

Green Transformation and Finance Literature: A Mini-Review Approach

**Dian Primanita Oktasari, Nurasyikin Jamaludin, Jumadil Saputra,
Mohd Yusoff Yusliza and Zikri Muhammad**

Faculty of Business, Economics and Social Development

Universiti Malaysia Terengganu

21030 Kuala Nerus, Terengganu, Malaysia

dprimanita88@gmail.com, asyikin@umt.edu.my, jumadil.saputra@umt.edu.my,
yusliza@umt.edu.my, zikri@umt.edu.my

Abdul Talib Bon

Department of Production and Operations

Universiti Tun Hussein Onn Malaysia

86400 Parit Raja, Johor, Malaysia

talibon@gmail.com

Abstract

Green transformation is a process of urban transformation that focuses on using renewable energy sources and green areas (e.g. environmental degradation) for cities' sustainable future. In recent decades, this dilemma has become a universal concern for humankind because of increasing daily needs, urbanisation, population, and economic growth to produce CO₂ emissions. Thus, this paper seeks to provide an overview of the literature on green transformation and finance from various sources, summarises the results and makes conclusions based on the findings. This study's design is a qualitative method with mini-review through reading and analysing 30 journal articles. Green transformation and finance reviews were carried out by reading and analysing 30 peer-reviewed journal articles and summarised on the basis of the subject in two tables, namely article journal and publisher distribution, and article category. Using the mini-review analysis, we found that most companies in different countries implement different regulations and policies related to the environment to overcome this green transformation. It is undeniable that lenders are willing to invest their money to support companies that practise environmental sustainability awareness to implement the green transformation to loans. As a result, it is quite significant for companies and countries' performance that have policies and controls on the environment to implement and deploy green finance. In conclusion, this study found a role and government policies related to green finance in realising green transformation and firm performance.

Keywords

Green finance, company performance, green transformation, and environmental degradation

1. Introduction

Green transformation is a renewable energy source transformation and green areas towards a sustainable urban future (Jiang et al., 2020). For humankind's, its important to protect the environment for sustaining future life. Of these, the government is doing to make a policy so that the entire supply chain process of goods and services can care and protect environmental conservation (Wang et al., 2019). Green Finance and all activities involved must consider aspects of environmental protection and environmental sustainability. The benefits that can be obtained from its policies are economic activities should concern on the environment where the company is funded and conducts its operations, of course, it has a good impact on nature and the earth because of the reduction in emissions, the quality of life

of humanity, especially the environmental impact of the company, such as the reduction of air, water and other pollution (Amores-Salvadó et al., 2014), opportunities to improve the company performance (Lin et al., 2019).

Green transformation needs supporting from various parties, including the communities, companies, and government. Due to the exploitation of nature and the environment, we should find ways to be responsible for our generations' survival in the future. Government policy is the first right step to support awareness of the environment by making green finance and increasing economic growth (Soundarrajan & Vivek, 2016; Wang et al., 2019). Companies are founded on the basis of business can use, process, and produce expected to do not destroy nature. It is highly recommended that the remaining waste can be reused to protect nature (Soundarrajan & Vivek, 2016). It is a good synergy by all of the people on earth. However, there are obstacles in implementing it, namely innovation, technology, and funding companies (Wang et al., 2019; Zhang, Rong, & Ji, 2019). This obstacle needs to be overcome immediately to implement sustainability and green economy in economic growth. It is hoped that the production process can use raw materials efficiently and effectively not to be wasted. It can be done by reducing business models, raw materials, production processes (Al-Sheryani & Nobanee, 2020) and innovation and technology (Zhang et al., 2019; Eyraud et al., 2013). With utilising renewable energy, it aims to create a green economy. This cycle can be created by interfering with the role of government, financial and investment institutions, innovation, and technology. In conjunction with the previous elaboration, this study seeks to provide a mini-review of green finance literature.

