

## Article

# The Influence of Venture Capital on Growth through Innovation and the Use of Internet Technology in Micro and Small Industries (MSIs) in Indonesia

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**Abstract:** One challenge that Micro and Small Industries (MSIs) face is financing. Venture capital is one of the financing options to overcome capital problems by providing financial and non-financial support. This study aims to analyze the influence of venture capital on the growth of Micro and Small Industries (MSIs) in Indonesia through innovation and internet technology as the intervening variables. The research data were collected from a survey (Statistics Indonesia) in 2019 with 83,616 Micro and Small Industries (MSIs) as the samples. This research used the STATA logistic regression method and the Sobel test. The results showed that venture capital had a direct positive but insignificant influence on growth. Meanwhile, innovation could mediate the effect of venture capital on growth, yet the use of internet technology could not mediate the impact of venture capital on growth. This study proves that venture capital increases innovation activities and accelerates growth.

**Keywords:** venture capital; growth; innovation; use of internet technology



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## 1. Introduction

Research indicates that venture capital influences SMEs' growth in developed and developing countries (Du and Cai 2020; Biney 2018; Engel 2002; Peneder 2010). Previous research has indicated that venture capital provides financing, as capital and non-financing, such as strategic direction, monitoring, and network access to business partner companies (Harrison et al. 2020; Gornall and Strebulaev 2015). Early stage companies with few assets are often collaterally rejected by banks and directed to venture capital financing for new and risky businesses (Shao and Sun 2021). The reason is that SMEs at the start-up stage have limited or no access to banking credit and retained earnings. At the same time, venture capital is a form of capital financing that may be used as an option to overcome capital problems (Muchira 2019). Venture capital also influences the development of technological innovation in agricultural companies because the recent development of internet technology can expand SMEs' productivity and profit (Du and Cai 2020).

The capital source is a classical problem faced by Indonesian SMEs because of their unequal ability to meet the requirements demanded by the banking sector; therefore, Indonesian SMEs have a financing gap. This opportunity encourages Indonesian SMEs to use venture capital that is considered advantageous compared to other financings. Venture capital is required in Indonesia since the market is still wide open for SMEs to grow, such as in Solok, West Sumatra, and Indonesia (Sartika et al. 2019).

The following research was conducted in Indonesia, one of the developing countries in Asia in which the venture capital market has not been well developed and is still rarely utilized. In contrast, the previous research conducted by Du and Cai (2020), Biney (2018), Engel (2002), and Peneder (2010) used Small and Medium Enterprises (SMEs). This study

used Micro and Small Industries (MSIs) as its study objects since the Indonesian National Industrial Development Master Plan within 2015–2035 is prioritizing Micro and Small Industries (MSIs) as contributors to national economic growth. However, the financing problem is the second-ranked obstacle faced by Micro and Small Industries (MSIs) after marketing (Statistics Indonesia 2019). Only a small number of Micro and Small Industries used venture capital financing in 2019, 0.17% out of the total Micro and Small Industries (MSIs) surveyed by Statistics Indonesia (Statistics Indonesia 2022), which is one of the reasons why this research was conducted.

Meanwhile, based on the research conducted by Du and Cai (2020), Biney (2018), Engel (2002), and Peneder (2010), venture capital significantly influences SMEs' growth. Concerning financial problems faced by Micro and Small Industries (MSIs) in Indonesia, venture capital as a source of business financing has the opportunity to overcome financial problems and, therefore, influences Indonesian Micro and Small Industries' (MSIs) business growth. This research also attempted to examine the role of innovation and internet technology in mediating venture capital financing's influence on Indonesian Micro and Small Industries (MSIs) growth. This idea is supported by the opinion of (Du and Cai 2020), stating that SMEs' investment in technological innovation through venture capital is better than otherwise. Venture capital is associated with the ICT sector and has a high return rate (OECD 2015). Venture capital influences innovation (Peneder 2010), the use of internet technology (Pradhan et al. 2019), and company growth (Adam and Alarif 2021). Meanwhile, internet technology influences the company's growth (Onileowo and Fasiku 2021). This study was conducted to analyze venture capital's role in Micro and Small Industries' (MSIs) growth, both directly and indirectly through innovation, in the form of intellectual property rights, including trademarks, and the use of internet technology as the intervening variables by Indonesian Micro and Small Industries (MSIs). This research contributes to venture capital, the Micro and Small Industries (MSIs) sector, and the government concerning venture capital financing's role and opportunities in developing Indonesian Micro and Small Industries (MSIs). This study aimed to analyze venture capital's role in the growth of Micro and Small Industrial (MSIs) sectors, covering all sectors of processing or manufacturing industries such as food, apparel, woven, wood, rattan industries, and others with a 1–20 workforce (Statistics Indonesia 2019).

This research analyzes venture capital's direct and indirect influence on growth through innovation and internet technology. This research contributes to the objects, models, methodologies, and stakeholders due to venture capital's role in the growth of business entities. This study formulated the following questions: (1) Does venture capital directly influence Micro and Small Industries' (MSIs) growth? (2) Does venture capital influence growth through innovation? (3) Does venture capital influence growth through internet technology?

