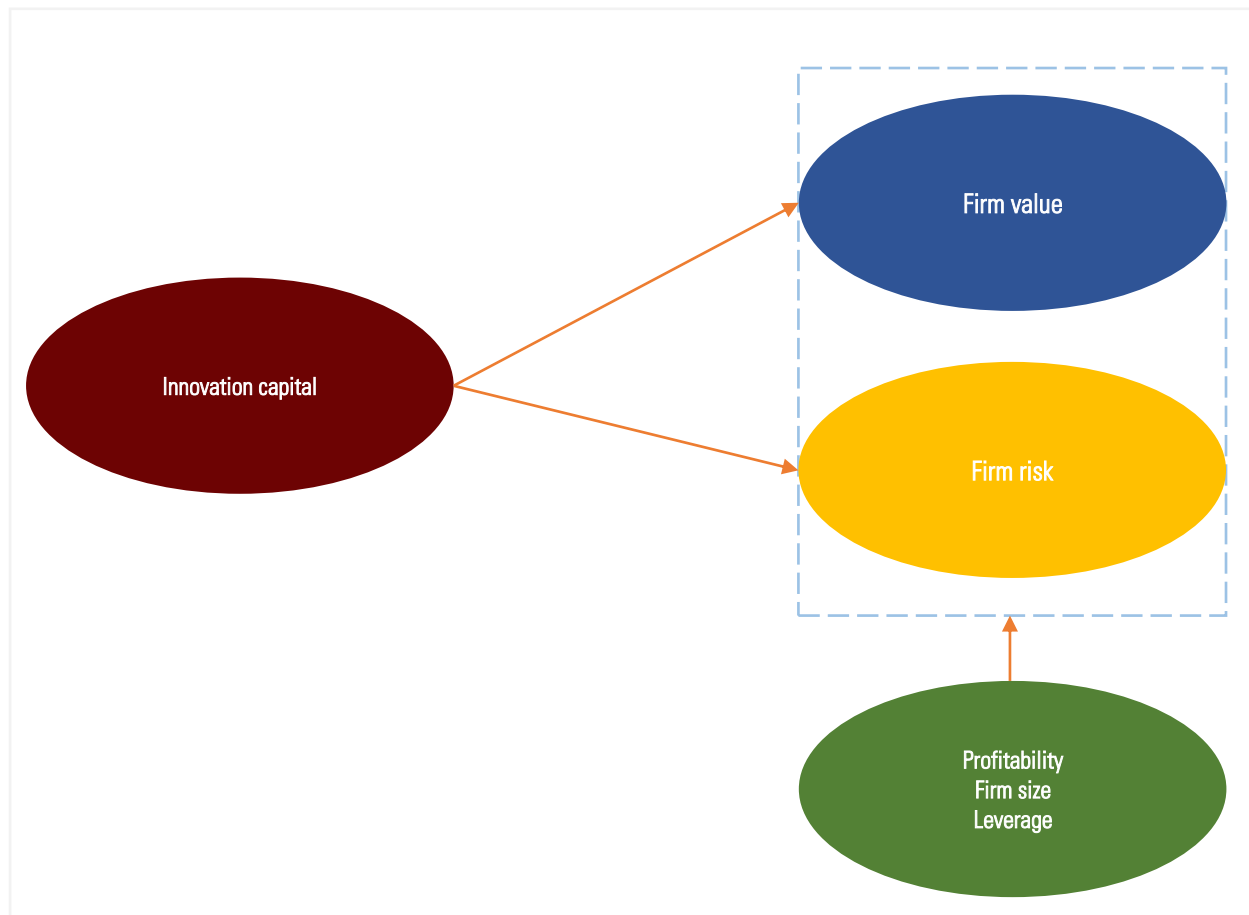


Figure 1. Research framework

Source: Researcher data (2022)

METHODOLOGY

The Bureau van Dijk database is used to compile data for this study, which includes annual financial data in 2016-2020. The study used a purposive sampling method with two procedures. First, we gathered information on 772 companies listed on the Indonesian Stock Exchange. Second, we excluded companies that provided insufficient data, i.e., those that failed to disclose R&D costs or investments for five consecutive years. The

final sample in the study was 36 publicly traded companies on the Indonesian Stock Exchange, with 180 observations of each company year.