2. Methodology

This review on green finance was conducted by reading through and analysing 30 peer-reviewed journal articles. These articles are summarised based on present the information journal articles, title, authors, publishers, year of publication, contents, objective, findings, and journal articles' recommendation. These articles are summarised in the tables below:

Table 1. Journal and Publisher Distribution

No	Article Name	Author(s)	Journal	Publisher	Year
1	Green Innovation Transformation, Economic Sustainability and Energy Consumption During China's New Normal Stage	Zhujun Jiang, Pinjie Lyu, Liang Ye, & Yang Wenqian Zhou	Journal of Cleaner Production	Elsevier	2020
2	Green Innovation And firm Performance: Evidence from Listed Companies In China	Dayong Zhang, Zhao Rong, Qiang Ji	Resources, Conservation & Recycling	Elsevier	2020
3	The Green Advantage: Exploring The Convenience Of Issuing Green Bonds	Gianfranco Gianfrate , Mattia Peri	Journal of Cleaner Production	Elsevier	2019
4	Green Credit, Debt Maturity, and Corporate Investment—Evidence from China	Enxian Wang, Xinghe Liu, Jiapeng Wu & Danting Cai	Sustainability	Multidisciplinary Digital Publishing Institute (MDPI)	2019
5	Does firm size matter? Evidence on the impact of the green innovation strategy on corporate financial performance in the automotive sector	Woon-Leong Lin, Jun-Hwa Cheah	Journal of Cleaner Production	Elsevier	2019
6	Turning Green Subsidies Into Sustainability: How Green Process Innovation Improves Firms' Green Image	Xuemei Xie , Qiwei Zhu, & Ruoyi Wang	Business Strategy and Environment	Wiley	2019

7	Asymmetric Impacts of The Policy And Development Of Green Credit On The Debt financing Cost and Maturity Of Different Types Of Enterprises In China	Xinkuo Xu & Jingsi Li	Journal of Cleaner Production	Elsevier	2020
8	Green Finance for Sustainable Green Economic Growth in India	P. Soundarajan, & N. Vivek	Agricultural Economics	CAAS Agricultural Journal	2016
9	Green credit, renewable energy investment and green economy development: Empirical analysis based on 150 listed companies of China	Lingyun He et al.,	Journal of Cleaner Production	Elsevier	2018
10	Investigating the Influence of Green Credit on Operational Efficiency and Financial Performance Based on Hybrid Econometric Models	Changqing Luo & Siyuan Fan and Qi Zhang	International Journal of Financial Studies	Multidisciplinary Digital Publishing Institute (MDPI)	2017
11	The role of green finance in environmental protection: Two aspects of market mechanism and policies	Yao Wang, Qiang Zhia	Finance and Economics	Science Direct	2016
12	Green Innovation and Finance in Asia	Tolliver, C., Fujii, H., Keeley, A. R., & Managi, S	Economic Research	Asian Economic Policy Review	2020
13	Business models for sustainable finance: The case study of social impact bonds	Torre, Trotta, Chiappini, & Rizzello	Sustainability	Multidisciplinary Digital Publishing Institute (MDPI)	2019
14	Green Finance for Sustainable Global Growth: Costs and Benefits of Green Buildings Compared with Conventional Buildings	Ojo-Fafore, E. M., Aigbavboa, C., Thwala, W., & Remaru, P	Green Finance for Sustainable Global Growth	EBSCO	2019
15	Internet Finance, Green Finance, and Sustainability	Wang, K., Tsai, S.-B., Du, X., & Bi, D.	Sustainability	EBSCO	2019
16	Understanding the role of green bonds in advancing sustainability	Aaron Maltais & Björn Nykvist	Sustainable Finance & Investment	Taylor & Francis	2020
17	Environmental regulation and green investments: the role of green finance	Falcone, P.M.	Business and Economics	Int. J. Green Economics	2020
18	Corporate Governance and Green Innovation	Mario Daniele Amore & Morten Bennedsen	Journal of Environmental Economics and Management	Elsevier	2015

