

Effect of Green Financing and Financing Constraints on Green Technology Innovation in the Consumer Goods Industry in Indonesia

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Abstract: Green technology innovation is a major problem for companies to maintain their competitiveness and excellence, but in Indonesia alone there has not been much research on green technology innovation, especially in the consumer goods industry. Therefore, this study was conducted to determine whether green finance and corporate financing constraints really have a significant effect on green technology innovation in the industry. The independent variables in this study are green finance and internal and external financing constraints. While the dependent variable is green technology innovation. There are five control variables in this study, namely company size, return on asset (ROA), leverage, tobin's Q ratio, and company age. This study collects data from 25 companies in the consumer goods industry listed on the Indonesia Stock Exchange for a period of 4 years (2018-2021) and uses a regression research model for testing. The findings of this study indicate that green finance as measured by the ratio of debt to capital does not have an effect on green technology innovation which is assessed from the cost of corporate social responsibility. The results of this study can be used to present a successful model for the consumer goods industry in Indonesia to know that green financing can be a reference for companies to innovate green technology.

Keywords: consumer goods industry; green financing; green technology innovation; financing constraints; regression effect model

1. Introduction

Green technology innovation is one of the driving factors for companies to become stronger and more sustainable for a better future. This is a challenge for companies to create technological breakthroughs that are able to answer economic and environmental problems. Green technology innovation is not only a medicine for energy saving and emission reduction, but also an important support for improving environmental ecology and promoting high-quality development (Lu et al., 2022). This is done to improve the depleted energy resources and to limit the spread of the waste from getting further.

Indonesia is now facing an ecological tipping point, there is a need to meet this demand while preserving their environment. Green technology innovations are also formed by companies to become agents of socio-economic prosperity while minimizing the negative impact on the environment. To overcome the situation of unfavorable economic growth at the expense of the environment, the Green Economic Forum 2022: Toward Sustainable & Green Indonesia took the initiative to thoroughly explore the development of the green economy in Indonesia, both from the planning, regulation and realization in the field, including implementation in the business sector. However, green technology innovation has a technological and environmental "dual externality". This strong externality causes a decrease in the efficiency of social resource allocation, which must be avoided through environmental regulatory policies (Cai et al., 2020).

In contrast to conventional technological innovations, green technology innovations face greater risks, more uncertain short-term returns, and require higher capital investments in R&D. When financing is limited, companies have no choice but to seek external financing. These activities are growing more critical in both developing and established economies. It promotes sustainable consumption and guides public and private green finance and procurement (Hao et al., 2021). In addition, the impact of the Green Credit Guidelines on corporate innovation is mainly achieved through debt financing (Liu et al., 2019). However, there are green finance reform

innovation (GFRI) financing instruments that cover all major financial instruments such as green bonds, green equity indexes and related products, green development funds, green insurance, and carbon finance, in addition to green credit. Therefore, as a comprehensive green finance policy, the influence and channels of GFRI on corporate green innovation need to be explored more deeply.

It has been found that the adoption of Green Credit Guidelines can effectively promote environmental innovation by firms and significantly increase the innovation efficiency of highly polluting firms (Wen et al., 2021) but the promotion effect on innovation intensity of highly polluted firms is relatively weak (Hong et al., 2021). As a result, companies may face financing constraints due to difficulties in accessing external finance but also due to insufficiency or non-availability of internal funds. The use of internal funding sources is influenced by their availability and by moral hazard issues and tax considerations. Moral hazard refers to the difficulty in separating management and ownership interests, and when the manager's investment strategy does not tie in with the owner's goal of maximizing firm value (Santos & Cincera, 2022).

One of industry that often innovates is the consumer goods industry. The consumer goods industry remains one of the industries that is growing rapidly even in the midst of the COVID-19 pandemic. However, there are still many problems and phenomena faced by this industry and become financial difficulties. Companies must make new discoveries to be able to compete and carry out social responsibility in order to protect the environment. This causes many companies in the consumer goods industry to experience financial constraints, such as a lack of funds to carry out their responsibilities in waste management, waste reduction, and safeguarding water and energy resources. Therefore this study aims to analyze the effect of green financing, internal and external financing constraints, and control variables (size, age, tobin's Q, leverage, and ROA) on green technology innovation.

