

Innovation Driven Enterprise, Sustainable Business and Firm Financial Performance

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Abstract *Innovation should be followed by profitable commercialization to have a sustainable business. Teece (1986) identified that it is often not the innovator who introduces a new process, product or service who profits the most from an innovation, but instead suppliers, cooperators, customers and competitors. In emerging markets, especially in Indonesia, it is challenging to do innovation due to the lack of infrastructure. This study explores innovation-driven enterprise relationships with firm financial performance measures by firm profitability. To identify the innovation-driven enterprise financing capabilities and innovation, the study used company age, R&D expense, sales, sales growth, debt ratio and retained earnings as independent variables. Firm profitability performance was measured by return on assets (ROA). R&D expenses of innovation-driven enterprises had a positive correlation with firm financial performance. Sales and retained earnings had a positive correlation with R&D expense. However, company age, debt ratio and sales growth had a weak negative correlation with corporate innovation activities. Retained earnings had a positive correlation and was the biggest determinant of firm profitability. It was shown that innovation-driven enterprises in Indonesia are financing their innovation with retained earnings (internal financing) and not debt (external financing).*

Keywords: *Innovation, sustainable business, financial performance, R&D expense, internal financing*

1. Introduction

Stamm (2003) argued that innovation is invention plus commercialization (implementation). Inventions that have the potential to create positive social and ecological effects need to consider the effective sustainability of innovation (Geels, Elzen, & Green, 2004; Hockerts & Wüstenhagen, 2010; Schaltegger & Wagner, 2011; Tukker et al., 2008). Innovators continue to strive to do their business with the goal of realizing a positive effect for society, the environment, good financial performance and sustainability. Innovation-driven enterprises face these challenges as they try to spread new solutions through the commercialization of inventions and seek greater market share, socio-political influence and good financial performance (Wüstenhagen & Boehnke,

2008; Schaltegger, 2002; Schaltegger & Wagner, 2008). Innovation-driven enterprise business models integrate all innovation to find greater improvement, environmental impact, social value and financial sustainability (Stubbs & Cocklin, 2008; Porter & Kramer, 2011). However, some innovation research revealed significant uncertainties related to innovation activities. Innovation has been widely regarded as a driver for sustainable business, but there remains considerable uncertainty about how it will lead to more sustainable business development and society (Hall & Wagner, 2012).

Market demand-side factors such as concentrated market structures and lack of demand are as important as financial constraints in determining the failure of corporate innovation and financial barrier

considerations of traditional demand, market structure and regulatory factors involved in decreasing innovation performance (Pellegrino & Savona, 2017). Profiting from an innovation-driven enterprise has many challenges from the deliberate idea to co-create economic benefit, social and environmental value (Boons, 2009; Boons & Lüdeke-Freund, 2013; Cohen & Winn, 2007; Hansen, Große-Dunker., & Reichwald, 2009; Hockerts & Wüstenhagen, 2010).

Innovation-driven enterprises, especially in term of R&D activities, require significant uncertainty. As companies, there is a possibility to lose control of their resource management, especially mature companies. Moreover, slow-growing industries should consider collaborating with science-based providers and advisors such as universities and government research institutions (Seoa Chungb, & Yoonc, 2017).

Sustainable business and innovation-driven enterprises cannot stand alone even if the innovation becomes the main driver for growth. To build a sustainable business, companies needs to integrate environmental and social issues to achieve long-term shareholder value (Banerjee, 2002). They are economic needs and technological factors to solve environmental problems, cultural issues, behavioral changes and institutional development (Hoffman & Sandelands, 2005).

Sustainable business models need to deliver economic value and create competitive advantage through superior customer value while contributing to sustainable business to the firm and society (Lüdeke & Freund, 2010). Sustainable business models and innovation-driven enterprises can use the triple bottom line approach (People, Profit, Planet) to define the firm's purpose and measure performance that includes a wide range of stakeholders, especially in relation with the environment and society (Stubbs & Cocklin, 2008). Implementation of sustainable business models using the triple bottom line approach has many challenges in Asia. This region has

become more importance not only as a source of low-cost manufacturing, but also as a source of innovation (Ernst, 2002). However, technological growth and innovation is not equally distributed among Asian economies because of inadequate infrastructure, regulations and a lack of political openness, such as in the Philippines and Indonesia (Ramstad & Chao, 2011). On the other side, Indonesia as an emerging market economy has the biggest polulation in the Southeast Asia region with a large productive population of ages 0-14 years (25.42%) and 15-24 years (17.03%). Indonesia's economy is based on minerals, fuels and animal or vegetable fats export (includes palm oil). Is there a relationship between innovation-driven business models, sustainable business and firm performance in emerging markets like Indonesia? The purpose of this study was to explore innovation-driven enterprises, business models, sustainable business and firm performance relationships in Indonesia as an emerging economy. This study used R & D, sales, debt and earnings return to measure innovation-driven companies. Then the age of the company would represent a sustainable business and return on assets as the financial performance measure of the company's profitability.

2. Literature Study

Innovation Driven Enterprise Business Model

Teece (1986) and Chesbrough (2010) identified a fundamental innovation dilemma related to innovation profitability. An innovator is not the one who always gets the benefit of their invention. Sustainable innovations are innovations that maintain or increase the overall capital of the firm (economic, environmental, and social). This means that sustainable businesses not only have to internalise negative external effects with their innovations but should also try to produce "net positive" effects for their business (Cohen & Winn, 2007; Ehrenfeld, 2008; Hansen et al., 2009; Schaltegger & Wagner, 2011).