19	Eco-innovation measurement: A review of firm performance indicators	Eva M. García-Granero, Laura Piedra-Muñoz, Emilio Galdeano-Gómez	Journal of Cleaner Production	Elsevier	2018
20	Exploring the Schemes for Green Climate Fund Financing: International Lessons	Lianbiao Cui & Yuran Huang	World Development	Elsevier	2018
21	External knowledge sources, green innovation and performance	Wissal Ben Arfi, Lubica Hiker, & Jean-Michel Sahut	Technological Forecasting & Social Change	Elsevier	2017
22	Does green innovation mitigate financing constraints? Evidence from China's private enterprises	Yuming Zhang, Chao Xing, Yuan Wang	Journal of Cleaner Production	Elsevier	2020
23	Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: Does service capability matter?	Yudi Fernando Charbel Jose Chiappetta Jabbour, & Wen-Xin Wah	Resources, Conservation & Recycling	Elsevier	2018
24	Drivers of green bond market growth: The importance of Nationally Determined Contributions to the Paris Agreement and implications for sustainability.	Tolliver, C., Keeley, A. R., & Managi, S.	Journal of Cleaner Production	Elsevier	2020
25	The drivers of eco-innovation and its impact on performance: Evidence from China	Wugan Cai, Guangpei Li	Journal of Cleaner Production	Elsevier	2018
26	The political and institutional constraints on green finance in Indonesia	James Guild	Sustainable Finance & Investment	Taylor & Francis	2020
27	Great Green Transition and Finance	Claudia Kemfert, Dorothea Schäfer and Willi Semmler	Economic	Springer	2020
28	Macro-economic analysis of green growth policies: the role of finance and technical progress in Italian green growth	Leonidas Paroussos ¹ & Kostas Fragkiadakis ¹ & Panagiotis Fragkos ¹	Climatic Change	Springer	2020
29	Closing the green finance gap – A systems perspective	Sarah Hafnera., Aled Jonesa, Annela Anger-Kraavib, Jan Pohla	Environmental Innovation and Societal Transitions	Elsevier	2019
30	Conceptual Building of Sustainable Financial Management & Sustainable Financial Growth	Al Ahbabi & Nobanee	SSRN	Elsevier	2020

Table 1 above captures the summary of the journal and publisher distribution. We have reported 30 peer-review articles published at numerous journals and publishers related to green transformation and finance. Further, the next table is presented to list of the article's category based on the subject.

Table 2. Articles Category Based on the Subject

No	Article Name	Objectives	Findings	Recommendations
1	Green innovation transformation, economic sustainability, and energy consumption during china's new normal stage.	To analyse how energy consumption affects energy innovation and innovation transformation in the new normal stage.	There is an increasing tendency for energy structure to transform into renewables as the energy consumption increases. Instead of total innovation counts, the green innovation transformation can reduce energy consumption and benefit economic sustainability.	
2	Green innovation and firm performance: evidence from listed companies in China.	To analyse how green patenting influences a firm's subsequent performance. By investigating listed manufacturing firms in China for the 2000–2010 period.	Green utility-model patents mainly drive green growth and that this positive relationship only exists among state-owned enterprises (SOEs). Furthermore, the positive relationship exists primarily after 2006, when the government began to provide formal legislative support to the green industry.	
3	The green advantage: exploring the convenience of issuing green bonds.	To study green bonds as one of the best candidates to mobilise financial resources towards clean and sustainable investments.	Green bonds are more financially convenient than non-green ones. The advantage is larger for corporate issuers, and it persists in the secondary market.	
4	Green credit, debt maturity, and corporate investment: evidence from China.	To analyse the green credit, debt maturity, and corporate investment in China.	The green credit guidelines policy's promulgation has significantly reduced the proportion of long-term debt to heavily polluting enterprises for reasons such as risk aversion and total credit constraints.	
5	Does firm size matter? Evidence on the impact of	To determine the dynamic	The Green Innovation Strategy (GIS) affected	

	the green innovation strategy on corporate financial performance in the automotive sector.	correlation between the GIS and the CFP, with regards to the firm size.	Corporate Financial Performance (CFP). The small-sized firms showed higher green innovation investments return than the larger-sized firms.	
6	Turning green subsidies into sustainability: how green process innovation improves firms' green image.	To analyse how green process innovation improves firms' green image.	The green subsidies are positively related to two dimensions of green process innovation, namely, cleaner production technology and end of pipe technology. Further, the cleaner production technology and end-of-pipe technology are positively related to firms' green image. Also, the firm's cleaner production technology mediates the relationship between green subsidies and its green image.	
7	Asymmetric impacts of the policy and development of green credit on the debt financing cost and maturity of different types of enterprises in china.	To analyse how asymmetric impacts of green credit policy and development on the debt financing cost and maturity of different types of enterprises in China.	The green credit policy and green credit development increase the debt financing cost of "two-high" enterprises, but they reduce the debt financing cost of green enterprises. Further, the green credit policy and green credit development reduce the debt financing maturity of "two- high" enterprises. At the same time, they have little impact on the debt financing maturity of green enterprises. Also, the impact of green credit policy on enterprise debt financing cost and maturity occurs partly through green credit development. Concerning the debt financing cost and maturity, enterprises in	