2. Theoretical review and hypothesis development

2.1 Green technology innovation

Green technology innovation is one of the company's updates to prevent natural damage caused by the production process, so the company must make updates to reduce these losses. According to Dai & Xue, (2022), green innovation will have a significant positive impact on corporate value, which is especially reflected in the aspect of optimizing the organizational production structure, and bringing new technologies and new environmentally friendly products to society and companies. Green technology innovation can be useful for producing more differentiated products and increasing a company's competitive advantage. With this innovation, the company's value will be affected by the company's future profitability and sustainable development capabilities.

2.2 Green financing

Green financing is considered as an important instrument to promote green economy transformation by providing financial support to green companies. According to Wen et al., (2021), green financing can be measured from green credit which consists of a series of policies, institutions and practices to promote pollution reduction and increase energy efficiency through credit interventions. In particular, green credit policies influence corporate environmental behavior by means of loan products, loan maturity, loan interest rates, and credit quotas. Then green finance reform innovation (GFRI) can significantly promote green innovation in non-SOE companies, while for the SOE group it is not significant (Lu et al., 2022).

2.3 Internal and external financing constraints

In internal financing, the company uses funds that are entirely sourced from the company itself or from activities related to the realization of these goals. Thus, internal funds can be generated by returning profits into further investments, selling some of the company's assets, or aggressively pushing the realization of more capital. The findings show that firms facing lower internal constraints have a higher sensitivity to investment cash flows, and firms facing higher external constraints have a higher sensitivity. Investment dependence on cash flows is weaker for state-controlled companies, especially large ones, than for other companies (Azam & Syah, 2011).

External financing is especially helpful for companies, as it is often difficult for them to obtain the investment necessary to run their business. There are limited assets that can be invested in the company's operations. An important source of external financing for companies operating outside of financial markets are commitments to suppliers, employees, treasury, etc., arising from the company's operations (Harel et al., 2020). But there are always obstacles experienced when using financing from outside the company. These short-term operating liabilities are the result of companies delaying payments for supplies and services, wages, taxes, and insurance. Companies are more likely to delay payments, for example, for products, materials, or services provided. They have to finance their own debts.

2.5 Enterprise size, enterprise age, tobin's q, leverage and return on asset (ROA)

Green technology innovation is not only influenced by green financing and internal and external financing constraints, but there are also several control variables that refer to research by Lu et al., (2022), namely enterprise size, enterprise age, tobin's q, leverage, and return on assets (ROA). In his research, it was found that the control variable had an effect on green financing for green technology innovation.

2.6 Conceptual framework

The effect of green financing on green technology innovation has provided many related descriptions from the results of previous studies. Like the research conducted by Na Lu, Jiahui Wu, and Ziming Liu (2022) where they used a sample of 3236 companies registered with A-share in China in 2011 – 2018. Research data was obtained from the CSMAR database and the IncoPat database. This study analyzes whether green reform finance innovation (GRFI) has an influence on green technology innovation. The results show that A-share companies in China show that GRFI has a positive and significant effect on the company's green technology innovation regardless of whether the control variable is included in the model, indicating that GRFI has an increasing effect of green technology in pilot provinces compared to non-pilot provinces after policy implementation. It then shows that state-owned companies in China have green technology innovation effects from GRFI mainly influenced by green invention patents. There are two possible reasons for this. On the one hand, state-owned enterprises, as micro-market carriers for building socialism with Chinese characteristics, bear more responsibility in the process of building ecological civilization, and the state has relatively higher requirements for their green innovations.