The study's independent variable is innovation capital. The efficiency of innovation capital as a proxy for innovation capital can be calculated by dividing R&D costs or investment by the value added of the firm (Nadeem et al., 2017). The value added of a firm is calculated as the sum of net income, employee salary costs, interest

costs, tax costs, depreciation, and amortization cost, as well as costs or investments in research and development (R&D). Additionally, this study includes two dependent variables: firm value and firm risk. First, firm value is defined as the present value of a series of future cash inflows generated by the firm (Bardhan et al., 2013). Tobin's Q ratio is used in this study to determine the company's value as a proxy for the sum of the market capitalization and the total value of liabilities divided by the total value of assets. Second, the company's risk proxy, namely the coefficient of variation is used to quantify the company's risk taking. The coefficient of variation is calculated as the standard deviation divided by the average financial ratio over a five-year period. The financial ratio recommended is R&D costs or investment divided by total annual sales (Santacruz, 2020). The magnitude of firm-to-firm variability was normalized to a comparable scale using the coefficient of variation rather than the standard deviation or variance, as is customary in

research. Profitability, firm size, and leverage are used as control variables in this study. Profitability is both a measure of a firm's ability to earn profits and a description of the management performance of that firm. The calculation makes use of the return on assets (ROA) ratio, which is determined by comparing the value of net income to the total assets of the firm. The term "company size" refers to the extent to which a firm's assets accurately reflect its size. The study determines the size of a firm by calculating the natural logarithm (Ln) of its total assets. Leverage is a critical metric for determining the effectiveness of a firm's debt use. The debt-to-asset ratio (DAR) is used to calculate leverage. It is the ratio of a company's total debt to the total value of its assets.

In this study, we developed two distinct types of multiple linear regression models to test two previously proposed research hypotheses. Consider the following:

Model 1:

$$FV = \alpha_1 + \beta_1 IC + B_2 Pr + B_3 FS + B_4 Lev + \varepsilon$$

Model 2:

$$FR = \alpha_2 + \beta_5 IC + B_6 Pr + B_7 FS + B_8 Lev + \varepsilon$$

Where:

FV	: Firm Value	Pr	: Profitability
FR	: Firm Risk	FS	: Firm Size
IC	: Innovation Capital	Lev	: Leverage

RESULT AND DISCUSSION

According to Table 1, the sample consisted of 36 publicly traded companies that met the selection criteria. During the 2016-2020 period, the average firm's risk is 0.5011, with a standard

deviation of 0.4634. According to the data in Table 1, the average firm risk exceeds the standard deviation. This results in a homogeneous sample of 36 businesses. Next, the standard deviations for the variables firm size and leverage are less than the average, at (1.5770 < 15.2701)

and ($0.2695 < 0.4817$). Thus, both the firm size and leverage samples are homogeneous, with a narrow distribution of the data. Meanwhile, for the firm value variable, the mean and standard deviation are 3.8584 and 4.0295. The standard deviation of firm value is greater than the standard deviation of firm value. These findings suggest that the sample for the firm value

variable is heterogeneous or that the data have a broad distribution. The same results were obtained for the innovation capital and profitability variables, where the standard deviation was greater than the mean ($0.0108 > 0.0046$) and ($0.1117 > 0.0568$), indicating that the data for these two variables were heterogeneous.

Table 1
Descriptive statistic

	Firm risk	Firm value	Innovation capital	Profitability	Firm size	Leverage
Mean	0.5011	3.8584	0.0046	0.0568	15.2701	0.4817
Median	0.3399	2.5470	0.0016	0.0542	15.3020	0.4424
Standard Deviation	0.4634	4.0295	0.0108	0.1117	1.5770	0.2695
Minimum	0.100	0.9325	0.0001	-0.2876	11.6811	0.0943
Maximum	2.097	18.0040	0.0605	0.3811	17.8368	1.4699
Count	36	36	36	36	36	36

Source: Researcher data (2022)

Table 2
Results of Regression of Innovation Capital on Firm Value

	Coefficients	Standard Error	P-value
Intercept	-3.4798	4.3035	0.4249
Innovation capital	141.0822	49.3933	0.0076
Profitability	19.3678	5.5428	0.0014
Firm size	0.3437	0.2775	0.2248
Leverage	0.7118	2.0406	0.7296

Source: Researcher data (2022)