Boons et al. (2013) defined continuous innovation as a process in which sustainability (environmental, social, and financial) factors are integrated into enterprise systems, from idea generation to research and development (R & D) and commercialization. The outcomes of this process are new technologies, products and services as well as business models that include sustainable innovations that include ecological, economic and social criteria. Innovation-driven companies think it will generate uncertainty about how it will lead to a more sustainable society (Hall & Wagner, 2012). A business model is the method of doing business by which a company can generate revenue to sustain the business and create value for their

customers. The basic framework of a business model should be defined as what product or service will be offered, who is the target market or customer segment and how the service or product is produced (Chaudhury & Kuilboer, 2002). Sustainable business models should provide the dominant logic of a business process for creating and delivering value (Rappa, 2001; Turban, King, Lee, Warkentin, & Chung, 2002; Linder & Cantrell, 2000; Petrovic, Kittl., Teksten, 2001; Auer & Follack, 2002). The most cited business model definition and components are from Chesbrough and Rosenbloom (2002), Afuah and Tucci (2000) and Osterwalder and Pigneur (2002) as shown in Table 1.

Table 1.
Comparing Business Model Components

Theory	Value	Customer	Revenue	Offering	Cost	Partner	Strategy	Delivery
Osterwalder & Pigneur (2002)	Value Proposition	Target Customer	Revenue Model	Value Configuration	Cost Structure	Partner Network	Core Capabilities	Customer Relationship Distribution Channel
Afuah and Tucci (2000)	Customer Value	Scope	Revenue Source	Implementation	Pricing	Connected activities	Sustainability	Capabilities
Chesbrough & Rosenbloom (2002)	Value Proposition	Market Segment	Revenue Mechanism	Value Chain	Cost Structure	Value Network	Competitive Strategy	-

Osterwalder, Pigneur and Tucci (2005) defined business models as a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing and delivering this value and the relationship of capital to generate profitable and sustainable revenue streams. Elements of a business model are customer segments and value propositions, channels and customer relations, key resources, activities, partnerships (how to create value), revenues stream, and cost structures (how to capture value). The evolution of the business

model may take time because of the need for reconfiguration and coordination of activities, resources, partnerships and revenue models (Osterwalder & Pigneur, 2010). It was observed that the transformation of a company's value proposition generally requires a sequence of continuous improvement steps to develop new capabilities and change how the company does business, engaging the workforce and managers, suppliers, customers, and the company's broader stakeholders. The essence of a business model is defining the manner by which the enterprise delivers value to customers, entices customers to pay for value and converts this into profit (Teece, 2010). Present business models are from an activity

system perspective, viewing the business model as a network. This exemplifies an emerging view that business models need to develop using a network-centric rather than a single firm-centric perspective (Zott & Amit, 2010). Phaal, Farrukh, and Probert (2004) viewed roadmaps as powerful communication tools, which allow people from various functional backgrounds to work together on a shared future vision. This may be useful to support the transition to sustainable business models.

Sustainable Business Models

Sustainable business models as a prerequisite must be economically sustainable. Therefore, the objective in sustainable business modelling is to identify solutions that allow firms to capture economic value, while generating environmental and social value and thereby establishing the business case for sustainability (Schaltegger & Wagner, 2011). Sustainable business models seek to go beyond delivering economic value and include consideration of other forms of value for a broader range of stakeholders. They have been defined as business models that create competitive advantage through superior customer value while contributing to sustainable development of the company and society (Lüdeke & Freund, 2010). Sustainable business models use both systems and firm-level perspectives, build on the triple bottom line approach to define the firm's purpose and measure performance and include a wide range of stakeholders related to environment and society (Stubbs & Cocklin, 2008).

At the core of business model innovation is rethinking the value proposition and the product or service the firm offers to its stakeholders. Bowman and Ambrosini (2000) and Allee (2011) argued that conventionally, business model innovation has been about creating new forms of customer value, focusing on user value and how the firm captures value through transaction value such as economic or exchange value, paid by the buyer to the producer and including intangible benefits such as market access. To create a

sustainable business, a holistic view of the value proposition is required that includes benefits and costs to other stakeholders (besides customers and the firm) and specifically to society and the environment.

Sustainable business models represent six types of stakeholders: (1) customers, (2) investors and shareholders, (3) employees, (4) suppliers and partners, (5) the environment, and (6) society (Donaldson and Preston, 1995). The value for these stakeholder groups' needs to involve the understanding tangible and intangible value flows between stakeholders towards identifying relationships, exchanges and interactions, and opportunities for greater collaborative mutually beneficial value creation (Allee, 2011). Porter and Kramer (2011) defined this enhanced approach as "shared-value creation."

There are still many unanswered questions with regard to the conceptual foundations of the term, how organizations design and change business models successfully and what influences this, from the micro-level of the individual firm and government agency to the macro-level of countries and economic areas (Chesbrough, 2010). However, developing an innovative business model to capture the value is not a trivial task, neither for start-ups nor for established firms. There is missing clarity about the "right" business model to exploit innovations, which may be another crucial obstacle for sustainability-oriented business model innovation. This failure is closely related to the influence that the dominant logic exerts on organizational learning and information availability (Lüdeke & Freund, 2013).

Innovation Driven Enterprise and Firm Financial Performance

Innovation driven enterprises aim at gaining a competitive advantage and provide hope for the company to be able to increase or maintain revenue, which in turn can enable the company to survive and continue to exist until it is sustainable in the future. The company's commitment to spend on research and

development contributes to the company's financial performance (Mansfield, 1998). With innovative products, the company can compete with its competitors and even has a chance to be in the forefront and capture market share in the industry. Innovation-driven enterprises expect to increase performance by reducing the number of operational costs. Improved operating efficiencies resulted in the achievement levels of productivity and higher financial performance (Echevarria, 1997).

Cho and Pucik (2005) stated that the quality and product innovation is a condition of the formation of a good corporate performance and growth of the profitability of the company from time to time. So although the company managed to create a product with a good innovation, if the product is not qualified, then the company cannot increase its profitability. It is expected that the company can increase profitability in the long term, not just in the short term and may continue to outperform competitors. Long-term profitability for the company can also be achieved through the creation of new products that have a large difference with previous products; the greater the difference between the new products with a product that has been created before, the better the long-term financial performance of the company. The differences in question involve a new product that can meet the needs of consumers with different features than existing products, along with new features difficult for competitors to imitate.