## 2. Literature Review and Hypotheses Development

Financial support is the first stepping stone for companies' rapid growth. Venture capital is a non-bank financing source in the financial markets developed through the provision of initial capital for large companies development, such as FedEx (Du and Cai 2020). Venture capital positively influences company performance as an active investor provides financing and additional valuable services to companies with technological competence but without commercial experience (Keuschnigg and Nielsen 2004). Venture capital is often consulted in a company's portfolio related to financial management, assisted by key customers, suppliers, and investors (Hochberg et al. 2007). Venture capital also helps investees establish relations with customers and suppliers and monitors investees' performance, acting as the sounding boards in assisting companies concerning strategic issues (Timmons and Bygrave 1986). Venture capital aggressively encourages companies to expand the market (Hellmann and Puri 2000), supports them to be more professional (Bottazzi and Rin 2002), and significantly contributes to business development. Large and Muegge (2008)

categorized venture capital's added value into eight types: legitimacy, outreach, strategic planning, consulting, recruitment, mandating, mentoring, and operating.

Peneder (2010) also stated three influences of venture capital financing on company performance. It is, first, a financing function where venture capital backs up companies' businesses that lack the necessary resources due to high uncertainty and asymmetric information. Second, the selection of a process where venture capital attempts to allocate rare financial resources to be used in the most profitable activities. Third, provision of value-added functions, where venture capital contributes not only in the form of capital but also managerial experience, monitoring, and providing professional advice to investee companies.

Engel and Keilbach (2007) examined young German companies' innovative behavior and growth. Their research results show that companies with a large number of patents are more likely to obtain venture capital financing, and there is no difference in the number of patents before and after securing venture capital financing. However, venture capital influences the companies' growth as measured through labor growth rates. This finding is in line with the opinions of Kortum and Lerner (2000) and Hellmann and Puri (2000) that while venture capital influences innovation and explains that venture capital contributes 15% to innovative industries in the United States, venture capital positively influences innovation and competitiveness. Pradhan et al. (2018), through four innovation proxies: patents, trademarks, R&D, and activities, stated that the causality test has found no causal relationship between venture capital and innovation/patent. In Japan, the results of research conducted by Ueda and Hirukawa (2008) show that venture capital has a positive and significant influence on the number of patents. Using panel data from 17 states, Faria and Barbosa (2014) showed that venture capital positively influences innovation, helping develop innovation mainly in the final stage.

### 2.1. Relationship between Venture Capital and Innovation

Companies backed up by venture capital are more innovative than those otherwise. Meanwhile, regarding innovation's influence on company growth using patents as an innovation variable, innovation has a positive and significant impact on company growth backed up by venture capital in the United States (Greenwood et al. 2022). The research conducted by Gornall and Strebulaev (2015) shows that venture capital in the United States contributes 82% to public companies. The study also shows that many companies are backed up by venture capital, including highly innovative ones such as Tesla, Apple, Starbucks, and Costco Wholesale. According to Pradhan et al. (2019), acquiring capital at risk in innovation activities through the venture capital industry will increase translational and applied research in the industrial sector. Venture capital funding contributed 10.2% to the innovative industry from 1991 to 2005 in 10 industrial companies (Popov and Roosenboom 2012).

Engel and Keilbach (2007) researched early stage companies concerning venture capital investment. In addition, they researched companies that produced innovation as the output. The result was that after venture capital investment, there was no difference in the number of patents from the number before the investment.

This study used trademarks to test different innovation proxies from previous research (Du and Cai 2020; Peneder 2010; Ueda and Hirukawa 2008; Pradhan et al. 2020; 2018; Faria and Barbosa 2014). It examined whether venture capital can stimulate Indonesian Micro and Small Industries (MSIs) to produce innovation. Thus, the following hypothesis was formulated:

**Hypothesis 1.** *Venture capital has a positive and significant influence on innovation.*

### 2.2. Relationship between Innovation and Growth

Innovation influences a business entity's growth. The research conducted by Adam and Alarif (2021) shows that innovation practices have a positive and significant influence

on Saudi Arabian SMEs' performance and survival. Meanwhile, [Jan et al. \(2018\)](#) examined innovation's effect on Pakistan SMEs growth. [Hall et al. \(2009\)](#) found that innovation positively influences SMEs' productivity, especially in the innovation process. Likewise, the results of research conducted by [Frimpong et al. \(2021\)](#) using European countries' macro data as a unit of the analysis show that innovation influences company growth in the health sector. [Martin and Namusonge \(2014\)](#) also researched innovation's influence on SMEs' growth in manufacturing industries in Nakuru. The results show that innovation influences SMEs' growth. Based on different analysis units in testing innovation's impact on growth in the previous studies, there are micro-analysis units in the form of companies and macro-analysis units in the form of countries. This study attempted to use micro-analysis units. Thus, the following hypothesis was proposed:

**Hypothesis 2.** *Innovation has a positive and significant influence on growth.*

### 2.3. Relationship between Venture Capital and Growth

Research by [Frimpong et al. \(2021\)](#) found that venture capital positively influences company growth in the health sector. This study used various venture capital proxies, such as companies' venture capital revenues and venture capital investment. [Greenwood et al. \(2022\)](#) examined the influence of venture capital on the growth of companies, either backed up by venture capital or not, using various growth proxies, including R&D/Sales, increase in the number of employees, sales growth, and company value in public companies. The research shows that capital positively and significantly influences a company's revenues. Furthermore, the study conducted by [Engel \(2002\)](#) comparing venture capital-funded companies to non-venture capital-funded companies in Germany indicates that venture capital-funded companies have high profitability.