Table 3
Results of Regression of Innovation Capital on Firm Risk

	Coefficients	Standard Error	P-value
Intercept	1.5384	0.7346	0.0445
Innovation capital	-6.5597	8.4311	0.4424
Profitability	0.0187	0.9461	0.9844
Firm size	-0.0840	0.0474	0.0861
Leverage	0.5689	0.3483	0.1125

Source: Researcher data (2022)

Table 4
t-test of Innovation Capital Regression on Firm Value

	Coefficients	T Stat	T-table
Intercept	-3.4798	-0.8086	
Innovation capital	141.0822	2.8563	2.0395
Profitability	19.3678	3.4942	2.0395
Firm size	0.3437	1.2385	2.0395
Leverage	0.7118	0.3488	2.0395

Source: Researcher data (2022)

Two models describing the effect of innovation capital on firm value and risk were developed using the research method. The regression coefficients for the primary variable, innovation capital, on firm value are shown in Table 2. According to Table 2, innovation capital has a beneficial effect on the value of a business (141.0822). At a significance level of $\alpha = 0.05$ ($p - value = 0.0076$), the effect is statistically significant. These findings suggest that the more innovation capital a business owns, the more valuable the business. As a result of the regression analysis, H1 is accepted. Except for profitability ($p - value = 0.0015$), the other variables obtained have no significant effect.

The regression coefficients for innovation capital versus firm risk are shown in Table 3. The relationship between innovation capital and firm risk is found to be negative in Table 3. The regression results indicate that the relationship is not significant at either the significance level $\alpha = 0.05$ and $\alpha = 0.1$ ($p - value = 0.4424$). Although the negative impact of innovation capital demonstrates that the more innovation capital a business uses, the less risk it will accept. H2 is not accepted or rejected based on the description and regression results. At the significance level $\alpha = 0.05$, none of the other variables have a significant effect on company risk; only the company size variable does. Firm size had a negative effect on firm risk, based on

the results of the regression test. That is, as a business grows in size, it typically faces less risk.

Table 4 contains the t-test for the regression equation for innovation capital and firm value. The degree of freedom (df) was calculated to be 31 based on the number of samples and variables. The t-table value is determined using the df value, which equals 2.0395. Then, using the comparison results, it is determined that the variables with a significant effect are innovation capital ($2.8563 > 2.0395$) and profitability ($3.4942 > 2.0395$), while the variables of firm size ($1.2385 < 2.0395$) and leverage ($0.3488 < 2.0395$) have no discernible effect on the value of a business.

Table 5 illustrates the t-test for the regression equation relating innovation capital to firm risk. Individual variables do not appear to have a significant effect on company risk, as the t-statistic value is less than the T table value with a degree of freedom (df) of 31 and a significance level of 0.05. This result is consistent with the F test result, which indicates that there is no dependent variable that has a statistically significant effect on the risk of the business. Leverage has a significant effect on the 0.1 level of significance ($1.7729 > 1.6955$). These findings are consistent with those obtained by comparing the significance level and p-value for each independent variable.

Table 6 illustrates the F test for regression of innovation capital to firm value. A statistical F

value of 13.8557 was obtained. Thirty-one degrees of freedom were obtained based on the sample size and number of variables, and four independent variables were identified. As a result, in this regression, the F table was 2.68. Thus, when the F statistic and the F table are compared, it is possible to conclude that all dependent variables have a significant effect on firm value simultaneously ($13.8557 > 2.68$).

While the ANOVA table in Table 7 displays the F test results for the regression between innovation capital and company risk. The F statistic is 2,058 based on the table. When compared to the F table, it is clear that all dependent variables have no significant effect on company risk simultaneously ($2,058 < 2.68$).

Table5
t-test of Innovation Capital Regression on Firm Risk

	Coefficients	T Stat	T-table
Intercept	1.5384	2.0943	
Innovation capital	-6.5597	-0.7780	2.0395
Profitability	0.0187	0.0197	2.0395
Firm size	-0.0840	-1.7730	2.0395
Leverage	0.5689	1.6333	2.0395

Source: Researcher data (2022)

Table 6
Table ANOVA Regression of Innovation Model to Firm Value

	df	SS	MS	F	F Table
Regression	4	364.4474	91.1118	13.8557	2.68
Residual	31	203.8485	6.5758		
Total	35	568.2959			

Source: Researcher data (2022)

