International Journal of Business and Economic Affairs (IJBEA)
7(2), 1-25 (2022)
DOI: 10.24088/IJBEA-2022-72001
ISSN: 2519-9986

Leveraging Green Innovation Practices for Organizational Sustainable Performance: A Structural Equation Modeling Approach

Hafiz Muhammad Farhan [1*], Dr. Muhammad Shahid Nawaz [2]

[1] Assistant Professor, Department of Management Sciences, The Islamia University of Bahawalpur, Pakistan

[2] Assistant Professor, IBMAS, The Islamia University of Bahawalpur, Pakistan

Abstract: Manufacturing sector has been the major contributor towards the economic development and the environmental degradation too. This is mainly because of the large scale activities carried out by the organizations in this sector. Organizations are finding it mandatory to adopt green practices in order to bring about sustainability in their performances purely because of the pressures from various stakeholders. This study by using the theoretical lens of RBV, analyzed the role of Green Innovation practices in predicting Environmental, Economic and Social Performance. To find out the answers of the research question, data was collected from 209 listed manufacturing organizations using a survey questionnaire and was analyzed using MPLUS 7.0. Results demonstrated that green innovation practices predicted environmental and economic performance more strongly than the social performance dimension. These findings revealed the significance of green innovation practices in achieving the sustainable performance and unveiled the unknowns on the said relationships while highlighting the important implications for managers, policy makers and future researchers.

Keywords: Green innovation, Sustainable performance, Manufacturing, Pakistan

Received: 13 January 2022/ Accepted: 2 February 2022/ Published: 13 March 2022

INTRODUCTION

Climatic changes have been posing biggest challenges to countries around the world in recent years. One of the major reasons for such serious issues is the way the economic activities are being carried out by the organizations. Amongst other factors, it is reported that manufacturing organizations are mainly responsible for deteriorating environmental conditions and are the main cause of unsafe water, poor sanitation, air pollution and global climate changes that account for nearly a tenth of deaths and diseases burden worldwide (Ćurić, Zafirovski, & Spiridonov, 2022; Singh, 2017). Additionally due to this, the overall financial cost is expected to rise up to a hooping 17% of the global GDP and an additional cost of $5 trillion in case the remedial steps are not taken up immediately (Sanderson & O'Neill, 2020).

The role of manufacturing sector in environmental degradations is a serious issue, needs to be streamlined (Mathiyazhagan, Vimal, Kumar, Ramesh, & Agarwal, 2022; Qin & Horvath, 2022), demands immediate attention with an effective control mechanism and with the implementation of sustainable practices (Abdullah, Mohamad, & Thurasamy, 2015; Diabat, Khodaverdi, & Olfat, 2013; Hussain, Rigoni, & Orij, 2018). Organizations need to adopt environmental management practices to gain control over the socio, economic and environmental challenges (Parida & Brown, 2021) reduce the negative impact of their business activities on the socio-environmental aspects (Menezes & Drigo, 2017), under the guidelines of international agreements, rules and regulations that different nations (Cuadrado Quesada, Klenke, & Mejía-Ortíz, 2018; Kanstrup, Swift, Stroud, & Lewis, 2018), groups, continents, the UN, and other entities support and follow worldwide (Gençay, Birben, & Durkaya, 2018). Although the issue is global, but it is argued that developing countries with weaker infrastructure and lesser resources are more likely get hit by this ever mounting issue (Maduekwe & Adesina, 2022).Highly developed countries along with the emerging and developing economies are finding it difficult to control green house gas emissions , air pollution, industrial wastage and waste water problems. China is reported to be the largest contributor with a 26%

*Corresponding author: Hafiz Muhammad Farhan
†Email: Muhammad.Farhan@iub.edu.pk

of global greenhouse gas emissions, USA with contribution of 13%, the EU with 7.8% and India at 6.7% (Kumar, Singh, Raizada, & Hussain, 2022).