			economically developed regions are more strongly affected by green credit than those in economically underdeveloped regions.	
8	Green finance for sustainable green economic growth in India.	To study the green finance and to validate the concept as feasible in the Indian industries for balancing the ecological depreciation due to the assimilation of carbon gases in the atmosphere.	Green Finance is a market-based investing or lending program that impacts risk assessment or utilising environmental incentives to drive business decisions.	
9	Green credit, renewable energy investment and green economy development: empirical analysis based on 150 listed companies of China.	This paper constructs a threshold effect model to investigate the non-linear relationship between renewable energy investment and the green economy development index from the perspective of green credit.	The impact of renewable energy investment on the green economy development index includes dual threshold effects from green credit. The effect is divided into three stages: promoting, restraining, and promoting successively. Secondly, for large-sized companies, the impact of renewable energy investment on the green economy development index includes one threshold from green-credit.	
10	Investigating the influence of green credit on operational efficiency and financial performance based on hybrid econometric models.	To investigate the influence of green credit on operational efficiency and financial performance based on hybrid econometric models.	The average value of financial performance and operational efficiency is relatively low. The issuance of green loans does not improve public expectations of enterprises in the green industry, and green loans lead to an increase in financing costs, management costs, operation costs, and expenditure on R&D. Thus, the capital	

			allocation hypothesis is partly supported.	
11	The role of green finance in environmental protection: two aspects of market mechanism and policies.	To analyse the green finance in renewable energy and find some inadequacies, develop a market mechanism, and formulate policies.	Green finance's market mechanism is rational, and green finance can guide the flow of funds and achieve effective management of environmental risk and optimal allocation of environmental resources and social resources.	Future research can consider the efficient green finance system's mechanism coordinating the relationship between ecology and finance.
12	Green Innovation and Finance in Asia.	To analyse change and environmental externalities to promote environmentally adjusted multi-factor productivity growth, to impact their shifts to sustainable growth paradigms.	The amount of green innovation and finance in Asia has increased to meet the growing demand for sustainable economic development, pollution reduction and environmental problems. All of this is driven by government policies for sustainable economic development.	Future studies can analyse the sustainability of green finance using the frequency, volume, environmental impact.
13	Business models for sustainable finance: The case study of social impact bonds.	To analyse the collaboration of the social impact bonds within the framework of business models for sustainability.	The sustainability bonds with social impacts allow a fully collaborative partnership, low collaboration, and partial collaboration.	The study has great implications for policymaking to allow a better chance to acquire desired social impacts.
14	Green finance for sustainable global growth: costs and benefits of green buildings compared with conventional buildings	To compare the cost differences between traditional and greenhouse construction.	Green buildings are more expensive than traditional buildings but have an overall better return in the long run than that the traditional buildings.	
15	Internet Finance, Green Finance, and Sustainability	To analyse the relationship between sustainability and finance through gathering papers and manuscripts on green finance and operating mechanisms	Societal development comes with strained access and use of resources and negative environmental implications, leading to constraints and conflicts.	Governments should strive to develop low carbon economies by creating an enabling environment for green finance lenders and manufacturers to ensure sustainable economic development and transformation.
16	Understanding the role of green bonds in advancing sustainability.	To analyse green bonds, affect market participants'	The bottom-up growth of the green bond market is due to the	

		engagement with sustainability in Sweden.	strong matching of incentives between issuers and investors. Green bonds perceived to provide incentives to issuers to raise the 'green ambitions' of specific projects and their organisations.	
17	Environmental regulation and green investments: the role of green finance	To analyse green financial to create the conditions to guarantee the traditional and green economy.	Green finance supporting companies' environmentally sustainable projects, supporting thus countries to decarbonise economies and adapt to the consequences of climate change.	
18	Corporate Governance and Green Innovation.	To analyse the relationship between corporate governance and firms' environmental innovation.	Ineffective corporate governance may constitute a major obstacle to environmental efficiency.	
19	Eco-innovation measurement: A review of firm performance indicators.	To provide a critical review of literature on eco-innovation performance indicators.	The firm performance indicators classified into four different green innovation types, i.e. product, process, organisational and marketing.	
20	Exploring the Schemes for Green Climate Fund Financing: International Lessons.	To explore several schemes for raising the public finance of the GCF among developed countries.	Results reveal that the ongoing international financing mechanisms vary in their burden-sharing outputs, and the shares of existing donors are driven by highly complex reasons.	
21	External knowledge sources, green innovation, and performance.	To analyse how internal and external knowledge sharing intercede green innovation and ponders on how it affects the organisation performance.	Results reveal that the main factors that affect green lending include credit profiles, capita, requirements, the reputation of the organisations, and the regulatory pressure.	
22	Does green innovation mitigate financing constraints? Evidence from China's private enterprises	To analyse How green innovation can alleviate corporate financing constraints. An empirical test using a sample of	The green innovation, including green technology innovation and green management innovation, can significantly reduce the financing constraints of	