Discussion about the profitability of the company related to the concept of monopoly, i.e., one party enjoys a high profit since becoming the sole supplier of the product in a specific location. Lele (2003) defined that there are two types of monopoly. First, the company is said to have a monopoly if the company has only limited access to assets such as natural resources, markets, certain product or technology that is not owned by other parties. Second, the monopoly can also be formed out of the situation. For example, if

there was only a coffee shop in a residential complex, the coffee shop is still said to have a monopoly because of the situation that made it so.

It is referred to as a monopoly that not only can be reached from access to certain resources, or products that are unique and cannot be created any other person except a researcher at the company, but can also be achieved from the company's ability to provide products needed in specific target markets, in certain places, for a certain period of time. Herein lies the role of research and development to continue to develop products both incremental and radical to continue to surpass competitors. The ability to surpass competitors is obtained from the company's ability to enjoy a temporary monopoly situation on an ongoing basis (Roberts, 1999). The income earned by the company from product innovation is certainly going to affect corporate performance. The costs incurred by the company for product innovation would be an investment that also affects the company's financials and also directly affects the company's financial performance.

Innovation-driven enterprises innovate their products or services through a learning process in the field of research and product development based on their industries. Unlike physical investment that can have visible physical manifestations, investment in innovation leads to the knowledge that has a specific context (Shankar, Sourish, & Baveja, 2009). The process of forming an additional asset in the company knowledge is the basis for the formation of a company's competitive advantage. Reputation for product innovation has been shown to influence consumers' perceptions of the company image and will indirectly affect corporate performance. If the company has a good reputation in innovation, this can increase consumer interest to continue to use the products offered by the company. Moreover, when consumers have repeatedly been satisfied with the products provided by the company, this can improve the link of consumers to the company, thereby

increasing loyalty to the company.

This loyalty will influence the level of consumer tolerance against the failure of the company's products if a product currently being used do not correspond to consumer expectations. Thus, the behavior of the company in sustainable innovation will improve the company's financial performance because it can maintain or even develop its market segment. Successful product innovation is expected to increase the company's profit and growth. Moreover, product innovation is closely related to the manufacture of products which have more advantages than their competitors. Innovation, which is the result of investment in research and development, can produce knowledge in the field of technology that could give the company a competitive advantage (Liu & Chen, 2010). Moreover, this is true if the research conducted by the company has successfully produced an innovation that is not easily imitated by competitors. Thus, the competitive advantage that companies have can survive a long time in the future.

Often, a company's competitive advantage is also defined as a company's financial performance compared with its competitors. Competitive advantage in manufacturing industries can be achieved by developing the line and doing the differentiation of types of products offered to consumers. Many product variations can stimulate sales and improve profitability. Wolff and Pett (2006) found that the development of new products increasing the variety of products is related to the company's profitability growth. Hsueh and Ying (2004) stated that innovation has a positive relationship with the company's profit and sales growth.

Bayus, Erickson, and Jacobson (2003) stated that in 16 U.S. companies in the computer industry from 1974 to 1994, the launch of new products that were the result of product innovation had an effect on company profits reflected in an increase in the company's assets. Hull and Rothenberg (2008) also mentioned

the effect of industrial innovation and differentiation in a positive financial performance. So it can be concluded that the companies often conduct research and development in the hope that the investment made through successful innovation and thus the company will have high financial performance as well. However, it should be emphasized that the profitability in the objectives of the company from product innovation may not necessarily occur in the same year. It is believed new product innovation will influence profitability seen in subsequent years. Rajan and Zingales (1995) showed that the proxy can be used to measure the profitability of companies using total assets and return on assets. Large companies are expected to have easier access to capital markets to obtain additional capital (Titman & Wessel, 1988) and also get a loan with a lower load. Thus, if the companies get a loan with a lower load, it allows companies to expand even more. It is expected to have a positive influence on the profitability of the company. Moreover, the study defined a hypothesis of the relationship between innovation and firm financial performance as follows:

H1: Innovation positively affects the company's profitability.

Beside company profitability, debt ratio is defined as the amount of company debt compared to its assets. The debt ratio is calculated as total debt divided by total assets. Large debt tends to negatively impact the profitability of the company, as the company with a large debt has greater obligations to pay interest and principal debt. The strategy used by companies also affects investment decisions and subsequent investment decisions influence the choice of corporate financing. Product innovation requires funding from the company. Funding may come from internal funds such as retained earnings and external debt and equity issuance. Companies that implement innovation strategies tend to have a capital structure with lower debt levels and get funding through available cash from internal sources (O'Brien, 2003). Public companies in

external finance-dependent industries spend more on better research and development compared to their private company counterparts (Acharya & Xu, 2017). Public companies that rely on internal finance do not have a better profile of innovation than private companies. The effect of public listing on innovation depends on the need for external capital. However, external funding is also difficult to obtain by companies investing in research and development (Miller & Zimmermann, 2009).

The first reason is that the result of investment in research and development tends to be risky. This is due to the high possibility of the company to fail in the research process. Second, the quality of research and development activities undertaken by the company is very difficult to evaluate for success rate. Difficulty ratings are influenced by the need for technical expertise in accordance with the area concerned. Also, the closing of information to outsiders about the company's research and development activities tends to keep private the research procedures performed. Companies often conceal information from the fear that information about the activities of this research can be known to competitors (Markides & Charitou, 2004).

The reason companies have difficulty in obtaining external funding for research and development activities is because a company dominated by specific assets can reduce the possibility of the use of these assets for other purposes in the event of bankruptcy (Badhuri, 2002). In this case, the specific assets cannot be used as collateral eligible to support debt financing for the company (Myers, 2001; Korajczyk & Levy, 2003). Thus, it can be concluded that the research and development activities undertaken by the company is an investment that tends to be financed by capital from internal sources. Another reason to support this claim, namely that the product innovation that is an intangible investment in research and development of products tends to make an impact on the lower level of debt

(Vincente-Lorente, 2001).