Pakistan on the other hand is also being strongly affected by the climatic changes in the region too. According to Khan, Gao, Abid, and Shah (2021) and in a report by Eckstein, Künzel, Schäfer, and Winges (2019). This unprecedented experience and disastrous change in climate/weather has made Pakistan to bear 0.53 percent per unit of GDP, other economic losses of worth US$ 3792.52 million (Finance Deparment, 2020; Irfan et al., 2021). The country has witnessed 152 extreme weather events in the past 20 years and this could cost could rise up to US$ 14 billion per year (Finance Deparment, 2020; Irfan et al., 2021). Similarly, according to findings, Pakistan is amongst the 08 countries that are adversely hit by global warming and where the average temperature is projected to rise more than any other country(Ahmad & Afzal, 2021; Ali et al., 2021) . The manufacturing sector amongst others, is mainly responsible for causing serious damages to the environment and society in general (Malik et al., 2021). Although, large scale manufacturing (LSM) sector represents approximately 20 percent of the national economy's output and has recorded an average annual growth of 3.4 percent over the past five years (Hamayun, Khan, & Adil, 2020). A report on the environmental performance index (EPI) 2020 revealed that Pakistan is ranked on 147th out of 180 countries, with India at 169th, China at 120th (EPI, 2020). It has been reported that the country has seen a significant increase in pollution in the year 2016 when it joined list of most polluted countries in terms of air pollution (Hameed, Khan, Islam, Sheikh, & Naeem, 2020). These indicators are getting worst by each year which demands the country to formulate a comprehensive action plan on environmental management keeping in view of the of the expectations of various stakeholders.

However, it is also observed that there is lack of innovation adoption in the firms operating in Pakistan (Jin, Shahzad, Zafar, & Suki, 2022). According a report by ASEIC (2016) on eco-innovation adoption, Pakistan is rated in the lowest quartile with. However, Japan, South Korea and New Zealand are amongst the countries lying in the 1st quartile with a score of more than 70. Other Asian countries including China and Malaysia being in the 2nd highest quartile. Given the circumstances, it is inevitable for firms in the manufacturing industry to find ways for sustained and long term environmental, economic and social performance increase (Alraja, Imran, Khashab, & Shah, 2022; Parida & Brown, 2021; Yong et al., 2020) considering the pressures being faced from various stakeholders (Asadi et al., 2020; Ayuso, Rodríguez, García-Castro, & Ariño, 2014; Khan, Busari, Abdullah, & Mughal, 2018; Parida & Brown, 2021; Russo & Fouts, 1997; Saudi, Obsatar Sinaga, & Zainudin, 2019). Therefore, organizations need to focus on environmental sustainability along with economic and social sustainability especially in the times of ever worsening climatic conditions not only to save their economic interests but also to save future generations.

Scholars have defined sustainability from various perspectives but from the environmental aspect, all of them have common understanding of the concept and that is "doing business in a way that safeguards the natural environment, and the rights of the generations to come" (Jennings & Zandbergen, 1995; Malik et al., 2021; Roca-Puig, 2019; Shrivastava, 1995). Sustainable development is indeed mostly referred to as the creation of a balance between Profit, Planet and People ("Triple bottom line"). Sustainability is achieving a balance between people, planet and profits and achieving this balance is perceived as a difficult and, in some cases, a controversial challenge (Haffar & Searcy, 2017). An essential element to achieve sustainability is to provide variety of novel product and services to the customers can help the organizations to achieve sustainable outcomes at large (Asadi et al., 2020). Likewise, Dangelico (2016) is of the view that it can prove to be highly beneficial for the businesses aiming to achieve Triple Bottom Line. Therefore, the institutionalization of Green Innovation (GINNO) both green product and green process innovation practices and initiatives at the organizational level to foster sustainable organizational outcomes is the way to go in the current business scenarios (Asadi et al., 2020). Green product innovation (Gprod) is "the production of a new product or service that inflicts no or reduced negative impact on the environment that the current or competing product" (Wong, Lai, Shang, Lu, & Leung, 2012). Green process innovation (Gproc) "is the improvement of existing production processes and use of environmentally friendly technologies to produce goods and provide services that impose no or reduced negative impact on the environment" (Wong et al., 2012). This clearly states that green innovation (GINNO) demands the implementation of new processes, new technology, new procedures which obviously is an organizational level endeavor and requires highest levels of commitment. GINNO emphasizes on revitalizing the product and processes so that business can be operated in eco-friendly ways (Morant, Henseler, Leal-Millán, & Cepeda-Carrión, 2017). According to

Gunasekaran et al. (2017); Singh, Del Giudice, Chierici, and Graziano (2020) GINNO encompasses through various activities i.e. the purchase of environment friendly inputs, reducing production wastes, making eco-friendly products, controlling GHG emissions and efficient use of water, electricity and other raw materials.