		Chinese non-financial private enterprises listed in the Shanghai and Shenzhen.	enterprises. Moreover, the interaction between corporate environmental disclosure and green innovation can have a positive effect, further improving the financing conditions of firms.	
23	Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: Does service capability matter?	To analyse the green business concepts by investigating an original conceptual framework, which proposes that service innovation's capacity has a mediating effect on the relationship between sustainable organisational performance and environmental innovation.	The eco-innovations unlock better sustainable performance; service innovation capability has a partially significant positive mediating effect; service innovation capability ultimately benefits companies by allowing them to differentiate through value creation: service capability can also act as a business strategy to create barriers to new entry by competitors.	
24	Drivers of green bond market growth: the importance of nationally determined contributions to the Paris agreement and implications for sustainability.	To examine the driving forces behind the adoption of green bonds market growth and the factors that correspondingly disturb conventional bond market growth.	Various microeconomic and institutional factors influence the implementation of green bonds are crucial to encourage the green bond issuance.	
25	The drivers of eco-innovation and its impact on performance: Evidence from China.	To analyse how eco-innovation provides customer and business value and contributes to sustainable development while decreasing environmental costs and impacts.	The factors (i.e., technological capabilities, environmental, organisational capabilities, a market-based instrument, competitive pressures, and customer green demand) contribute to eco-innovation development.	
26	The political and institutional constraints on green finance in Indonesia.	To analyse the potential of green finance in renewable energy	There is a strong demand for capital markets for green bonds backing clean energy projects.	

		development in Indonesia.		
27	Great Green Transition and Finance.	To analyse the transformation from a climate-distorting to a climate protecting economy opens investment opportunities to rebuild the European economy.	Using a combination of CO2 tax and green public bonds to initiate the urgently needed boost for the great green transition seems to be a reasonable strategy on climate change.	
28	Macro-economic analysis of green growth policies: the role of finance and technical progress in Italian green growth.	To analyse the transition to low carbon in Italia green growth	In the coming decades, the low-carbon transition in case Italian firms and households have access to low-cost financial resources; Italian manufacturers acquire market shares in clean energy technologies.	
29	Closing the green finance gap – A systems perspective.	To study the key investment barriers using a theoretical framework and develop possible solutions to low carbon energy infrastructure investments.	The policy uncertainty and short-termism in the financial system are the two main investment barriers. The results show that identified barriers form a complex system characterised by path dependency, lock-in and non-linearity.	Future study can adopt the theoretical framework related to policy debate and propose sustainable investment vehicles.
30	Conceptual building of sustainable financial management and sustainable financial growth.	To identify the connectivity between financial management and sustainable business growth.	The financial executive plays an important role vital in addressing the risks associated with sustainability financial growth.	

3. Results and Discussion

As mentioned in the previous section, the current study is written to provide an overview of green transformation and finance literature. By using a mini-review approach, this study found that various countries have been developing and implementing the concept of green finance (Falcon, 2020; James, 2020; Sarah, 2019). It shows increasing their awareness of the environment (Soundarrajan and Vivek, 2016). A study by Jiang et al. (2019) focusing on energy consumption. They were concerned about different types, namely energy innovation and transformation. Their study found an increasing energy structure to transform into renewables as the energy consumption increases. Also, green innovation and transformation could reduce energy consumption and increase economic sustainability.

Further, several studies concerning production process using renewable energy sources aim to reduce the CO2 emission (Amores-Salvadó et al., 2014), making green innovation in the form of technology to protect the environment (Lin et al., 2019). The companies' good image comes from their caring for environmental sustainability (Wang et al., 2019). The existence of green financing to the company financial performance has been studied by Wang et al., 2019; Zhang et al., 2019; Lin et al., 2019; Amores-salvadó et al., 2014). However, there are obstacles to policies that regulate green finance and its implementation in various countries, such as adequate innovation, technology and infrastructure

to realise growth and green economics. As well as other things, there is still a lack of understanding of how to manage finance based on sustainability for the environment (Nobanee, 2020).