Meanwhile, the research conducted by [Biney \(2018\)](#) related to the influence of venture capital financing on SMEs' growth and development in Ghana using propensity score matching (PSM) and difference in difference (DiD) estimation techniques shows a positive and significant correlation between venture capital financing and SMEs' growth using proxies related to the number of employees and sales. The research conducted by [Engel \(2002\)](#) shows that concerning the growth of employment in the early stage, in less than three years, many companies in the technological industry were financed by venture capital. The results were higher than those concerning companies not financed by venture capital, e.g., venture capital funds screening companies, providing consultancy services, monitoring, and positively influencing the company's growth.

In addition, [Peneder \(2010\)](#), using four different data sources, researched the factors influencing venture capital financing and their influence on company performance was tested using the two-stage PSM (Propensity Score Matching) technique and microdata from Austria. The results indicated that venture capital financing influenced company growth, measured with employee growth and sales proxies. Research by [Mamba et al. \(2012\)](#), using changes in the number of employees before and after SMEs' use of venture capital, found an increase in the number of employees after the SMEs' use of venture capital in Kenya. Similarly, [Belke et al. \(2003\)](#) tested the influence of venture capital investment on labor growth. The research results show a positive and significant effect between venture capital investment and labor growth.

Meanwhile, research conducted by [Bertoni et al. \(2011\)](#) used dummy variables for venture capital, and the research results indicate the positive and significant influence of venture capital on labor growth. [Mirza and Sabah \(2018\)](#) also examined the role of venture capital in labor creation. The research shows benefits for companies that use venture capital for the workforce. The explanation above shows that venture capital plays a role in the growth of companies in developed and developing countries. Based on the above argument and to determine the role of venture capital in the development of Indonesian Micro and Small Industries (MSIs), the following hypothesis was postulated:

**Hypothesis 3.** *Venture capital has a positive and significant influence on growth.*

#### *2.4. Mediating Role of Innovation*

The relationship between venture capital and innovation and growth can be viewed via the relationships between venture capital and innovation, venture capital and growth, and innovation and company growth, as viewed from the results of previous studies. The research conducted by [Biney \(2018\)](#) found that venture capital has a positive and significant influence on SMEs' growth. [Engel \(2002\)](#) tested the effect of venture capital on companies' innovative behaviors. The result shows that companies using venture capital are more innovative and experience faster growth compared to similar companies that do not use venture capital. Venture capital companies tend to finance innovative companies ([Peneder 2010](#)). Meanwhile, according to [Adam and Alarif \(2021\)](#), innovation practice positively and significantly influences Saudi Arabian SMEs' performance and survival. Thus, one may conclude that venture capital directly or indirectly affects a company's growth through innovation. The following hypothesis was formulated accordingly:

**Hypothesis 4.** *Venture capital positively and significantly influences growth through innovation.*

#### *2.5. Relationship between Venture Capital and the Use of Internet Technology*

Using the error correction model, [Pradhan et al. \(2019\)](#) tested the possibility of interrelations between venture capital investment, ICT (Information Communication Technology) infrastructure, and economic growth in 25 European countries from 1989 to 2016. Using the Granger causality test, they found a causal relationship between variables venture capital investment, ICT infrastructure, and vice versa. The research results show a causal relationship between all variables. ICT infrastructure influences all stages of investment, from the initial to final stages of venture capital investment. Based on the Supply Leading Hypothesis, it is stated that most venture capital has been directed to the ICT sector and has obtained a high return rate. For example, in the United States, the ICT sector received almost 53.6% of VC investments in 2016, while in Europe, nearly 44% of VC investments were directed to the ICT sector ([OECD 2017](#)). Thus, the following hypothesis was formulated accordingly:

**Hypothesis 5.** *Venture capital has a positive and significant influence on the use of internet technology.*

#### *2.6. Relationship between the Use of Internet Technology and Growth*

The research conducted by [Bonsu and Sampong \(2012\)](#) tested ICT on SMEs in Kumasi Metropolis, finding an increase in SMEs' productivity from ICT implementation and ICT's contribution to SMEs' growth through ICT application. The Internet has changed how people do business, and SMEs' internet use helps them find additional contracts and expand their market share. The Internet is used more to acquire customers' locations, contracts, general internet businesses, and activities via e-mail instead of finding sources of raw materials needed by companies. Therefore, the use of ICT has a positive influence on the industry.