However, with regard to the connection between Green Innovation (GINNO) and Sustainable Performance (Sus_Performance), multiple studies have found positive association and contrary to this, there are several researchers who have reported and inverse relationship between GINNO and sustainability dimensions. Clearly the results of the various studies support both sides of the argument on GINNO and organizational performance (Saudi et al., 2019). For example, as highlighted, organizational green initiatives are inversely related with environmental and operational performance dimension of the organization (Eltayeb, Zailani, & Ramayah, 2011; Green, Zelbst, Meacham, & Bhadauria, 2012; Zhu, Sarkis, & Lai, 2007), "no effect on operational performance" (Perotti, Zorzini, Cagno, & Micheli, 2012). Similarly, Sezen and Cankaya (2013) found no relationship between green product innovation and sustainable performance. Tantayanubutr and Panjakajornsak (2017) tried to find out the association between GINNO and sustainable performance and reported a positive link between the two variables, with financial performance(Khan, Arif, Sahar, Ali, & Abbasi, 2022; Singh, Del Giudice, Chiappetta Jabbour, Latan, & Sohal, 2022) and environmental performance (Rehman, Kraus, Shah, Khanin, & Mahto, 2021) . Similarly Alraja et al. (2022); Asadi et al. (2020) revealed that GINNO is positively associated with sustainable performance. Contrary to this, Khan et al. (2022); Saudi et al. (2019) maintains that GINNO and organizational performance relationship remains unclear, and negatively significant with sustainable performance (Junaid, Zhang, & Syed, 2022). Considering these inconclusive findings and the few researches that have investigated the direct association between GINNO(green product innovation and green process innovation) and sustainable performance (environmental performance, economic performance and social performance) (Imran, Alraja, & Khashab, 2021). Similarly, multiple researchers have pointed out that studies are few in this area that have empirically investigated the link between GINNO and sustainability (Asadi et al., 2020; Imran et al., 2021).

Considering the inconclusive results and lack of clarity on the issue, this research aims to confirm the relationship between organizations' practice (Gprod, Gproc) and Sustainable performance (environmental performance, economic performance, social performance) especially in the manufacturing sector of Pakistan. Nonetheless, the study is quite unique from multiple aspects. First, the combination of variables and the relationships being investigated in this study based upon the research gaps and theoretical foundations of RBV set this study apart from the previous researches, as the evidence of such studies is hardly available in literature especially in the context of Pakistan. Second, this research is expected to set new directions for researchers and policy makers to design their future projects. However, as the focus of the study is the listed organizations in the manufacturing sector of Pakistan, the results are less likely to be generalizable. The remainder of this study contains the literature review, hypothesis development and theoretical development. This will be followed by research methodology, data analysis and results section along with the discussions on results. Finally, the study presents the implications, limitations, future research avenues and a conclusion.

LITERATURE REVIEW

Green Innovation (GINNO)

Green innovation is defined as "innovations that aim to develop environment-friendly products and processes" (Albort-Morant, Henseler, Cepeda-Carrión, & Leal-Rodríguez, 2018). There are various titles that are used to refer to green innovation in the past studies. For example, According to Takalo and Tooranloo (2021) "Green innovation", "innovation" ,"eco-innovation" and "sustainable development" are widely used titles by the scholars in past studies. It is important to mention here that GINNO does not occur at its own. There are multiple forces that drive the adoption of GINOO initiatives and "pressure to sustain" is amongst the major forces which ultimately lead to the achievement of sustainable performance of the organization (Jia, Liu, Chin, & Hu, 2018; Mehta & Chugan, 2015; Saudi et al., 2019; Xiu, Liang, Chen, & Xu, 2017). This proves that, although GINNO impacts the organizational sustainable performance but the degree and nature of impact will depend upon the nature of GINNO initiative (product innovation, process innovation, administrative innovation etc) (Xiu et al., 2017).