These studies have obtained mixed results. Some authors get the result that green financing has direct and indirect effects because green finance provides important financial support for technological innovation and reform of local companies. For environmental protection companies with abundant funds, green finance can increase capital allocation (Fang & Shao, 2022). However, research by Cao et al., (2021) states that green financial support is relatively limited. Polluting companies need to pay high pollution disposal costs under “market incentive” environmental regulations; their working capital is occupied in large amount. In response to national policies, green finance is increasingly reducing investment in polluting companies and exacerbating working capital tensions from polluting companies, thereby hindering green technology innovation. Therefore, the conceptual framework in this study can be described as follows:

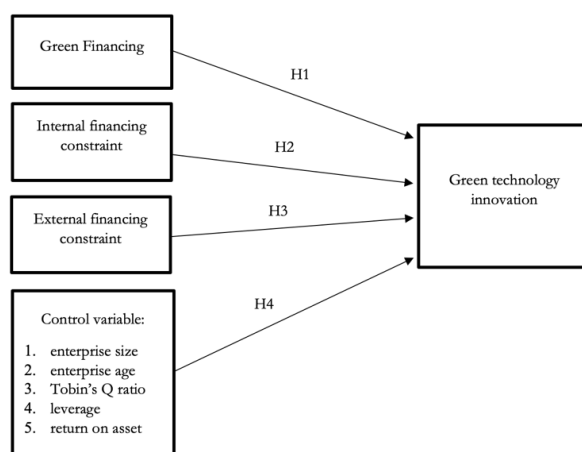


Figure 1: Conceptual framework

As a starting point for sustainable business, green financing aims to provide market-oriented capital guarantees for green technologies, green projects, and green industries through capital allocation. In recent years, green financing has received extensive attention from academics, the scope of research mainly focusing on the economic benefits of green industries and green projects (Fang & Shao, 2022). Green finance reduces the financing pressure of environmental protection companies by increasing the loan amount and reducing the loan interest rate, increasing the willingness of environmental protection companies to carry out green innovation activities and effectively accelerating the sustainable development of the green industry (Yu et al., 2021). Lu et al. (2022) also stated that Green Reform Finance Innovation (GFRI) would optimize the city's green financial system, form a good green financial environment, reduce information asymmetry, reduce transaction costs, increase the efficiency of financial institutions investing in green companies. or green projects. Based on this research, the following hypotheses were generated:

H1: There is an effect between green financing on green technology innovation.

Internal and external financing can help finance green technology innovations. On the other hand, when viewed from its characteristics, in addition to general investment projects, technology innovation projects have the characteristics of high failure rates, high risks, large capital investments and long durations, often encountering more serious information, so that financing constraints have become “roadblocks” of enterprise innovation (Hong et al., 2021). But given the risky nature of technological innovation and the scarcity of external financing, companies often prefer to finance their innovation activities using internal funds (cash flow, cash holdings and equity issuance), which have the advantages of lower costs, fewer constraints and lower risk. Aiello et al., (2020). Then in Lu et al.'s research, (2022) states that there is an influence of financing constraints that play a partial mediating effect in the influence of GFRI on corporate green technology innovation. So that the GFRI policy can promote corporate green technology innovation by reducing the company's internal financing constraints in pilot areas. Based on this research, the following hypotheses were generated:

H2: There is an effect between internal financing constraints on green technology innovation.

According to Lu et al., (2022) the higher the interest expense of a company, the more external funding it can access and the lower the external financing constraints. However, for companies in the decline stage, although green innovation cannot increase the company's sustainable development capabilities, it can increase the company's value through reducing external financing such as corporate debt (Dai & Xue, 2022). When companies find it expensive to raise external funds, it turns out that financially constrained monopolists that optimally produce higher amounts and rely more on external costs because financing increases or because their internal funds decrease (Kumar et al., 2016). Based on this research, the following hypotheses were generated:

H3: There is an effect between external financing constraints on green technology innovation.

Research from Xie et al., (2019), found a positive impact of company size on performance, because larger companies may be in a position to benefit from economies of scale, which will lower large-scale production costs. Then green innovation can create a competitive advantage for the company, enhance the company's sustainable development capabilities and reduce the company's financing constraints, which may significantly increase the company's value as measured by Tobin's Q (Dai & Xue, 2022). In research (Lu et al., (2022) it is also stated that the better a company's performance (measured by return on assets), the more funds available for R&D and innovation, and the more conducive it is to green innovation. Based on this research, a hypothesis was generated as follows:

H4: There is an effect of control variables (size, age, tobinQ, leverage, and ROA) on green technology innovation.