The research conducted by [Taruté and Gatautis \(2014\)](#) examines ICT's direct and indirect influence on SMEs' performance and business success. The result shows that ICT influences the development of internal and external communication and produces the best performance, given the importance of ICT investments made with internal capabilities and processes within an organization. The research conducted by [Onileowo and Fasiku \(2021\)](#) shows that SMEs play an essential role in the national economy's growth and development. Thus, it is necessary to research and investigate ICT's influence on SMEs' performance in Nigeria. The research results show that SME owners naturally perform business activities and marketing strategies limited only to the country. Therefore, expanding the scope of business through global integration with the help of ICT is necessary to increase the

country's economic growth. The research helps identify the leading causes of limited ICT capabilities and effectiveness, the need to implement ICT into business processes, and the benefits of implementing ICT. This study discusses the role of ICT in the growth of Micro and Small Industries (MSIs)' growth. The research results recommend the necessity to expand company productivity and increase profit and overall company performance. The research recommends that it is necessary to determine additional training facilities. Micro and Small Industries (MSIs) need to embrace ICT through resources, networks, and consumer capabilities. Entrepreneurs must be proficient and know how to use ICT for increased efficiency. Thus, the following hypothesis was formulated accordingly:

**Hypothesis 6.** *The use of internet technology has a positive and significant influence on growth.*

### 2.7. Mediating Role of Internet Technology

Likewise, the use of internet technology mediates the influence of venture capital on company growth. Based on previous studies, venture capital has a significant impact on the use of internet technology (Pradhan et al. 2019). Further, internet technology significantly affects company growth (Onileowo and Fasiku 2021). Thus, the following hypothesis was formulated:

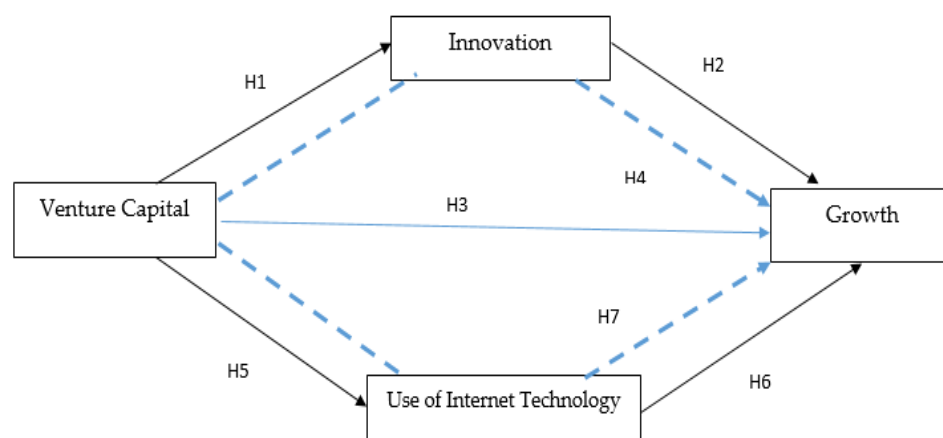
**Hypothesis 7.** *Venture capital has a positive and significant influence on growth through the use of internet technology.*

The Statistics Indonesia (2019) defined the manufacturing industry sector of small and micro-scale products as the production activity of converting basic materials or raw materials into semi-finished goods, finished goods, and goods with less value into ones with higher value. Small industry refers to an industrial company whose workforce is between 5 and 19 people. Micro industry refers to an industrial company whose workforce is between 1 and 4 people. The manufacturing sectors include food, beverage, tobacco processing, textiles, apparel, leather, wood, printing, paper, chemical, pharmaceutical, rubber industries, etc., on a micro and small scale. Micro and small industry are part of micro, small, and medium enterprises (MSMEs).

Micro enterprises have a net worth of up to IDR 50,000,000.00 (50 million rupiahs), excluding land and buildings for business premises, or have annual sales of at most IDR 300,000,000.00 (300 million rupiahs). In comparison, a small business is defined as an organization with a net value of between IDR 50,000,000.00 (50 million rupiahs) and IDR 500,000,000.00 (500 million rupiahs), excluding land and buildings. In addition, a small business is also defined as an organization that has annual sales of more than IDR 300,000,000.00 (300 million rupiahs) up to a maximum of IDR 2,500,000,000.00 (2 billion 500 million rupiahs) (Republik Indonesia 2008).

This study refers to the theory of company growth, explaining that company growth is a process where companies grow from small to large ones, from weak to reliable ones, and constantly expand in market competition. There are four scales of company expansion: output, input, profit, and value. Growth is a change or increase in a company's operational activities, qualitatively and quantitatively measured (Inyang and Callistus 2022). Meanwhile, according to Penrose (2009), growth can be defined from two perspectives: increasing the size and change or improvement process. In this research, we attempted to use employee growth to measure company growth.

This study discusses venture capital, innovation, the use of technology, and company growth. Furthermore, this research analyzes venture capital's direct and indirect influence on growth. The following Figure 1 illustrates the relationship between constructs.