There are also other reasons that support how the company's debt levels will affect the amount of investment made for innovation, which is associated with the risks facing the company. A company with a high debt level tends to avoid activities that increase the risk of their company. Moreover, companies with a high level of innovation face some difficulties in getting loans as an alternative to their funding. An investment in the innovation process at a company with low debt levels is a good way of doing risk management (Andersen, 2009). With the availability of additional funds for companies that invest in innovation, the company can improve its financial performance because it can continue to take advantage of opportunities in the market by using the revenue from these innovations. From these explanations, the proposed hypothesis is as follows:

H2: The debt ratio of an innovation driven enterprise has a negative correlation with company innovation activities.

The company sales and growth reflects the success of an innovation driven enterprise. The company's ability to increase sales positively affects the profitability of the company. This is reflected in additional cash inflows that are secured from the sale of the expansion that are expected to increase the company's profitability in the future. In addition to product innovations, other variables used that sales activity. Sales activity is one of the factors that affects the profitability of the company; due to the greater sales achieved by the company, the greater the profitability of the company. This is due to the direct relationship between sales and the company's profit. From the above description, two related hypotheses can be proposed:

H3a: Sales of an innovation driven enterprise has a positive correlation with company innovation activities.

H3b: Sales growth has a positive correlation with company innovation activities.

Available cash could help the company in terms of investing in innovation as follows.

First, to conduct research and development on an ongoing basis, a company must provide funding to ensure success. If the company has a fluctuating cash flow with a high level of volatility, this could threaten the success of the research investment made by the company. As a result, companies must make an extra effort to engage in risk management. Fluctuating cash flows will affect external funding sources and also the amount of money to be invested. Ultimately, cash flow fluctuations will increase the burden of the company. Therefore, companies need to maintain the stability of free cash that can be used for investment (Froot, Scharfstein, & Stein, 1993).

Second, the additional funds in the form of cash flow is critical to market products to consumers. Although the research activities managed to produce a new product variation, if the company does not have the funding to market the product as soon as possible, the company may declare a failure in supporting the success of investment in research. Third, the additional funds are necessary to support the development of the company in the acquisition of knowledge innovation to develop the company. Retained earnings may increase the increase the company's ability for production and innovation so that sales, free cash flow and earnings could be improved. This leads to another hypothesis as follows:

H4: Retained earnings have a positive correlation with company innovation activities.

The life of the company has a negative effect on the company's product innovation: the younger the company, the greater the tendency to innovate. Companies with young people will more often be doing innovation than the ones with the oldest people (Lee, 2004; Gifford, 1992). However, a company with an older age has the ability to innovate more from their accumulation of knowledge that has been done over a longer time (Sorensen & Stuart, 2000). The accumulation of knowledge can help companies to gain competitive advantage both in innovation and knowledge of the consumer when the market is constantly changing. Changes that occur can be more intense competition, frequent introduction of new technologies and shifting consumer preferences. These changes lead to a 50 percent failure of new products to be able to survive in such conditions so a company must have good knowledge of the market and a high degree of innovation (Rindfleisch & Moorman, 2001). Referring to Sorensen and Stuart (2000), this study considered the older the company, the more likely the company is to innovate products because of knowledge accumulation. Thus another hypothesis is as follows:

H5: Age of company has a positive correlation with company innovation activities.

Based on this hypothesis, the research framework can be seen in the diagram below.

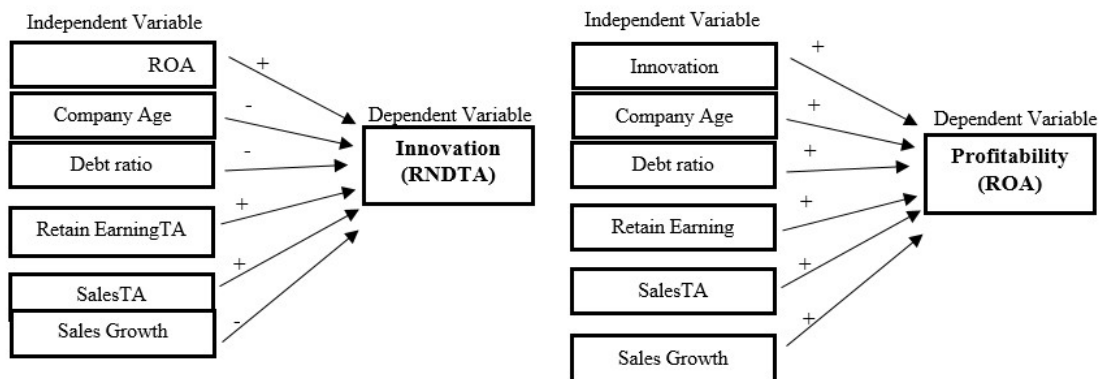


Figure 1. Innovation driven enterprise, sustainable business and firm financial performance research framework.

3. Methodology

This research data was taken from yearly financial statements of the company in the Indonesian Capital Market Directory and Capital IQ from 2009 to 2016. This study used return on assets (ROA) as an independent variable to represent the profitability of innovation-driven companies. Research and development expense, total assets, total sales, debt ratio, firm age, net income and retained earnings were used as dependent variables representing the innovation-driven enterprise financial activities. The innovation-driven enterprise business model covers the creation, selection and development or improvement of products, processes and technologies. By using all companies that had research and development expense as a proxy for business model innovation, the study conducted correlation matrix and data panel regression analysis. The observation period was from 2009 to 2016 to see company development after financial crisis year 2008. Moreover, 52 companies were found who met the study criteria of samples that have R&D expense within 8 years.