4. Conclusions

Green finance is a financial concept based on concern for the surrounding environment and the people's sustainability on earth. It is implemented by the increasing number of industries implementing green finance. Using the mini-review analysis, we found that most companies in different countries implement different regulations and policies related to the environment to overcome this green transformation. It is undeniable that lenders are willing to invest their money to support companies that practise environmental sustainability awareness to implement the green transformation to loans. As a result, it is quite significant for companies and countries' performance that have policies and controls on the environment to implement and deploy green finance. In conclusion, this study found a role and government policies related to green finance in realising green transformation and firm performance.

Reference

- Al-Sheryani, K., & Nobanee, H. (2020). Green Finance: A Mini-Review. *SSRN Electronic Journal*, (February). <https://doi.org/10.2139/ssrn.3538696>
- Amin, M., Tayeh, B. A., & Agwa, I. S. (2020). Effect of using mineral admixtures and ceramic wastes as coarse aggregates on properties of ultrahigh-performance concrete. *Journal of Cleaner Production*, 273. <https://doi.org/10.1016/j.jclepro.2020.123073>
- Amore, M. D., & Bennedsen, M. (2015). Author 's Accepted Manuscript Corporate governance and green innovation. *Journal of Environmental Economics and Management*. <https://doi.org/10.1016/j.jeem.2015.11.003>
- Ben, W., Hikkerova, L., & Sahut, J. (2017). Technological Forecasting & Social Change External knowledge sources , green innovation and performance, (September). <https://doi.org/10.1016/j.techfore.2017.09.017>
- Boons, F., Montalvo, C., Quist, J., & Wagner, M. (2013). Sustainable innovation, business models and economic performance: An overview. *Journal of Cleaner Production*, 45, 1–8. <https://doi.org/10.1016/j.jclepro.2012.08.013>
- Cai, W., & Li, G. (2018). The drivers of eco-innovation and its impact on performance: Evidence from China. *Journal of Cleaner Production*, 176, 110–118. <https://doi.org/10.1016/j.jclepro.2017.12.109>
- Cui, L., & Huang, Y. (2018). Exploring the Schemes for Green Climate Fund Financing : International Lessons. *World Development*, 101, 173–187. <https://doi.org/10.1016/j.worlddev.2017.08.009>
- Eyraud, L., Clements, B., & Wane, A. (2013). Green investment: Trends and determinants. *Energy Policy*, 60, 852–865. <https://doi.org/10.1016/j.enpol.2013.04.039>
- Falcone, P. M. (2020). Environmental regulation and green investments : the role of green finance, 14(2), 159–173.
- Fernando, Y., Chiappetta Jabbour, C. J., & Wah, W. X. (2019). Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance: Does service capability matter? *Resources, Conservation and Recycling*, 141(July 2018), 8–20. <https://doi.org/10.1016/j.resconrec.2018.09.031>
- Garc, E. M., Piedra-mu, L., Galdeano-g, E., Date, R., Date, R., Date, A., ... Production, C. (2018). Accepted Manuscript. <https://doi.org/10.1016/j.jclepro.2018.04.215>.
- Gianfrate, G., & Peri, M. (2019). The green advantage: Exploring the convenience of issuing green bonds. *Journal of Cleaner Production*, 219, 127–135. <https://doi.org/10.1016/j.jclepro.2019.02.022>
- Guild, J., & Guild, J. (2020). The political and institutional constraints on green finance in Indonesia Indonesia. *Journal of Sustainable Finance & Investment*, 0(0), 1–14. <https://doi.org/10.1080/20430795.2019.1706312>
- Gutiérrez, M., & Gutiérrez, G. (2019). Climate Finance: Perspectives on Climate Finance from the Bottom Up. *Development (Basingstoke)*, 62(1–4), 136–146.
- Hafner, S., Jones, A., Anger-kraavi, A., & Pohl, J. (2020). Closing the green finance gap – A systems perspective. *Environmental Innovation and Societal Transitions*, 34(November 2019), 26–60. <https://doi.org/10.1016/j.eist.2019.11.007>
- He, L., Zhang, L., Zhong, Z., Wang, D., & Wang, F. (2019). Green credit, renewable energy investment and green economy development: Empirical analysis based on 150 listed companies of China. *Journal of Cleaner Production*, 208, 363–372. <https://doi.org/10.1016/j.jclepro.2018.10.119>
- Jiang, Z., Lyu, P., Ye, L., & Zhou, Y. wenqian. (2020). Green innovation transformation, economic sustainability and energy consumption during China's new normal stage. *Journal of Cleaner Production*, 273, 123044. <https://doi.org/10.1016/j.jclepro.2020.123044>
- Kemfert, C., Schäfer, D., & Semmler, W. (2020). Great Green Transition and Finance. *Intereconomics*, 55(3), 181–