3. Methodology

The method used in sampling is purposive sampling method (purposive sampling). The use of this sample method has a purpose or is done intentionally, how to use this sample among the population so that the sample can

represent the characteristics of the population that have been known before. The use of this method is always based on knowledge of certain characteristics that have been obtained from the previous population. The sample of this study includes 25 companies in Indonesia which are listed on the Indonesia Stock Exchange. The data used as research is from 2018 – 2021.

The criteria for taking samples in this study are as follows:

- a) Is a company in the consumer goods industry
- b) Availability of annual reports in all companies.
- c) The companies are listed on the Indonesia Stock Exchange during the test period

In this study, data was collected using research methods with the aim of obtaining secondary data, namely

by conducting research on the official website of the Indonesia Stock Exchange (<https://www.idx.co.id>) and Yahoo Finance (<https://finance.yahoo.com/>).

Table 1: sampling criteria

Description	Total
Consumer goods industry company listed on the Indonesia Stock Exchange for the period 2018 - 2021	52
Companies with incomplete financial statements	(17)
Companies that have no share price from 2018 - 2021	(3)
Companies that do not complete the cost of corporate social responsibility	(7)
The number of companies used as samples	25

3.1 Measurement

Variables in this study include dependent variables, independent variables, and control variables. The dependent variable is green technology innovation. The independent variables are green financing, internal and external financial constraints. While the control variables include size, age, tobin's q ratio, leverage, and return on assets (ROA). The following are measurements for the variables to be studied:

Table 2: identification of measurement variables

Variables	Measurement	Reference
Green technology innovation	Logarithm of corporate social responsibility costs	Widi et al. (2021)
Green financing	Total debt/total equity	Nuerta et al. (2020)
Internal financing constraint	(current assets - current liabilities)/total assets	Lu et al. (2022)
External financing constraint	Interest expense/total assets	Lu et al. (2022)
Enterprise Size	Logarithm of total assets	Lu et al. (2022)
Enterprise Age	Statistical year – year formed + 1	Lu et al. (2022)
Tobin's Q Ratio	(Market value - total debt)/total assets	Ramdhania et al. (2020)
Leverage	Total debt/total assets	Lu et al. (2022)
Return on Assets	Net profit/total assets	Lu et al. (2022)

3.2 Research regression model

Based on the measurements above, a panel data regression model is used to assess whether the independent variables and control variables affect the dependent variable. The model is written as follows:

$$GI = -5.785218 + 0.237232GF + 0.436885IFC - 0.058659EFC + 1.244336LNSIZE - 0.000847AGE - 0.009162TOBINQ - 1.686033LEV + 0.739535ROA$$

Information:

GI	= enterprise green technology innovation
GF	= green financing
IFC	= internal financing constraints
EFC	= external financing constraints
Lnsiz	= enterprise size
Age	= enterprise age
TobinQ	= tobin's q ratio
Lev	= leverage
ROA	= return on assets
σ	= constant
β (GF)	= coefficient of green financing
β (IFC)	= internal financing constraint coefficient
β (EFC)	= coefficient of external financing constraints
β (Lnsiz)	= enterprise size coefficient
β (Age)	= enterprise age coefficient
β (TobinQ)	= tobin's q ratio coefficient
β (Lev)	= leverage coefficient
β (ROA)	= coefficient of return on assets
ε	= errors

4. Result and discussion

In this study, the Hausman test was carried out to determine what the most appropriate model to use is. Based on the statistical tests that have been carried out, the results of the Hausman test show that the probability value of the cross-section statistic is $0.6229 > 0.05$, where the decision that can be obtained is that H_0 is accepted so that the model used is the random effect model. To further ascertain whether the model used is correct or not, a Langrange multiplier test is carried out which is useful for making two choices between the common effect or random effect model. From this test, the results show that the probability value of the cross-section statistic is $0.6229 > 0.05$, so the decision that can be obtained is that H_0 is accepted so that the right model to use is the random effect model.