This research was conducted using a correlation matrix and a data panel regression model to see relationships and determinants of innovation-driven enterprise profitability over time. Gujarati (2004) explained that a data panel is a composite of data from data time series and cross sections (between individuals or variables). The value of one or more variables was collected from a couple of the same sample in a given time period. So measurement panel data represents (i) during a certain time period (t). There are several advantages in using panel data regression. First, the use of panel data can increase the number of observations. Second, the accumulation of cross-section data and time-series are repeated so the panel data regression can be used to

analyze the dynamics of change. Third, with panel data, one can analyze a more complex model than using linear regression including time lag. In general, using panel data regression models:

$$Y_{it} = \alpha + \beta \cdot X_{it} + u_{it}$$

This study used panel data regression with a fixed effects model (FEM). The assumption of the fixed effects model was that the intercept on the regression model may change for each individual, since it is assumed that the individual characteristics of the cross-section are represented in the intercept. The fixed effects model can be viewed in the following equations:

$$Y_{it} = \alpha + \gamma_2 W_{2t} + \gamma_3 W_{3t} + \dots + \gamma_N W_{Nt} + \delta_2 Z_{i2} + \delta_3 Z_{i3} + \dots + \delta_T Z_{iT} + \beta X_{it} + \epsilon_{it}$$

where W_{it} and Z_{iT} are *dummy variables* defined as:

$W_{it} = 1$; for individual i ; $i = 1, 2, \dots, N$;

$W_{it} = 0$; else or others;

$Z_{it} = 1$; for individual i ; $i = 1, 2, \dots, N$;

$Z_{it} = 0$; else or others.

To examine the effect of innovation-driven enterprise, company age, sales, debt ratio, retain earning and sales growth to return on assets as profitability ratio, the following models were used:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + U_{it}$$

where: $\beta_0 =$ Constants

$Y_{it} =$ Profitability (ROA)

$X_1 =$ Company Age (FirmAge)

$X_2 =$ Innovation (RNDTA, RND expense divided by Total Asset)

$X_3 =$ Sales (SalesTA, Total Sales divided by Total Asset)

$X_4 =$ Debt ratio (DebtRatio, Total Debt divided by Total Asset)

$X_5 =$ Retained Earning (RETA, Retained Earning divided by Total Asset)

$X_6 =$ Sales Growth (SalesGrowth)

$U_{it} =$ error term

4. Findings and Discussion

Descriptive statistics were compiled to

determine a general overview of the data collected in this study. All data that was collected is summarized as below:

Table 2.

Descriptive Statistics: Innovation-Driven Enterprise

	Mean	Median	Minimum	Maximum	Std. Dev.	Skewness	Ex. kurtosis
ROA	8.2407	6.7222	-11.41	37.66	8.5671	1.0235	1.5753
FirmAge	37.654	35	3	160	26.406	2.2573	6.8643
RNDTA	0.002056	0.0001505	0	0.073684	0.0062032	6.2233	52.052
SalesTA	1.0193	0.89688	3.23E-06	8.4293	0.85364	3.4091	20.405
RETA	0.18509	0.26086	-2.5876	0.79364	0.47894	-2.7556	10.899
DebtRatio	0.47281	0.41511	0.069175	2.6606	0.36117	3.4533	16.71
SalesGrowth	0.18914	0.11958	-0.99989	14.316	1.0139	13.048	179.13

From Table 2, it can be seen that all the variables have a mean greater than the median. This indicates that most of the variables has a positive skewness, which means the tail to the right (right tail) is longer so that the data distribution is more concentrated or leaning to the left. The average age of companies that conduct research and development activities was more than 37 years. This shows that innovation-driven enterprises were dominated by older companies. This means companies that conduct research and development activities are those that has a long-standing or are in the adult stage (mature). The average value of research and development expense per total assets was 0.002 from its total assets, less than the

median value, which indicates that there are still few innovation-driven enterprises in Indonesia conducting research and development as major activities. The average value of debt ratio is greater than the median, indicating the debt ratio data has a negative skewness, which means the data is skewed to the right. This indicates most of the companies in the sample have debt values greater than 40%. In addition, the average value of ROA for companies in the sample amounted to 8.24%. The variable total sales per total assets and sales growth has an average value greater than the median, which shows the innovation-driven enterprise has companies with firms that have a bigger sales growth.

Table 3.

Correlation Matrix between Variables: Innovation Driven Enterprise

Variable	ROA	RNDTA	SalesTA	RETA	DebtRatio	SalesGrowth	LnFirmAge
ROA	1.000	-	-	-	-	-	-
RNDTA	0.192	1.000	-	-	-	-	-
SalesTA	0.243	0.104	1	-	-	-	-
RETA	0.553	0.098	0.092	1.000	-	-	-
DebtRatio	-0.304	-0.062	-0.007	-0.688	1.000	-	-
SalesGrowth	-0.133	-0.021	0.018	-0.372	-0.036	1.000	-
LnFirmAge	0.278	-0.001	0.243	0.230	-0.066	-0.153	1

Table 3 shows the positive correlations between R & D and ROA ($r = 0.192$), sales

($r = 0.104$) and retained earnings ($r = 0.098$). Debt ratio, sales growth and firm

age are negatively correlated with RND, but the correlation value is relatively small under 0.09. The age of the company shows a small correlation value below 0.02 so one can conclude that the age of the company is low correlated with the innovation-

driven enterprise (although the average company that innovates is over 37 years old). The largest variable that has a positive correlation with ROA is retained earnings ($r = 0.553$).

Table 4.
Dependent Variable ROA as Innovation Driven Enterprise Profitability

Variable	Coefficient	Std. Error	t-ratio	p-value	
const	-2.65479	2.01457	-1.318	0.1884	
LnFirmAge	1.19161	0.594192	2.005	0.0457	**
RNDTA	217.782	58.824	3.702	0.0002	***
SalesTA	1.45781	0.449258	3.245	0.0013	***
DebtRatio	4.8511	1.55319	3.123	0.0019	***
RETA	12.6511	1.2441	10.17	<0.0001	***
SalesGrowth	1.36383	0.414351	3.291	0.0011	***
Sum squared resid	16439.97		S.E. of regression	6.776556	
LSDV R-squared	0.460259		Within R-squared	0.405876	
LSDV F(57, 358)	5.355816		P-value(F)	9.51E-24	
Akaike criterion	2826.1		Durbin-Watson	2.069035	

The results in Table 4 showed coefficient of company age had a positive sign (1.19161) and p-value less than 0.05, which means company age has a significant positive correlation with firm profitability. From the results, one can see that the older companies have greater profitability that can support product innovation activities. These results are consistent with the hypothesis (H5) that older companies would allocate budgets to product innovation. These results also support previous research by Sorensen and Stuart (2000). The older companies also have developed with a longer period of innovation and have accumulated knowledge. This gives a positive boost to the companies to continue to do research and development by utilizing the accumulated knowledge that they have owned.