186. <https://doi.org/10.1007/s10272-020-0896-y>
- Lin, W. L., Cheah, J. H., Azali, M., Ho, J. A., & Yip, N. (2019). Does firm size matter? Evidence on the impact of the green innovation strategy on corporate financial performance in the automotive sector. *Journal of Cleaner Production*, 229, 974–988. <https://doi.org/10.1016/j.jclepro.2019.04.214>
- Luo, C., Fan, S., & Zhang, Q. (2017). Investigating the Influence of Green Credit on Operational Efficiency and Financial Performance Based on Hybrid Econometric Models. *International Journal of Financial Studies*, 5(4), 27. <https://doi.org/10.3390/ijfs5040027>
- Maltais, A., & Nykvist, B. (2020). Understanding the role of green bonds in advancing sustainability. *Journal of Sustainable Finance and Investment*, 0(0), 1–20. <https://doi.org/10.1080/20430795.2020.1724864>
- Nobanee, H. (2020). Conceptual Building of Sustainable Financial Management & Sustainable Conceptual Building of Sustainable Financial Management & Sustainable Financial Growth, (January 2019). <https://doi.org/10.2139/ssrn.3472313>
- Ojo-Fafare, E. M., Aigbavboa, C., Thwala, W., & Remaru, P. (2018). Green Finance for Sustainable Global Growth, (April), 244–269. <https://doi.org/10.4018/978-1-5225-7808-6.ch010>
- Paroussos, L., Fragkiadakis, K., & Fragkos, P. (2020). Macro-economic analysis of green growth policies: the role of finance and the technical progress in Italian green growth. *Climatic Change*, 160(4), 591–608. <https://doi.org/10.1007/s10584-019-02543-1>
- Soundarrajan, P., & Vivek, N. (2016). Green finance for sustainable green economic growth in india. *Agricultural Economics (Czech Republic)*, 62(1), 35–44. <https://doi.org/10.17221/174/2014-AGRICECON>
- Tolliver, C., Keeley, A. R., & Managi, S. (2020). Green Innovation and Finance in Asia, 1– 21. <https://doi.org/10.1111/aep.12320>
- Tolliver, C., Keeley, A. R., & Managi, S. (2020). Drivers of green bond market growth: The importance of Nationally Determined Contributions to the Paris Agreement and implications for sustainability. *Journal of Cleaner Production*, 244, 118643. <https://doi.org/10.1016/j.jclepro.2019.118643>
- Torre, M. La, Trotta, A., Chiappini, H., & Rizzello, A. (2019). Business models for sustainable finance: The case study of social impact bonds. *Sustainability (Switzerland)*, 11(7). <https://doi.org/10.3390/su11071887>
- Wang, E., Liu, X., Wu, J., & Cai, D. (2019). Green Credit , Debt Maturity , and Corporate Investment — Evidence from China, (October 2011), 1–19. <https://doi.org/10.3390/su11030583>
- Wang, K., Tsai, S.-B., Du, X., & Bi, D. (2019). Internet Finance, Green Finance, and Sustainability. *Sustainability*, 11(14), 3856. <https://doi.org/10.3390/su11143856>
- Wang, Y., & Zhi, Q. (2016). The Role of Green Finance in Environmental Protection: Two Aspects of Market Mechanism and Policies. *Energy Procedia*, 104, 311–316. <https://doi.org/10.1016/j.egypro.2016.12.053>
- Xie, X., Zhu, Q., & Wang, R. (2019). Turning green subsidies into sustainability: How green process innovation improves firms' green image. *Business Strategy and the Environment*, 28(7), 1416–1433. <https://doi.org/10.1002/bse.2323>
- Xu, X., & Li, J. (2020). Asymmetric impacts of the policy and development of green credit on the debt financing cost and maturity of different types of enterprises in China. *Journal of Cleaner Production*, 264, 121574. <https://doi.org/10.1016/j.jclepro.2020.121574>
- Zhang, D., Rong, Z., & Ji, Q. (2019). Green innovation and firm performance: Evidence from listed companies in China. *Resources, Conservation and Recycling*, 144(January), 48–55. <https://doi.org/10.1016/j.resconrec.2019.01.023>
- Zhang, Y., Xing, C., & Wang, Y. (2020). Does green innovation mitigate financing constraints? Evidence from China's private enterprises. *Journal of Cleaner Production*, 264, 121698. <https://doi.org/10.1016/j.jclepro.2020.121698>