**Figure 1.** Research framework and relationship between constructs.

### 3. Methodology

This study used secondary data from the survey conducted by Statistics Indonesia in 2019. The population of the micro industries in 2019 was 4,174,108, the small industry was 253,068, and the total population of Micro and Small Industries (MSIs) was 4,380,176 (Statistics Indonesia 2022). The research sampling technique uses the Two-Stage Stratified Cluster Sampling method. The samples were selected using the Systematic Probability Proportional to Size (PPS) method, with the size related to the number of Micro and Small Industries (MSIs) obtained from the 2016 registration of the Economic Census and implicit stratification using the information of industrial centers and non-industrial centers. The samples included Micro and Small Industries (MSIs) with less than 20 workers registered in districts and city governments throughout Indonesia. The research sample was 90,295 Micro and Small Industries (MSIs) based on the criteria. However, 6679 of 90,295 samples were excluded due to incomplete information, including unavailable data on the number of employees and venture capital data. Finally, the samples used in this research totaled 83,616 Micro and Small Industries (MSIs). This study used Micro and Small Industries (MSIs) as the research objects, differently from Biney (2018) and Du and Cai (2020), who used Small and Medium Enterprises (SMEs). The hypotheses were tested using logistic regression with STATA for direct influence and the Sobel test for indirect impact. For data analysis, this study used a dummy variable to measure growth. If Micro and Small Industries (MSIs) increased their number of workers, a score of 1 was assigned, and if Micro and Small Industries (MSIs) decreased the number of workers, a score of 0 was assigned (Haynes and Brown 2009; Bui et al. 2021).

Meanwhile, Biney (2018), Peneder (2010), and Du and Cai (2020) used a ratio of the percentage increasing the number of workers, total assets, and sales from the previous to the recent year. The venture capital variables were the same as those in research conducted by Biney (2018) and Peneder (2010) using a dummy variable in which a score of 1 was assigned to SMEs that used venture capital and a score of 0 to those that did not use venture capital. For innovation variables in the form of trademarks, it differed from the research conducted by Peneder (2010), who used the number of patents owned. The use of Internet technology implemented a dummy variable with a score of 1 if Small and Micro Industries (MSIs) used the Internet and a score of 0 if they did not use the Internet.

In contrast, a previous study by Pradhan et al. (2020) used macro data, while this study used microdata. The data of this research were collected using a cross-sectional method with 83,616 Micro and Small Industries (MSIs) in 2019, while the previous studies used primary data through questionnaires (Biney 2018). The propensity score matching method used variable control. This study did not use variable control but used intervening variables, e.g., innovation and the use of internet technology in testing the influence of venture capital on growth. The variables used in this study displays at the Table 1 below.

**Table 1.** Symbol and description of variables.

No	Symbol		Description	Variable
1	GRW	Growth	Ratio of increase in workers of current period and prior to current period, Dummy = 1 if the ratio > 0 and 0 = if the ratio ≤ 0.	Dependent
2	VC	Venture Capital	Dummy 1 = if venture capital was used and 0 = if venture capital was not used.	Independent
3	INT	Use of Internet Technology	Dummy = 1 if uses the internet, 0 = if does not use the Internet.	Intervening
4	INV	Innovation	Dummy 1 = if trademark was available, 0 = if trademark was unavailable.	Intervening

### Model

PSM was used by [Biney \(2018\)](#), [Peneder \(2010\)](#), and [Engel and Keilbach \(2007\)](#) to deal with counterfactual issues and selection bias that would influence the results. Therefore, the treatment group and the control group are matched. In addition, the researchers used survey analysis through questionnaires for complete information related to company growth before and after using venture capital to be tested using the DiD (Different on Different) approach method. This study used logistic regression tests and secondary data only while not testing the influence of growth before and after using venture capital; PSM and DiD tests were not conducted.

This research used dummy variables for the dependent and independent variables; thus, the test was carried out using logistic regression analysis. In addition, a robustness test was carried out on the logistic regression to avoid bias. PSM was not used in this research since the research model was different from the research conducted by ([Biney 2018](#); [Peneder 2010](#); [Engel and Keilbach 2007](#)); an intervening variable was not used in this research.

The influence of venture capital on the growth of Indonesian Micro and Small Industries (MSIs) was examined directly using a temporary logistic regression test and indirectly through innovation and internet technology using the Sobel test. The logistic regression model was as follows

$$\ln \frac{INV}{1 - INV} = \alpha_i + b_1 VC_i + e, \quad (1)$$

$$\ln \frac{GRW}{1 - GRW} = \alpha_i + b_1 VC_i + b_2 INV_{2i} + e, \quad (2)$$

$$\ln \frac{INT}{1 - INT} = \alpha_i + b_1 VC_{1i} + e, \quad (3)$$

$$\ln \frac{GRW}{1 - GRW} = \alpha_i + b_1 VC_{1i} + b_2 INT_{2i} + e. \quad (4)$$

GRW = Growth.

INV = Innovation.

VC = Venture capital.

INT = Use of internet technology.