The decisions taken by the companies are also certainly influenced by their life cycles; namely, the development of the companies from an early stage, up to the stage of maturity, and the last stage is decreased. In addition, the funding factor must also

support a company that has matured to continue investing in research. Older companies with a good reputation may find it easier to get funding, either by issuing equity or debt securities. Young companies need time to build a good reputation in the eyes of investors, making it easier for them to raise funds as well as companies that had already been long in the industry.

The coefficient for the company's debt ratio shows a positive sign (4.8511) that means it will have the higher firm profitability. Positive numbers indicate that the greater the company's debt to fund innovation, the more increasing return on assets. However, the correlation matrix (see Table 2) shows a negative correlation between debt and RND indicating that most of the company's debt is not used for R & D activities. This suggests that the funding for product innovation activities undertaken by the company does not come from debt. The result is in line with the second hypothesis (H2) which states that the innovation driven enterprise debt ratio is negatively related to company innovation activities and consistent with research by

Andersen (2009). The results indicate that the product innovation activities are not financed by corporate debt rather than the company's equity. The company's equity consists of retained earnings and stock. According to data obtained from the financial statements of 52 companies studied, the growth of the new shares was not significantly circulated by the company so that most of the funding for research and development activities of the company derived from the company's retained earnings.

The result shows that retained earnings (RETA) had a significant positive correlation with firm profitability. The correlation matrix (Table 2) shows a positive correlation between RND and retained earnings, which indicates that most of R & D funding activities came from firm retained earnings and not debt. Use of funds from internal sources to fund product innovation driven by the need for funds must always be available for research and development, also known as the financial slack. This funding requirement cannot be supported by the use of debt or the stock because it takes a long time to get funds from debt or issuing new shares. These results indicate the second hypothesis (H2) that retained earnings have a positive correlation with company innovation activities significantly (p-value = <0.0001).

The coefficient sign value for research and development expenses to total assets ratio variable (RNDTA) shows that innovation has a positive correlation (coefficient=217.782) with firm profitability. This indicates that research and development activities conducted by the innovation-driven enterprises have a positive impact on the profitability of the company. The positive relationship is generated by the development of new products by the company, which would generate additional income for the company. This result shows that the first

hypothesis (H1) that is research and development has a positive effect on the company's profitability significantly (p-value = 0.0002). The results are similar to previous studies such as Hull and Rothenberg (2008), Hsueh and Ying (2004) and Bayus, Erickson, and Jacobson (2003). Product innovation can be a positive influence on the profitability of the company for innovation activities of the company can increase the number of sales through new products that can satisfy consumers. The company's ability to produce products that satisfy consumers is called a competitive advantage; it can be concluded that the product innovation activities undertaken by the company can produce a competitive advantage, which in turn affects the increase in sales for the company.

The total sales per total assets is a proxy for innovation-driven enterprise sales activities. The coefficient sign of total sales per total assets show a significant positive correlation (1.45781). These results indicate that the hypothesis H3a and H3b are sales (p-value = 0.0013) and sales growth (p-value = 0.0011) has a positive effect on the company's innovation activities significantly. Bigger sales had a positive effect on the profitability of companies in the study described as the company's return on assets. This shows that companies that have a large sales activity will have greater levels of firm profitability. With the increase in sales, the profitability of the innovation-driven enterprise will be increasing. There is a direct relationship between sales and firm profitability. The results are supported by Asimakopoulos, Samitas, and Papadogonas (2009) that show sales activity has a significant impact on the profitability of the company. The greater the sales activities undertaken by the company indicates greater production capacity undertaken by the company. A large quantity of sales activity indicates that the product sold by the company is well suited

to meet the needs of consumers. But if the company does not respond to the needs of consumers with innovative products, both on a radical and incremental ongoing basis, then the company's market share may be captured by a competitor who managed to produce goods in accordance with the needs and desires of consumers. This in turn resulted in a decrease in sales activity and a decrease in the profitability of the company. For the overall data panel regression model, F test results show a p-value ($9.51E-24$) less than 0.01 and r-square more than 40%. The Durbin Watson value of 2.069 indicates the model did not have an autocorrelation problem. The correlation matrix shows each independent variable correlation is less than 0.75, indicating that all independent variables are free from a multi-collinearity problem. One can conclude this model can be BLUE (Best Linier Unbiased Estimator). It can also be concluded that the innovation-driven enterprise and sales activities have positive correlations and significantly affect the company's profitability and financial performance.

R&D expense had a positive correlation with company ROA, sales and retained earnings. However, the company age, debt ratio and sales growth had a weak negative correlation with the company research and development expense. Innovation-driven enterprises use less funding from debt. The empirical results indicated that companies that conduct research and development activities tend to use retained earnings as the source of innovation funding. The negative influence of age and innovation-driven enterprise is contradictive from other research findings such as Lee (2004) and Sorensen and Stuart (2000). Debt ratio had a negative correlation with research and development activities, also in line with Miller and Zimmermann (2009), Korajczyk and Levy (2003), O'Brien (2003), Bhaduri (2002), Vincente-Lorente (2001), and Titman and Wessels (1988) research findings. Sales together with research and

development activities also had a positive correlation that affected the company's profitability significantly and positively. This study showed that innovation-driven enterprise activities undertaken by the company can positively affect the profitability of the company. The results support Teece (1986), Hsueh and Ying (2004) and Hull & Rothenberg (2008) research findings.