After using the random effect model, an F test was carried out which aims to test whether the regression model is feasible or not. The criteria for making a decision on the F test are as follows:

- a. If the probability F-statistic < 0.05 , H_0 is rejected
- b. If the probability F-statistic > 0.05 , H_0 is accepted

Based on the results of the F test, the results of the F-statistics were 7.970119 and the probability of the F-statistics was $0.000000 < 0.05$, so that H_0 was rejected, which means that the results of the analysis in this study indicate that together the independent variables, namely green financing, internal financial constraints and constraints External financial and control variables, namely enterprise size, enterprise age, tobin's ratio, leverage and return on assets (ROA) have an influence on green technology innovation, so that the regression model is appropriate to use in this study.

After carrying out the F test, then goodness fit (r square) test was carried out which aims to find out how much influence the independent and control variables have in explaining the dependent variable, if the value is close to 1, it means that the independent variable is able to explain the dependent variable. From the goodness fit (r square) test, the adjusted r-square value was 0.360304. This means that the independent variables, namely green financing, internal financial constraints and external financial constraints as well as control variables, namely enterprise size, enterprise age, tobin'q ratio, leverage and return on assets (ROA) are able to explain variations in green technology innovation of 36.0304% and the remaining 63.9696% explains that green technology innovation

can be influenced by other factors that are not contained in this model. So that there is a weak relationship between green financing, internal financial constraints and external financial constraints as well as control variables, namely enterprise size, enterprise age, tobin'q ratio, leverage and return on assets on green technology innovation.

4.1 Descriptive statistical analysis

Based on the results of the descriptive statistical analysis of the tests that have been carried out, the following results are obtained:

The dependent variable, namely green technology innovation, has an average value of 9.658855, a median of 9.615423, and a standard deviation of 1.112006. The maximum value is 13.84073 which is owned by H.M. Sampoerna Tbk in 2019 and a minimum value of 7.212188 owned by Kino Indonesia Tbk in 2020. For the independent variable, namely green financing, it has an average value of 0.730632, a median of 0.558533, and a standard deviation of 0.527408. The maximum value is 3.824769 owned by Pyridam Farma Tbk in 2021 and the minimum value is 0.149870 owned by the Industri Jamu Dan Farmasi Sido Muncul Tbk in 2018. Internal financing constraints have an average value of 0.289710, a median of 0.309027, and a standard deviation of 0.221549. The maximum value is 0.869243 owned by Hartadinata Abadi Tbk in 2020. And the minimum value is -0.151124 owned by Multi Bintang Indonesia Tbk in 2021. External financing constraints have an average value of 0.140468, a median of 0.013589, and a standard deviation of 1.003108. The maximum value is 0.365004 owned by Wilmar Cahaya Indonesia Tbk in 2019 and the minimum value is 0.000055 owned by the Industri Jamu Dan Farmasi Sido Muncul Tbk in 2020.

The results of the descriptive statistical analysis for the control variables, enterprise size has an average value of 12.67459, a median of 12.57038, and a standard deviation of 0.703639. The maximum value is 14.25372 owned by Indofood Sukses Makmur Tbk in 2021 and the minimum value is 11.27197 owned by Pyridam Farma Tbk in 2018. Enterprise age has an average value of 46.42000, a median of 43.00000, and a standard deviation of 37.24182. The maximum value is 204,0000 owned by Kimia Farma Tbk in 2021 and the minimum value is 9,000000 owned by Indofood CBP Sukses Makmur Tbk in 2018. Tobin's Q Ratio has an average value of 2.393101, a median of 1.696788, and a standard deviation of 2.215799. The maximum value is 12.26301 owned by Multi Bintang Indonesia Tbk in 2018 and the minimum value is 0.445356 owned by Indofood CBP Sukses Makmur Tbk in 2019. Leverage has an average value of 0.383221, a median of 0.358317, and a standard deviation of 0.150159 . The maximum value is 0.792736 owned by Pyridam Farma Tbk in 2021 and the minimum value is 0.130336 owned by the Industri Jamu Dan Farmasi Sido Muncul Tbk in 2018. Return on assets (ROA) has an average value of 0.119410, the median is 0.097905 , and a standard deviation of 0.119509. The maximum value is 0.925050 owned by Merck Tbk in 2018 and the minimum value is -0.065044 owned by PT Chitose Internasional Tbk in 2021.