Biographies

Dian Primanita Oktasari is a Lecturer at Universiti Mercu Buana. She was born on October 29, 1990, in Jakarta, Indonesia. She is a Student PhD in Financial Economics at Universiti Malaysia Terengganu. She studied from elementary school until high school in Jakarta and finished her studies in 2008. Further, she continued her Bachelor's degree in the Faculty of Economic and Business at Universiti Mercu Buana and completed her degree in 2012. She continued her study for a Master's degree in Management Finance at Universiti Mercu Buana, Jakarta and completed her studies in 2015. At the end of September 2020, she registered for a PhD at Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu, Malaysia. She researches areas are Green Finance, Sustainable Development, and Environmental.

Jumadil Saputra is a PhD holder and works as a senior lecturer in the Department of Economics, Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu, Malaysia. He has published 128 articles Scopus/ WoS indexed. As a lecturer, he has invited as a speaker in numerous universities, the examiner (internal and external), the reviewer for article journal and proceeding, the conference committee, journal editorial board, and others. He is a professional member of the International Business Information Management Association (IBIMA), Ocean Expert: A Directory of Marine and Freshwater Professional, and Academy for Global Business Advancement (AGBA). His research areas are Quantitative Economics (Microeconomics, Macroeconomics, and Economic Development), Econometrics (Theory, Analysis, and Applied), Islamic Banking and Finance, Risk and Insurance, Takaful, i.e., financial economics (Islamic), mathematics and modeling of finance (Actuarial). His full profile can be accessed from <https://jumadilsaputra.wordpress.com/home-2/>.

Mohd Yusoff Yuzliza graduated with a B.B.A in human resource management from Universiti Putra Malaysia in 1999, before pursuing an MBA at Universiti Sains Malaysia in 2005, and finally obtaining her PhD in administrative science from Universiti Teknologi MARA in 2009. From 2009 to 2016, she was a lecturer at the Graduate School of Business in Universiti Sains Malaysia. In 2016, she became an associate professor at the Faculty of Business, Economics & Social Development of Universiti Malaysia Terengganu. She is the author of more than 100 articles, with an H-index of 9 in Scopus and Web of Science. Her research interests include organisational and behavioural studies, human resource management (HRM), green HRM, international HRM (international students' adjustment), electronic HRM, line managers' involvement in HRM, empowerment, and human resource roles and competencies.

Zikri Muhammad was born in Terengganu, Malaysia. He received the Bachelor's degree in business administration from Universiti Putra Malaysia in 1999, the M.A. degree from Universiti Sains Malaysia, and the Ph.D. degree in geography from Universiti Kebangsaan Malaysia. From 2012 to 2016, is a Senior Lecturer with the School of Humanities, Universiti Sains Malaysia for five years. He is currently a Senior Lecturer with the Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu. His research interests include urban geography, sustainable development, quality of life, and local government.

Abdul Talib Bon is a professor of Production and Operations Management in the Faculty of Technology Management and Business at the Universiti Tun Hussein Onn Malaysia since 1999. He has a PhD in Computer Science, which he obtained from the Universite de La Rochelle, France in the year 2008. His doctoral thesis was on topic Process Quality Improvement on Beltline Moulding Manufacturing. He studied Business Administration in the Universiti Kebangsaan Malaysia for which he was awarded the MBA in the year 1998. Bachelor's degree and a diploma in Mechanical Engineering obtained from the Universiti Teknologi Malaysia. He received his postgraduate certificate in Mechatronics and Robotics from Carlisle, United Kingdom in 1997 and published more 150 International Proceedings and International Journals and 8 books. He is a member of MSORSM, IIF, IEOM, IIE, INFORMS, TAM and MIM.