Table7
Table ANOVA Regression of Capital Innovation on Firm Risk

	df	SS	MS	F	F Table
Regression	4	1.5776	0.3944	2.0585	2.68
Residual	31	5.9394	0.1916		
Total	35	7.5169			

Source: Researcher data (2022)

Table 8
Innovation Capital Regression Statistics on Firm Value

Regression Statistics	
Multiple R	0.8008
R Square	0.6413
Adjusted R Square	0.5950
Standard Error	2.5643
Observations	36

Source: Researcher data (2022)

Table 9
Innovation Capital Regression Statistics on Firm Risk

Regression Statistics	
Multiple R	0.4582
R Square	0.2099
Adjusted R Square	0.1079
Standard Error	0.4377
Observations	36

Source: Researcher data (2022)

Table 8 provides the coefficient of determination. The R-square indicates the magnitude of the coefficient of determination. The coefficient of determination is 0.6413 based on the data in Table 8. This value indicates that the model or equation developed can account for the variation in the firm's value by 64.13%. In other words, variables such as innovation capital and profitability, firm size, and leverage can account for 64.13% of the variance in firm value, while 35.87% is explained by variables not included in the model or equation. These findings indicate that the concurrent model of innovation capital and other variables is critical for explaining and forecasting firm value, as it contains nearly all the information necessary to do so.

Table 9 contains the coefficient of determination for the regression of innovation capital to firm risk. The coefficient of determination is calculated as 0.2098 using the data in the table. Thus, innovation capital and the variables of profitability, firm size, and leverage can account for or predict only 20.98% of the risk faced by a business. This dependent variable contributes only a small portion of the explanation or prediction, as the remaining 79.02% is explained or predicted by variables not included in the model or equation.

These findings suggest that innovation capital and other variables are limited in their

ability to explain or predict firm risk. According to statistical tests, H1 is accepted in this study. The findings of this study are consistent with [Ehie & Olibe \(2010\)](#), [Glova & Mrázková \(2018\)](#), [Gupta et al. \(2017\)](#), [Kim et al. \(2020\)](#) and [Sorescu & Spanjol \(2008\)](#). Even though our sample includes firms from a variety of sectors on the Indonesia Stock Exchange, we have established a positive and significant relationship between innovation capital and firm value. Companies that disclose research and development costs or investments in their financial statements consistently demonstrate a commitment to reform in the process of developing and introducing new products and services to the market. This means that when a company invests in research and development, it is attempting to be the best in their respective sectors. Given that investors will seek out companies with competitive advantages in order to determine whether they are the right place to invest. Additionally, the efficiency of the company in managing R&D costs or investments can be considered. If the company discloses poorly managed costs or investments, they detract the company's value from an investor's viewpoint.

H2 was excluded from the study based on statistical testing results. The findings of this study are consistent with [Mcalister et al. \(2007\)](#) dan [Suurmeijer et al. \(2015\)](#) that innovation capital has a negative and insignificant

relationship on firm risk. The findings are insignificant not without reason; they occur as a result of factors such as heterogeneity across companies, industries, and/or time periods. Mcalister et al. (2007) also revealed similar findings. Innovation capital can be considered as risk-free investment or expenditure. This means that businesses can mitigate the risk associated with innovation capital and its negative impact by diversifying their innovation portfolios across tangible and intangible assets. Additionally, the findings in H2 demonstrate that Bowman's Paradox holds true for the measurement model used in this study, in which risk and return are negatively related.

CONCLUSION AND RECOMMENDATION

The purpose of this study was to examine the relationship (1) between innovation capital and firm value and; (2) between innovation capital and firm risk. The findings of this study indicate that in order to increase firm value, innovation capital is required. Investor assumes innovation capital as a competitive advantage, as the company uses some of its capital to update products or services. Additionally, other findings indicate that innovation capital has no effect on a firm's systematic risk. This is because each company and industry has its own unique

characteristics that can help minimize their negative impact and maximize their efficiency.

Theoretically, the negative results for the innovation capital and firm risk relationship model suggest that a variety of other financial ratio proxies can be used to measure company risk in the manner developed (Santacruz, 2020). Next research can utilize alternative financial ratio proxies and incorporate elements of marketing and product development costs as risk factors for the company. In practice, this research demonstrates the critical nature of allocating innovation capital to a business because it increases the company's value. Management must consider the allocation of innovation capital to ensure the company's survival and competitiveness in the industry. Not only are products and services allocated innovation capital, but also culture, strategies, tools, and human resources. Further research should employ more comprehensive methods, such as surveys and interviews, to elicit information about innovation capital. In order to increase innovation capital, regulators such as the government or the Financial Services Authority (OJK) must establish regulations. The regulations must encourage innovation investment by providing risk guarantees to investors and establishing a minimum innovation capital requirement for firms to attract investors.