Table 3: Descriptive statistic test

	Mean	Median	Maximum	Minimum	Standard Deviation
Green technology innovation	9.658855	9.615423	13.84073	7.212188	1.112006
Green financing	0.730632	0.558533	3.824769	0.149870	0.527408
Internal financing constraint	0.289710	0.309027	0.869243	-0.151124	0.221549
External financing constraint	0.140468	0.013589	0.365004	0.000055	1.003108
Enterprise Size	12.67459	12.57038	14.25372	11.27197	0.703639
Enterprise Age	46.42000	43.00000	204.0000	9.000000	37.24182
Tobin's Q Ratio	2.393101	1.696788	12.26301	0.445356	2.215799
Leverage	0.383221	0.358317	0.792736	0.130336	0.150159
Return on Assets	0.119410	0.097905	0.925050	-0.065044	0.119509

Source: output panel data regression (e-views)

4.2 T-Test

This test was conducted to determine whether each independent variable has a significant effect on the dependent variable. Based on the results of the individual T-test, the following test results can be obtained:

H1: There is no effect between green financing on green technology innovation.

Green financing has a probability value of $0.1515 > 0.05$ (alpha 5%) which shows no significant effect. The results of this study conclude that there is no significant influence between green financing on green technology innovation. This means that this research is not in line with research conducted by Lu et al., 2022 which states that green financing has a positive and significant effect on green technology innovation. Therefore, this study cannot prove that the amount of green financing can increase green technology innovation. The use of green financing is considered not to show maximum results for increasing green technology innovation in the consumer goods industry.

Whereas in research by Shang et al. (2022) green financing as measured by logarithm of CSR can promote corporate innovation, because CSR can reduce the company's funding costs, but also spends too many resources on unproductive activities. Then in research by Dong & Tao (2022) green financing in the pilot zone has a positive impact on the company's total factor productivity. Therefore, the government should continue pilot policies and improve them, thereby increasing investment in green financing facilities and strengthening environmental risk awareness of financial institutions and companies. At the same time, the government must change the intrinsic thinking of a one-size-fits-all strategy and formulate strategic pilot zone green financing by taking into account heterogeneity. Whereas in research by Jiang et al. (2022) green financing in state-owned companies has a more positive impact on non-state owned companies (NSOE) green technology innovation because NSOE tends to be more responsible for environmental protection due to its close relationship with the government.

H2: There is no effect between internal financing constraints on green technology innovation.

Internal financial constraints have a probability value of $0.3583 > 0.05$ (alpha 5%) which shows no significant effect. The results of this study conclude that there is no significant effect between internal financial constraints on green technology innovation. Therefore, this study cannot prove that the magnitude of internal financial constraints can influence green technology innovation. The existence of internal financial constraints is considered to show less result that affect green technology innovation in the consumer goods industry.

Whereas in research by Nylund et al. (2020) it has varied results for different sectors and only companies in the energy sector will be more innovative when they are profitable and, thus, have access to internal financing. Internal financing is considered to support innovation in profitable companies and not be a barrier to innovation. Meanwhile, research by Janasz (2010) shows that the results of research on Polish companies are not proven because innovation is not seen from a high level of own capital, but from inadequate accessibility of private capital. The success of innovation depends on the creation of the right financing innovation model and the emergence of special arrangements between individual entities (country administrations, economic regions, companies, international connections).

H3: There is an effect between external financing constraints on green technology innovation.

External financial constraints have a probability value of $0.0000 < 0.05$ (alpha 5%) which shows a significant effect. The magnitude of the coefficient is -0.058659 . The results of this study conclude that there is a negative and significant influence between external financial constraints on green technology innovation. This means that this research is in line with research conducted by Lu et al. (2022) which states that external financial constraints have a significant effect on green technology innovation. Therefore, this study can prove that the magnitude of external financial constraints can influence green technology innovation. The existence of internal financial constraints shows the results that affect green technology innovation in the consumer goods industry.