Dimensions of green innovation

Generally, GINNO is composed of two types, Green Product Innovation (Gprod) and Green Process Innovation (Gproc). On the similar lines, most authors have reported two types of GINNO; green product (Gprod) and green process (Gproc) innovations. (Chen, 2008; Chen, Lai, & Wen, 2006; Chiou, Chan, Lettice, & Chung, 2011). It is obvious that serving the customers to satisfy their needs is main objective of every business and its processes. Therefore, the real purpose to strive for service/Gprod is to enhance the quality, services and functioning of the products for customers and clients (Takalo & Tooranloo, 2021). Although, from the organizational perspective, the main objective of both types of GINNO is to green the organization but both the types of GINNO are different from each other where Gprod focuses on the end while Gproc focuses on the means. But as far as the Gprod is concerned, it is the manufacturing or producing the product or a service in a way that it creates no or lesser negative impact on the environment than the existing or competitive products or service (Wong et al., 2012). This means that the focus here is to revitalize the basic product itself. On the other hand Gproc focuses on the means; to redesign, reengineer or bringing about improvement in the existing production processes and utilization of pro-environmental technologies and means of production that inflict absolutely no or lesser negative impact on the environment (Wong et al., 2012). That is, the core focus of Gproc is to restructure the process of production so that there are lesser or no harmful effects on the surroundings.

Benefits of green innovation (GINNO)

GINNO offers multiple benefits to the organization both in the short run and long run. According to Chang (2011); Chen (2008); Chen et al. (2006); Woo, Chung, Chun, Han, and Lee (2014), the implementation GINNO initiatives ensures several organizational benefits such as; redesigning of product and manufacturing processes to reduce energy-consumption, air-pollution, waste and to control the overall negative impact of business on the surroundings (Chang, 2011; Chen, 2008; Chen et al., 2006; Woo et al., 2014). Saudi et al. (2019) highlighted some other benefits of GINNO i.e. knowledge enhancements, time efficiency and cost reduction. Moreover, environmental and economic sustainability are also included in the list of major benefits resulted from adopting GINNO initiatives (Fliaster & Kolloch, 2017). Likewise, GINNO can be very helpful for organizations aiming for a long term completive advantage (Hur, Kim, & Park, 2013). Additionally, organizational led GINNO can help it to achieve sustainable competitive advantage and strengthen its green image (Chen, 2008; Chen et al., 2006). Similarly, Takalo and Tooranloo (2021) have summed up most of the potential benefits of adopting GINNO within an organization including; educating people on waste management and pollution management, ensuring the availability of green talent, decreased environmental hazards and performance optimization in organizations. Multiple authors have reported that increased performance was achieved due to organizational GINNO(Lin & Chen, 2007), Gprod (Lin, Tan, & Geng, 2013) and green practices (Armbruster, Bikfalvi, Kinkel, & Lay, 2008; Mitra & Datta, 2014; Teece, Pisano, & Shuen, 1997; Vanalle, Ganga, Godinho Filho, & Lucato, 2017). According to (Schumpeter, 1942), GINNO support the fulfillment of the green expectations of customers which safeguards the surroundings where they operate (Gürlek & Tuna, 2018). These are probably the reasons why GINNO has gained the center-stage position for business and communities around the globe. Furthermore these benefits highlight the strategic importance of supporting and adopting GINNO initiatives.

Nonetheless, today, GINNO has gained significant attention of business managers who want to stay ahead of their competitors and to capture a greater market share. A highly successful GINNO enables business to strengthen their market standing by alluring more customers towards the eco-friendly products and services that lead to sustainable competitive advantage. Just like any other organizational initiatives, GINNO also have certain prerequisites which determine its success rate. But this needs to be explored that what are those various contextual factors that determine the effectiveness of these benefits and the organizational performance (Saudi et al., 2019) that result in the formulation and implementation of GINNO initiatives.