5. Conclusions

Innovation-based companies face uncertainty in the commercialization of a new invention. This situation can be seen from the risk of failure of market penetration and competition. The results of research on innovation activities in Indonesia showed a positive relationship between the ability for innovation with the company's financial performance, especially corporate profitability (ROA). The average age of companies that issued R & D budgets was 34 years. These innovation-based companies indicate the existence of sustainability for companies that innovate their products or business models.

The funding source of the companies innovation activities came from cash from sales and retained earnings, while corporate debt was negatively correlated with R & D budget. This suggests that innovation-driven companies in Indonesia finance their innovation with retained earnings (internal financing) instead of debt (external financing). So, retained earnings become the main determinant profitability of innovation-based companies. The managerial implication is that managers must always manage the retained earnings of the company to continue to innovate or conduct sustainable innovation. The limitations of infrastructure are not a barrier to innovation but the selection of innovation funding sources can become an obstacle for sustainable innovation. In

developing countries like Indonesia, retained earnings are the best source of financing to increase the profitability of innovation-based companies.

References

- Andersen T. (2009). Effective Risk Management Outcomes: Exploring Effects of Innovation and Capital Structure. *Journal of Strategy and Management* 2(4), 352-379.
- Afuah, A. & Tucci, C.L. (2001). *Internet business models and strategies: Text and cases 1st Ed*". New York: Mcgraw-Hill Higher Education.
- Allee, V. (2011). *Value Networks and the true nature of collaboration*" Online Edi., *ValueNet Works and Verna Allee Associates*. available at: <http://www.valuenetworksandcollaboration.com/> (accessed 25 March 2015).
- Acharya, V. & Xu, Z. (2017) Financial Dependence and Innovation: The Case of Public versus Private Firms. *Journal of Financial Economics*, 124, 223-243
- Asimakopoulou, I., Samitas, A., & Papadogonas, T. (2009). Firm - specific and economy wide determinants of firm profitability: Greek evidence using panel data", *Managerial Finance*, 35(11), 930-939, Doi: 10.1108/03074350910993818
- Bayus, B.L, Erickson, G., Jacobson, R., (2003). The Financial Rewards of New Product Introductions in the Personal Computer Industry. *Management Science*, 49(2), 197-210.
- Bhaduri, S. N. (2002). Determinants of Corporate Borrowing: Some Evidence from the Indian Corporate Structure. *Journal of Economics and Finance* 26 (2), 200-215.
- Boons, F.A.A., (2009). Creating Ecological Value. In: *An Evolutionary Approach to Business Strategies and the Natural Environment*. Elgar, Cheltenham.
- Boons, F. & Lüdeke-Freund, F. (2013): Business models for sustainable innovation: State-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 45, 9-19.
- Bowman, C. & Ambrosini, V. (2000). Value creation versus value capture: towards a coherent definition of value in strategy. *British Journal of Management*, 11, 1-15.
- Chesbrough, H. (2010), Business model innovation: opportunities and barriers. *Long Range Planning*, 43(2/3) Sp. Iss. SI, 354–363.
- Clinton, L., & Whisnant, R. (2014). *Model Behavior: 20 Business Model Innovations for Sustainability*. Sustain Ability, February 2014.
- Donaldson, T., & Preston, L. (1995). The Stakeholder Theory of the Corporation: Concepts, evidence and Implications. *Academy of Management Review*, 20(1), 65-91.
- Echevarria, D. P. (1997). Capital Investment and the Profitability of Fortune 500 Industrials: 1971-1990. *Studies in Economics and Finance*, 18(1), 3-35.
- Ernst, D. (2002a). Global Production Networks and the Changing Geography of Innovation Systems. Implications for Developing Countries. *Economics of Innovation and New Technologies*, XI (6), 497–523.
- Froot K., Scharfstein, D., & Stein, J. (1993). Risk Management: Coordinating Corporate Investment and Financing Policies. *The Journal of Finance* ,48(5),1629-1658.
- Geels, F., Elzen, B., & Green, K. (2004). *General Introduction: System innovation and Transitions to sustainability*.
- Gujarati D. (2004). *Basic Econometrics*, McGraw-Hill, New York, 2004.
- Hansen, E.G., Große-Dunker, F., Reichwald, R., (2009). Sustainability innovation Cube: a framework to evaluate sustainability-oriented innovations. *International Journal of Innovation Management* 13, 683-713.
- Hockerts, K. & Wüstenhagen, R. (2010).