## 4. Results

### 4.1. Descriptive Statistics

The descriptive statistics explain that the minimum and maximum of each variable in venture capital, use of internet technology, innovation, and growth are 0 and 1. See [Table 2](#) below.



**Table 2.** Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
VC	83.616	0.006183	0.0783892	0	1
INT	83.616	0.1546714	0.3615933	0	1
INV	83.616	0.0252105	0.1567648	0	1
GRW	83.616	0.0401359	0.196279	0	1

Note: This table is the descriptive statistic of the dependent, independent, and intervening variables in Micro and Small Industries (MSIs) in Indonesia in 2019.

#### 4.2. Logistic Regression Results

Unlike Peneder (2010) and Biney (2018) who used propensity score matching, this study used logistic regression to answer the hypotheses after the robustness test. For the results of logistic regression, see Table 3 below.

**Table 3.** Logistic regression after robustness test.

Variable		INV (1)	GRW (2)	INT (3)	GRW (4)
VC	Coefficient	0.4968	0.1082	0.0588	0.1037
	Odds Ratio	1.6435	1.1143	1.0606	1.1092
	<i>p</i> -value	0.0260 *	0.6130	0.6230	0.6290
INV	Coefficient		0.5082		
	Odds Ratio		1.6630		
	<i>p</i> -value		0.0000 **		
INT	Coefficient				0.5164
	Odds Ratio				1.6759
	<i>p</i> -value				0.0000 **
Constanta		0.0258	0.4112	0.1829	0.0379
R2		0.0002	0.0010	0.0000	0.0049
N		83,616	83,616	83,616	83,616

Note. The influence of venture capital on internet use, innovation, and the growth of Micro and Small Industries (MSIs) was tested using a logistic regression test. The sample included (N) 83,616 Micro and Small Industries (MSIs) in 2019. Significance Level 5% \*, 1% \*\*. The data were collected from the survey by Statistics Indonesia (BPS).

Using a dummy variable on the independent, intervening, and dependent variables. The test results in Model 1, shown with simple logistic regression to test the influence of venture capital on innovation, had a positive and significant impact on innovation with a significance value of  $0.0260 < 0.05$ . Due to the fact that the odds ratio (OR) is 1.6435, Micro and Small Industries (MSIs) that use venture capital are 1.6435 times more innovative than Micro and Small Industries (MSIs) that do not use venture capital; thus, Hypothesis 1 is accepted.

Model 2, shown with multiple logistic regression, tested the influence of innovation on growth and venture capital on growth. The influence of innovation on growth is positive and significant, with a significance value of  $0.000 < 0.05$ . Due to the fact that the odds ratio (OR) value is 1.6624, Micro and Small Industries (MSIs) that use innovation have the opportunity to grow 1.6624 times more than Micro and Small Industries (MSIs) that do not use innovation; thus, Hypothesis 2 is accepted. Furthermore, the influence of venture capital on growth is positive and insignificant, with a significance value of  $0.6130 > 0.05$ . Due to the fact that the odds ratio (OR) value is 1.1143, Micro and Small Industries (MSIs) that use venture capital have the opportunity to grow 1.1034 times more than Micro and Small Industries (MSIs) that do not use venture capital, but this is insignificant. Therefore, Hypothesis 3 is rejected.

Model 3, shown with simple logistic regression to test the influence of venture capital, had a positive but insignificant effect on Internet use with a significance value of  $0.6230 > 0.05$ . Due to the fact that the odds ratio (OR) value is 1.0606, Micro and Small Industries (MSIs) that use venture capital have the opportunity to use the Internet 1.0606 times more than Micro and Small Industries (MSIs) that do not use venture capital. Still, this value is insignificant, thus Hypothesis 5 is rejected.

Model 4, shown with multiple logistic regression, tested the influence of internet technology on growth. The effect of the use of internet technology on growth is positive and significant, with a significance value of 0.000. Due to the fact that the OR value is 1.6759, Micro and Small Industries (MSIs) that use the Internet have the opportunity to grow 1.6759 times more than Micro and Small Industries (MSIs) that do not use the Internet; thus, Hypothesis 6 is accepted. Furthermore, the influence of venture capital on growth is positive but insignificant, with a significance value of 0.6290. Due to the fact that the odds ratio (OR) value is 1.1092, Micro and Small Industries (MSIs) that use venture capital have the opportunity to use venture capital 1.0606 times more than Micro and Small Industries (MSIs) that do not use venture capital. Still, insignificantly, Hypothesis 6 is rejected.

#### 4.3. Mediating Effect Test Result

Innovation can mediate the influence of venture capital on Indonesian Micro and Small Industries (MSIs) growth using the Sobel test (Sobel 1982). The Sobel test examines the effect of variables X on Y through M, which means that M can serve as the mediating variable (Kristopher and Preacher 2020).

Table 4 depicts the Sobel test with innovation as a mediating variable. The  $p$ -value of the Sobel test is  $0.0395 < 0.05$ , which means that innovation can mediate the influence of venture capital on Indonesian Micro and Small Industries (MSIs) growth. Micro and Small Industries (MSIs) that use venture capital as a source of financing have their growth influenced by innovation. Thus Hypothesis 4 is accepted.