It is important to point out what determines the GINNO and how much is known about its determinants. Researchers have highlighted many contextual and organizational level factors that are necessary for successful implementation of eco-friendly innovation. For example, adoption of green technology (Chou, 2014; Huang & Li, 2017), developing a supportive environment in the organizations through knowledge-management systems (Tseng, Tan, & Siriban-Manalang, 2013), institutionalizing that green/eco-friendly culture (Chu, Wang, & Lai, 2019; Gürlek & Tuna, 2018), developing a supportive/collaborative atmosphere within the organization to that facilitates the

green the execution of green innovation (Burki & Dahlstrom, 2017; Zailani, Govindan, Iranmanesh, Shaharudin, & Chong, 2015; Zhu et al., 2007), top management and leadership support for the innovation (Burki & Dahlstrom, 2017; Dangelico, 2015; Tseng et al., 2013), implementing knowledge-management systems (Dangelico, 2015; Wong et al., 2012; Zimmerling, Purtik, & Welpe, 2017) and implementation of various environmental regulations (Chiou et al., 2011; Lee & Kim, 2010; Wong et al., 2012; Yang, Chen, & Li, 2016), are all highlighted as the important determinants for GINNO implementation in organizations and communities. An important determinant of GINNO is Green management in most cases but it is to kept in mind that the contextual factors in developed & underdeveloped world play their bit that effect the strength/direction of the association between GINNO and Sus_Performance (Brik, Rettab, & Mellahi, 2011; Rojšek, 2001), because both the developed and underdeveloped countries are vastly different from each other in terms of their financial, environmental, societal and legal structure. Greening the process in developed countries largely depends upon the resources and financial strength and market share of the firms. Whereas, business organizations in the less developed or emerging economies do not have the similar financial strength and resources (Brik et al., 2011), thus greening of the organization is mainly initiated in response to legal , social and institutional pressures.

Sustainability

Researchers have used various names or labels in past researches to describe the concept of sustainability, for example “TBL”, “sustainability performance (SP)”, “PPP” and “corporate sustainability” (Fauzi, Svensson, & Rahman, 2010; Maletic, Podpečan, & Maletic, 2015; Nicolăescu, Alpopi, & Zaharia, 2015). Various theoretical perspectives have been applied by the researches to investigate and understand the sustainable performance. Mostly scholars have discussed PPP (People, Planet, Profit) from a internal resource based perspective that emphasize the integrating the organizational resource, strategies and environmental aspects (FadzlinaMohdFahmi & Ismail, 2020; Russo, 2003). Likewise, sustainability in this study is discussed based on the theoretical assumptions of RBV, which states that Sus_Performance and competitive advantage are achieved on the basis of optimal utilization of scarce and inimitable resources developed by the firms (Barney, 1991; Gile, Buljac-Samardzic, & Van De Klundert, 2018). RBV emphasizes on the internal resources (Finance, Technology, Human Resources, Structures, Strategies etc.) of an organization and assumes that these resources can facilitate in formulating organization strategies to achieve an edge over the competitor in the long run (Madhani, 2010). But it is important to point out that these resources have to be inimitable and non-substitutable in order to leverage the competitive advantage of the organization that will lead to Sus_Performance (Barney, 2001).

As discussed, the concepts of TBL, sustainability, sustainable performance and PPP have been used as an alternative to the main concept “sustainability” in this research. Over the years organizations have reaped many benefits by employing sustainability initiatives in to their environmental agenda. Organizations have successfully combined and pursued all three dimensions of sustainability to cater the needs of corporate greening agenda (Khan, Wu, Saufi, Sabri, & Shah, 2021; Zeng, Zhao, & Zhao, 2020), to considerably decrease the production cost while adding more value to environmental performance and production at the same time (Koo, Chung, & Ryoo, 2014). Despite the importance placed on the integration of all three dimensions of sustainability, researchers and organizations have paid lesser attention on the environmental and social aspects of the Sus_Performance thus far. Thereby, requiring more efforts to understand and find out the antecedents of each dimension of sustainability. It is important to mention that sustainability, TBL, PPP or sustainable performance comprised of three dimensions; environmental performance, economic performance and social performance, thus sustainability is a combination/ integration of the three different concepts (Elkington, 1994; Furnish, Kay, & Xia, 2013) and the current research measures it by using these on these three main dimensions:

- Economic Performance (ECP)
- Social Performance (SOP)
- Environmental performance (ENVP)

In view of this, it can be argued that the achievement of these three dimensional performance is inevitable for long term and sustained growth (Khan, Wu, et al., 2021; Nilashi et al., 2019).Organizations need to create a balance amongst economic, environmental and social performance dimensions for achieving competitive advantage. According to Chardine-Baumann and Botta-Genoulaz (2014), TBL dimensions must be synchronized in order to get better long term performance(Chardine-Baumann & Botta-Genoulaz, 2014). However, these three dimensions

also have different corresponding indicators which can be used to determine the direction of the organizations towards the achievement their relative goals.