- Greening Goliaths versus emerging Davids – Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of Business Venturing*, 25(5), 481–492.
- Hull, C. L., & Rothenberg, S.(2008). Firm Performance: The Interactions of Corporate Social Performance with Innovation and Industry Differentiation. *Strategic Management Journal*, 29, 781-789.
- Hsueh, L., & Ying, Y.T. (2004). Innovation and the Operational Performance of Newly Established Small and Medium Enterprises in Taiwan. *Small Business Economics*, 23(2), 99-113.
- Korajczyk, R.A., & Levy, A. (2003). Capital Structure Choices: Macroeconomic Conditions and Financial Constraints. *Journal of Financial Economics* 68, 75-109.
- Liu, T., & Chen, Y. (2010). Research and Development Investment Strategy and Market Performance. *Social Behavior and Personality*, 38(2), 227-236.
- Lüdeke-Freund, F. (2013). *Business Models for Sustainability Innovation – Conceptual Foundations and the Case of Solar Energy*. [PhD Thesis]. Lüneburg: Leuphana University.
- Lee, C. (2004). The Determinants of Innovation in the Malaysian Manufacturing Sector: An Econometric Analysis at the Firm Level. *ASEAN Economic Bulletin* 21(3), 319-329.
- Lele, M. (2003). Monopoly Thinking Can Make Your R&D More Effective. *Research Technology Management*, 46(5), 34-42.
- Mansfield, E. (1998). The Speed and Cost of Industrial Innovation in Japan and The United States: External vs. Internal Technology. *Management Science* 34(10), 1157-1168.
- Markides, C.C., Charitou, C.D., (2004). Competing with dual business models: a contingency approach. *Academy of Management Executive* 18, 22-36.
- Miller E., & Zimmermann,V. (2009). The importance of equity finance for R&D activity. *Small Business Economics* 33(3), 303-318.
- Myers S.C. (2001). Capital Structure. *Journal of Economic Perspectives*, 15(2), 81-102
- O'Brien, J. (2003). The Capital Structure Implications of Pursuing a Strategy of Innovation. *Strategic Management Journal*, 24(5), 415-431.
- Osterwalder, A. (2004): *The business model ontology: A proposition in a design science approach*. [PhD Thesis]. Lausanne: Universite de Lausanne.
- Osterwalder, A. & Pigneur, Y. (2010): *Business model generation. A handbook for visionaries, game changers, and challengers*. Hoboken, NJ: Wiley.
- Pellegrino, G., & Savona, M., (2017). No money, no honey? Financial versus knowledge and demand Constraints on innovation. *Research Policy*, 46, 510–521.
- Peterovic, O., Kittl, C., Teksten, R.D. (2001). Developing Business Models for eBusiness, *International Conference on Electronic Commerce 2001*, Vienna, October 31. – November 4.
- Phaal, R., Farrukh, C. J. P., & Probert, D. R. (2004). Technology roadmapping: a planning framework for evolution and revolution. *Technological Forecasting and Social Change*, 71(1-2), 5-26. Doi.:10.1016/S0040-1625(03)00072-6.
- Porter, M.E., & Kramer, M.R. (2011). Creating Shared Value. *Harvard Business Review*, 89(1/2), 62–77.
- Rajan & Zingales. (1995). What do We Know About Capital Structure? Some Evidence from International Data. *Journals of Finance* 50(5), 1421-1460.
- Roberts P. (1999). Product Innovation, Product-Market Competition and Persistent Profitability in The U.S. Pharmaceutical Industry. *Strategic Management Journal*, 20, 655–670.
- Shankar, R., Sourish A., & Baveja, A. (2009). Soft-system Knowledge

- Management Framework for New Product Development. *Journal of Knowledge Management* 13(1), 135-153.
- Stamm, B. Von. (2003a). Innovation = Creativity and Commercialization. In *Managing Innovation, Design and Creativity*. Chichester: Wiley, pp. 19-38.
- Short, S.W., Bocken, N.M.P., Rana, P., & Evans, S. (2012). *Business Model Innovation for Embedding Sustainability: A Practice-Based Approach Introducing Business Model Archetypes*, in proceedings of the 10th Global Conference on Sustainable Manufacturing (GCSM): Towards Implementing Sustainable Manufacturing, 31st October - 2nd November, Istanbul, Turkey.
- Schaltegger, C.A. (2002). Budgetregeln und ihre Wirkung auf die öffentlichen Haushalte: Empirische Ergebnisse aus den US-Bundesstaaten und den Schweizer Kantonen, *Schmollers Jahrbuch* 122, 369-413.
- Schaltegger, S., & Wagner, M., (2008). *Types of sustainable entrepreneurship and the conditions for sustainability innovation*. In: Wüstenhagen, R., Hamschmidt, J., Perspectives in Research on Corporate Sustainability. Edward Elgar, Cheltenham, pp. 27-48.
- Sharma, S., & Starik, M. (2008). *Sustainable Innovation and Entrepreneurship*. (Eds.). New. Edward Elgar Publishing Limited. ISBN: 978 1 84720 037 2
- Schaltegger, S. & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions, *Business Strategy and the Environment*, 20(4), 222–237.
- Seoa, H., Chungb, Y., & Yoonc, H. (2017). R&D cooperation and unintended innovation performance: Role of appropriability regimes and sectoral characteristics. *Technovation*, 59, (forthcoming).
- Sorensen, J. B., & Stuart, T.E. (2000). Aging, Obsolence, and Organizational Innovation. *Administrative Science Quarterly*, 45(1), 81-112.
- Teece (1986). Profiting from innovation. *Research Policy*, 15(6), 285-305.
- Teece (2010). Capturing value from knowledge assets: the new economy, markets for know-how, and intangible assets. *Essays on Technology Management and Policy*, 47-75
- Titman, S., & Wessels, R. (1998). The Determinants of Capital Structure Choice. *The Journal of Finance*, 43(1), 1-19.
- Tukker, A.; Emmert, S.; Charter, M.; Vezzoli, C.; Sto, E.; Andersen, M.; Geerken, T.; Tischner, U. & Lahlou, S. (2008). Fostering change to sustainable consumption and production: An evidence Based view, *Journal of Cleaner Production*, 16(11), 1218–1225.
- Turban, E., D. King, J. Lee, M. Warkentin, & H.M. Chung. (2002). *Electronic Commerce: A Managerial Perspective*. New York: Prentice Hall, 2002.
- Vincente-Lorente, J. D. (2001). Specificity and Opacity as Resources-Based Determinans of Capital Structure: Evidence for Spanish Manufacturing Firms. *Strategic Management Journal*, 22 (2).
- Wüstenhagen, R., & Boehnke, J., (2008). Business models for sustainable energy. In: Tukker, A., Charter, M., Vezzoli, C., Stø, E., Andersen, M.M. (Eds.), *Perspectives on Radical Changes to Sustainable Consumption and Production* 1. System Innovation for Sustainability. Greenleaf, Sheffield, pp. 70-79.
- Wolff, J.A., & Pett, T.L. (2006). Small-Firm Performance: Modeling the Role of Product and Process Improvements. *Journal of Small Business Management* 44(2), 268-284.
- Zott, C., & Amit, R. (2010). Designing your future business model: An activity system perspective. *Long Range Planning*, 43, 216–226.