**Table 4.** Sobel test results with innovation as a mediating variable.

	Input		Test Statistic	Std. Error	$p$ -Value
A	0.4968	Sobel test	2.05833633	0.12159715	0.03955786
B	0.5038				
Sa	0.2239				
Sb	0.0914				

Source; Calculate Sobel Test, 2022.

Table 5 depicts the Sobel test result with the use of internet technology as a mediating variable. The  $p$ -value of the Sobel test is  $0.6232 > 0.05$ , which means that the use of internet technology cannot serve as the mediating variable or mediate the influence of venture capital on Indonesian Micro and Small Industries (MSIs) growth. Consequently, internet technology cannot influence Micro and Small Industries (MSIs) that use venture capital to grow. Therefore, Hypothesis 7 is rejected.

**Table 5.** Sobel test results with the use of internet technology as a mediating variable.

	Input		Test Statistic	Std. Error	$p$ -Value
A	0.0588	Sobel Test	0.49123642	0.06148885	0.62325924
B	0.5137				
Sa	0.1196				
Sb	0.0423				

Source; Calculate Sobel Test, 2022.

#### 4.4. Hypothesis Test Result

Table 6 depicts the statistical test results that indirect innovation can mediate venture capital's influence on growth. However, the use of internet technology is not able to mediate the effect of venture capital on development. In contrast, venture capital does not directly influence the development of Micro and Small Industries (MSIs) in Indonesia.

**Table 6.** Hypotheses result test.

	Hypotheses	p-Value	Result
H1	VC → INV	0.026 **	Significantly Positive
H2	INV → GRW	0.000 ***	Significantly Positive
H3	VC → GRW	0.6130	Insignificantly Positive
H4	VC → INV → GRW	0.039 **	Significantly Positive
H5	VC → INT	0.6230	Insignificantly Positive
H6	INT → GRW	0.000 ***	Significantly Positive
H7	VC → INT → GRW	0.640	Insignificantly Positive

Note the sig value \*\* with a  $p$ -value < 0.05 (5%), while \*\*\* a significant value < 0.01 (1%).

## 5. Discussion

This study examines venture capital's direct and indirect influence on Indonesian Micro and Small Industries (MSIs) growth. The first hypothesis states that venture capital influences innovation activities in Micro and Small Industries (MSIs) and that the statistical test shows positive and significant values. This study result confirms the opinion of [Peneder \(2010\)](#) that companies that use venture capital generally tend to introduce new products and protect innovation through explicit appropriation in the form of intellectual property rights and have better performance regarding innovation. Providing venture capital financing to innovative companies due to credit limitations through traditional channels requires them to manage the companies more professionally and bring products to the market faster, accelerating growth and improving innovation in the company's market share ([Hellmann and Puri 2000](#)). According to [Pradhan et al. \(2020\)](#), acquiring risky capital for innovative activities through the venture capital industry will increase translational and applied research. [Pradhan et al. \(2018\)](#) also conducted research using four innovation proxies: patents, trademarks, R&D, and activities. [Kortum and Lerner \(2000\)](#) state that venture capital positively influences innovation and competitiveness. Using venture capital data from 17 European countries, [Faria and Barbosa \(2014\)](#) found that venture capital positively influences innovation. Furthermore, venture capital aids innovation development; most companies are in the final stages of financing. In Indonesia, it is evident that venture capital successfully allows Micro and Small Industries (MSIs) to innovate related to trademark creation.

Furthermore, the second hypothesis supports that innovation positively and significantly influences the growth of Micro and Small Industries (MSIs). This finding is in line with [Adam and Alarif's \(2021\)](#) research that innovation practice positively and significantly influences the performance and survival of SMEs in Saudi Arabia. In addition, this result supports the statement that managerial innovation practices influence company performance ([Freeman 2004](#)). Meanwhile, [Jan et al. \(2018\)](#) state that the effort to place goals in innovation activities influences improved company performance. According to [Hall et al. \(2009\)](#), innovation positively influences SMEs' productivity, especially in the innovation process. [Martin and Namusonge \(2014\)](#) also researched the influence of innovation on SMEs' growth in the manufacturing industry in Nakuru County, finding that innovation influences SMEs' growth.

The third hypothesis states that venture capital positively and insignificantly influences Indonesian Micro and Small Industries (MSIs) growth. Venture capital does not influence the growth of Indonesian Micro and Small Industries (MSIs). This finding is

contrary to the research conducted by [Biney \(2018\)](#), [Engel \(2002\)](#), [Peneder \(2010\)](#), [Belke et al. \(2003\)](#), [Bertoni et al. \(2011\)](#), and [Mirza and Sabah \(2018\)](#) stating that venture capital plays a role in company growth through changes in the number of employees. According to [Peneder \(2010\)](#), venture capital positively and significantly influences employee growth because it screens and monitors a company's financing. However, it is possible that the company's venture capital in Indonesia has not optimally served its functions and that the venture capital market in Indonesia is not mature yet. As observed from the development, the amount of venture capital in the Financial Services Authority (OJK) decreased from 2015 to 2020 ([Sofia et al. 2021](#)).