REFERENCES

- Aksoy, H. (2017). How do innovation culture, marketing innovation and product innovation affect the market performance of small and medium-sized enterprises (SMEs)? *Technology in Society, 51*, 133–141. <https://doi.org/10.1016/j.techsoc.2017.08.005>
- Bardhan, I., Krishnan, V., & Lin, S. (2013). Business value of information technology: Testing the interaction effect of IT and R&D on Tobin's Q. *Information Systems Research, 24*(4), 1147–1161. <https://doi.org/10.1287/isre.2013.0481>
- Barney, J. B., Ketchen, D. J., & Wright, M. (2011). The future of resource-based theory: Revitalization or decline? *Journal of Management, 37*(5), 1299–1315. <https://doi.org/10.1177/0149206310391805>
- Bassi, L. J., & Van Buren, M. E. (1999). Valuing investments in intellectual capital. *International Journal of Technology Management, 18*(5), 414–432. <https://doi.org/10.1504/ijtm.1999.002779>
- Chang, W. S., & Hsieh, J. J. (2011). Intellectual Capital and Value Creation-Is Innovation Capital a Missing Link? *International Journal of Business and Management, 8*(2), 3–12. <https://doi.org/10.5539/ijbm.v6n2p3>
- Chatzoglou, P., & Chatzoudes, D. (2018). The role of innovation in building competitive advantages: an empirical investigation. *European Journal of Innovation Management, 21*(1), 44–69. <https://doi.org/10.1108/EJIM-02-2017-0015>
- Chen, J., & Zhu, Z. (2004). Measuring intellectual capital: A new model and empirical study. *Journal of Intellectual Capital, 5*(1), 195–212. <https://doi.org/10.1108/14691930410513003>
- Chierici, R., Tortora, D., Del Giudice, M., & Quacquarelli, B. (2020). Strengthening digital collaboration to enhance social innovation capital: an analysis of Italian small innovative enterprises. *Journal of Intellectual Capital, 22*(3), 610–632. <https://doi.org/10.1108/JIC-02-2020-0058>
- Dotzel, T., & Shankar, V. (2019). The Relative Effects of Business-to-Business (vs. Business-to-Consumer) Service Innovations on Firm Value and Firm Risk: An Empirical Analysis. *Journal of Marketing, 83*(5), 133–152. <https://doi.org/10.1177/0022242919847221>
- Dotzel, T., Shankar, V., & Berry, L. L. (2013). Service innovativeness and firm value. *Journal of Marketing Research, 50*(2), 259–276. <https://doi.org/10.1509/jmr.10.0426>
- Ehie, I. C., & Olibe, K. (2010). The effect of R&D investment on firm value: An examination of US manufacturing and service industries. *International Journal of Production Economics, 128*(1), 127–135. <https://doi.org/10.1016/j.ijpe.2010.06.005>
- Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management, 19*(2), 110–132. <https://doi.org/10.1111/1540-5885.1920110>
- Glova, J., & Mrázková, S. (2018). Impact of intangibles on firm value: An empirical evidence from European public companies. *Ekonomicky Casopis, 66*(7), 665–680.
- Günther, T. (2010). Accounting for Innovation: Lessons Learnt from Mandatory and Voluntary Disclosure.