H4: There is an effect between control variables (size, age, tobin's Q, leverage, and ROA) on green technology

innovation.

This study proves that the control variables enterprise size and return on assets are in line with research conducted by Lu et al. (2022) which states that enterprise size and return on assets have a positive and significant influence on green technology innovation. That is, the greater the value of enterprise size and return on assets, the company uses its assets to innovate. However, for the control variables enterprise age, tobin's q ratio, and leverage in this study and did not prove that there was a significant positive relationship, which means that the three variables are in contrast to research conducted by Lu et al. (2022)

Enterprise size has a probability value of 0.0000 < 0.05 (alpha 5%) which shows a significant effect. The magnitude of the coefficient is 1.244336. Meanwhile, return on assets (ROA) has a probability value of 0.0383 < 0.05 (alpha 5%) which also shows a significant effect. The results of this study conclude that there is a positive and significant influence between enterprise size and return on assets on green technology innovation. Enterprise age has a probability value of 0.6947 > 0.05 (alpha 5%) which shows no significant effect. The results of this study conclude that there is no significant influence between enterprise age on green technology innovation. Tobin's q ratio has a probability value of 0.6947 > 0.05 (alpha 5%) which shows no significant effect. The results of this study concluded that there was no significant influence between the tobin's q ratio on green technology innovation. Leverage has a probability value of 0.0821 > 0.05 (alpha 5%) which shows no significant effect. The results of this study conclude that there is no significant influence between leverage on green technology innovation.

Table 4: T-Test

Independent variable	Dependent variable		
	Green technology innovation		
	Coefficient	Probability	Decision
Costant	-5.785218	-	-
Green financing	0.237232	0.1515	Not significant
Internal financing constraint	0.436885	0.3583	Not significant
External financing constraint	-0.058659	0.0000	Negative significant
Enterprise size	1.244336	0.0000	Positive significant
Enterprise age	-0.000847	0.6947	Not significant
Tobin's Q ratio	-0.009162	0.8005	Not significant
Leverage	-1.686033	0.0821	Not significant
Return on Assets	0.739535	0.0383	Positive significant

Source: output panel data regression (e-views)

5. Conclusion and implication

Based on the results of the tests that have been carried out, this research can be concluded that the first one has a green financing variable that does not significantly influence green technology innovation. Second, the variable internal financing constraints have no significant effect on green technology innovation, while external financing constraints have a negative and significant effect on green technology innovation. And finally, the control variables, namely enterprise size and return on assets, have a positive and significant effect on green technology innovation, while enterprise age, Tobin's Q ratio, and leverage have no significant effect on green technology innovation.

After getting to these conclusions, there are benefits to be gained based on the results of the research that has been carried out as implications for financial managers and investors that can be taken into consideration in making a decision. The implications obtained are as follows:

5.1 For Finance Manager

Through this research, it is hoped that financial managers can encourage companies to open financing channels for green technology innovation and reduce external financing for green technology innovation. Because external financing will reduce green technology innovation. Financial managers are expected to fund their innovation projects more with internal financing and manage total assets properly so that they can increase profitability and ROA will also increase. In addition, financial managers can also expand using their own capital.

5.2 For Investor

This research is expected to provide information to investors to assess the company before making an investment. Companies that should be chosen are companies that fund their green technology innovations with internal financing. Investors can also judge from enterprise size and return on assets where companies with good asset management or high total assets can increase green technology innovation. In addition, investors are better off choosing companies that fund their companies with internal rather than external financing.

6. Limitation and recommendation

Based on the result, there are some data limitations in this study, namely not all companies write down their corporate sustainability costs in their annual reports or sustainability reports, making it difficult to find complete CSR data. Taking into account the availability of data, this study cannot see the effect of green financing on green technology innovation broadly because it requires data such as the level of marketing, financial development, and internal control (Lu et al., 2022). Then, based on the findings of this study, it can be suggested to add environmental regulation and import trade variables because the results of research by Shang et al. (2022) show that environmental regulation import trade can play a role in promoting green technology innovation.

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