The fourth hypothesis states that the influence of innovation as a variable that mediates venture capital and Micro and Small Industries (MSIs) growth shows positive and significant value. This means that innovation by Indonesian Micro and Small Industries (MSIs) from venture capital involvement successfully increases their growth.

The fifth hypothesis is related to venture capital's influence on internet technology use. Data processing found that venture capital cannot increase Micro and Small Industries (MSIs)' opportunity to use internet technology. This result does not conform to the statement of [OECD \(2017\)](#) that venture capital directed to the ICT sector will lead to a higher level of investment.

The sixth hypothesis is related to the influence of internet technology on Micro and Small Industries (MSIs)' growth. The result finds that internet technology can provide Micro and Small Industries (MSIs) the opportunity to grow. [Onileowo and Fasiku \(2021\)](#) believe that ICT can increase productivity and efficiency. ICT use will reduce processing costs, overcome distance barriers, reduce regional distance, and increase operation within geographic boundaries. Likewise, concerning the seventh hypothesis, in which Micro and Small Industries (MSIs) use venture capital, positive but insignificant values are shown regarding their growth. This means that internet technology cannot mediate the relationship of venture capital with Micro and Small Industries (MSIs) growth.

This study shows that venture capital cannot directly increase Micro and Small Industries (MSIs) growth. However, innovation indirectly mediates the use of venture capital with growth but not with the use of internet technology variables, which shows that the use of the Internet cannot mediate the influence of Micro and Small Industries (MSIs)' use of venture capital on their growth. According to [Peneder \(2010\)](#), venture capital is only complementary to company financing but not a substitute for the funding within the company. Venture capital cannot allow Micro and Small Industries (MSIs) to grow indirectly. The results of this study may serve as a reference for use in the business sector and developing countries.

## 6. Managerial and Theoretical Implications

The results of this study contribute to the owners of Micro and Small Industries (MSIs) that use venture capital as one of their financings since, based on the results, venture capital influences Indonesian Micro and Small Industries (MSIs) growth through innovation. This finding indicates that venture capital financial and non-financial financing, such as the strategic direction of venture capital, can increase or create innovations and influence growth. This result means that venture capital financing can increase innovation activities to achieve a company's goals, thus, influencing the industry's growth.

Even if the number of Micro and Small Industries (MSIs) that use venture capital is quite small, venture capital can influence the Micro and Small Industries (MSIs) growth through innovation. The government understands the importance of venture capital financing and innovation in rapidly increasing Micro and Small Industries (MSIs) growth. Therefore, Micro and Small Industries (MSIs) are familiar with and benefit from the existence of venture capital institutions.

Theoretically, the results of this research extend the growth theory, in which business growth is not only influenced by the source of venture capital financing but by innovation and the use of internet technology. This research finds that venture capital can influence

growth through innovation in Micro and Small Industries (MSIs). Indonesian business owners can use this to take advantage of venture capital financing in the business capital structure since venture capital can influence innovation and growth. This research empirically proves that innovation successfully mediates the influence of venture capital on business growth. This is the first research to associate venture capital, innovation, use of internet technology, and growth of Micro and Small Industries (MSIs) in one model and use a dummy variable for the growth variable. This research proves that the variables relate to the influence of venture capital on growth that previous studies have not tested. Future research will include other variables taken as the mediating variables to contribute to science and the use of venture capital.

## 7. Conclusions and Limitations

This study's objective was to examine venture capital's influence on growth through innovation and the use of internet technology in Micro and Small Industries (MSI) in Indonesia. Based on the analysis result, the following conclusion is summarized. Venture capital positively and significantly influences innovation (H1). Growth is positively and significantly influenced by innovation (H2). Furthermore, venture capital does not influence growth (H3). Venture capital positively and significantly influences growth through innovation (H4). Furthermore, venture capital does not influence the use of internet technology (H5). On the other hand, internet technology has a positive and significant influence on growth (H6). Finally, venture capital did not influence growth through the use of internet technology (H7).

In conclusion, venture capital is one solution for companies in which, because of limited credit experience, Micro and Small Industries (MSIs) use venture capital financing, manage their companies professionally, and produce innovations; thus, it influences growth. Therefore, venture capital increases innovation, and innovation increases Micro and Small Industries (MSIs) growth. However, venture capital is not able to increase the use of internet technology, but the use of internet technology increases Micro and Small Industries (MSIs) growth. Furthermore, venture capital does not directly increase the growth of Indonesian Micro and Small Industries (MSIs). Still, the role of innovation for venture capital is required to increase Micro and Small Industries (MSIs) growth.

This study has some limitations. First, this study only examined the role of venture capital from the perspective of the financial function, and it did not examine non-financial function detail. Second, this study did not use primary data to obtain detailed information regarding the influence of venture capital on growth through innovation and internet technology but used secondary data from Statistics of Indonesia. Third, because of the limited data available, this study only used a growth proxy from changes in the number of employees within two years. Further research should use other measures and increase the research period.

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