- Innovation and International Corporate Growth*, 319–329. https://doi.org/10.1007/978-3-642-10823-5_19
- Gupta, K., Banerjee, R., & Onur, I. (2017). The effects of R&D and competition on firm value: International evidence. *International Review of Economics and Finance*, 57(July), 391–404. <https://doi.org/10.1016/j.iref.2017.07.003>
- Hsiao, S. H. (2014). PTE, innovation capital and firm value interactions in the biotech medical industry. *Journal of Business Research*, 67(12), 2636–2644. <https://doi.org/10.1016/j.jbusres.2014.04.001>
- Kamasak, R. (2015). Determinants of innovation Performance: A Resource-based Study. *Procedia - Social and Behavioral Sciences*, 195, 1330–1337. <https://doi.org/10.1016/j.sbspro.2015.06.311>
- Kijek, T. (2012). Innovation Capital and Its Measurement. *Journal of Entrepreneurship, Management and Innovation*, 8(4). <https://doi.org/10.7341/2012844>
- Kijkasiwat, P., & Phuensane, P. (2020). Innovation and Firm Performance: The Moderating and Mediating Roles of Firm Size and Small and Medium Enterprise Finance. *Journal of Risk and Financial Management*, 13(5), 97. <https://doi.org/10.3390/jrfm13050097>
- Kim, J. M., Yang, I., Yang, T., & Koveos, P. (2020). The impact of R&D intensity, financial constraints, and dividend payout policy on firm value. *Finance Research Letters*, 40(October 2020), 101802. <https://doi.org/10.1016/j.frl.2020.101802>
- Kim, W. S., Park, K., Lee, S. H., & Kim, H. (2018). R & D investments and firm value: Evidence from China. *Sustainability (Switzerland)*, 10(11), 1–17. <https://doi.org/10.3390/su10114133>
- Liu, B., Ju, T., & Gao, S. S. S. (2021). The combined effects of innovation and corporate social responsibility on firm financial risk. *Journal of International Financial Management and Accounting*, 32(3), 283–310. <https://doi.org/10.1111/jifm.12135>
- Lukovszki, L., Rideg, A., & Sipos, N. (2020). Resource-based view of innovation activity in SMEs: an empirical analysis based on the global competitiveness project. *Competitiveness Review*, 31(3), 513–541. <https://doi.org/10.1108/CR-01-2020-0018>
- Mcalister, L., Srinivasan, R., & Kim, M. (2007). Advertising, Research and Development, and Systematic Risk of the Firm. *Journal of Marketing*, 71(January), 35–48.
- Mehralian, G., Rasekh, H. R., Akhavan, P., & Ghatari, A. R. (2013). Prioritization of intellectual capital indicators in knowledge-based industries: Evidence from pharmaceutical industry. *International Journal of Information Management*, 33(1), 209–216. <https://doi.org/10.1016/j.ijinfomgt.2012.10.002>
- Nadeem, M., Gan, C., & Cuong, N. (2017). The Importance of Intellectual Capital for Firm Performance: Evidence from Australia. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3001537>
- O'Dwyer, M., Gilmore, A., & Carson, D. (2009). Innovative marketing in SMEs: A theoretical framework. *European Business Review*, 21(6), 504–515. <https://doi.org/10.1108/09555340910998805>
- Rubera, G., & Kirca, A. H. (2012). Firm innovativeness and its performance outcomes: A meta-analytic review and theoretical integration. *Journal of Marketing*, 76(3), 130–147.

<https://doi.org/10.1509/jm.10.0494>

- Ruggiero, S., Kangas, H. L., Annala, S., & Lazarevic, D. (2021). Business model innovation in demand response firms: Beyond the niche-regime dichotomy. *Environmental Innovation and Societal Transitions*, 39(January), 1–17. <https://doi.org/10.1016/j.eist.2021.02.002>
- Santacruz, L. (2020). Measures of firm risk-taking: revisiting Bowman's paradox. *Managerial Finance*, 46(3), 421–434. <https://doi.org/10.1108/MF-09-2019-0466>
- Santosa, P. W. (2020). The effect of financial performance and innovation on leverage: Evidence from Indonesian food and beverage sector. *Organizations and Markets in Emerging Economies*, 11(22), 367–388. <https://doi.org/10.15388/OMEE.2020.11.38>
- Sorescu, A. B., & Spanjol, J. (2008). Innovation's effect on firm value and risk: Insights from consumer packaged goods. *Journal of Marketing*, 72(2), 114–132. <https://doi.org/10.1509/jmkg.72.2.114>
- Suurmeijer, M., Smid, P. P. M., & von Eije, J. H. (2015). Research and Development and Firm Risk. *Journal of Corporate Finance Research*, 9(3). <https://doi.org/10.2139/ssrn.2350270>
- Wu, H. Y., Chen, J. K., & Chen, I. S. (2010). Innovation capital indicator assessment of Taiwanese Universities: A hybrid fuzzy model application. *Expert Systems with Applications*, 37(2), 1635–1642. <https://doi.org/10.1016/j.eswa.2009.06.045>