Economic performance (ECP)

One of the three components of Sus_Performance that organizations are looking to target is the sustainability of economic performance (ECP). Economic performance has been the emphasis of organizations and researchers over the years. Economic performance is composed of several indicators that should be taken into account when measuring the concept. Past researchers have highlighted multiple indicators which can be used to evaluate ECP, for example the profit that the firms earns in a given period, the amount of tax, income (Zhu, Sarkis, & Lai, 2012), ROS, market share (Green et al., 2012), financial statistics (Lopes de Sousa Jabbour, VazquezBrust, Chiappetta Jabbour, & Andriani Ribeiro, 2020), assets and liabilities (Iqbal, Ahmad, Nasim, & Khan, 2020). However, all the individual and bodies who have associated stakes with the organizations are pushing for the appropriate use of the financial base to meet environmental and social objectives which are equally important for the achievement of sustainability.(Lopes de Sousa Jabbour et al., 2020). But this is to be kept in mind that the parameters used for the assessment of economic performance are not limited to the monetary or financial aspects or indicators only.

Past researchers have also highlighted the importance of the non financial parameters of to measure the business financial performance i.e. increase in the market share of the organization, entry/expansion to untapped markets, and product positioning in market (Chin et al., 2015; Geng et al., 2017). This highlights the importance of both financial and non-financial indicators for achieving ECP. Literature also provides more a more specific compositions of ECP based upon three variables; market performance, financial performance and operational performance. Whereas, marketing performance of business organization is measured using the indicators like "the achievement of marketing positioning" and the "market share" (De Giovanni, 2012; Yang, 2013), the financial/economic performance is measured using "profitability indicators" (De Giovanni, 2012; Yang, 2013), while the operational performance is evaluated "based upon the efficiency in production and distribution"(Wong et al., 2012; Yang, 2013).

Social performance (SOP)

The second important dimension of Sus_Performance is Social Performance (SOP) (Khan, Wu, et al., 2021). It aims at improving the lives of the society and the employees working for the organization. SOP is defined as "the enterprise's commitment to incorporate social benefits into business strategies and operations, focusing on stakeholder satisfaction, social responsiveness" (Clarkson, 1995), and "involving internal factors" i.e. employment practices and "external factors" i.e. community relations and social impact. (Carroll & Shabana, 2010; Székely & Knirsch, 2005). SOP is evaluated based upon the determinants including, organizational social-commitment, employee T&D, social welfare support, working conditions for the employees and other employee-related issues (Amui, Jabbour, de Sousa Jabbour, & Kannan, 2017). Pislaru, Herghiligiu, and Robu (2019) have highlighted some other important determinants of SOP such as, various employee support and recognition programs, employee health & safety, product liability and consumer relationships management. Considering these indicators of SOP, one cannot deny its importance because it is as valuable as the other dimensions of sustainability i.e. financial performance (Lopes de Sousa Jabbour et al., 2020).

Researchers have broadly categorized SOP indicators into three categories, namely; Employee practices, community relations and social impact. First, the employee practices are measured by looking at the improvement in employee engagement in organizational matters and in business practices related to working environment, pay & prerequisites and fulfillment of other basic human rights (De Giovanni, 2012; Yang, 2013). Second, community relations measure the degree of corporate interactions with all the stakeholders and with the people living in its surroundings, developing mutual bond, trust and supportive relationships (De Giovanni, 2012; Yang, 2013). While the third component "Social impact" measures the impact of corporate initiatives and operations on society and communities (Carroll & Shabana, 2010; Yang, 2013).

Environmental performance (ENVP)

Another important aspect of sustainability is Environmental Performance (ENVP). It aims at taking care of the environment in which the firm operates in a way that there is absolutely no harm or environmental degradation caused because of the firms operations. It is imperative for organizations to meet demands of all the stakeholders

precisely which are related to the environmental protection, so that the primary objective of securing higher profits and maximization are met. Nonetheless, to satisfy the stakeholders either internal, external or both, scoring good on environmental performance has gained more significance. According to Zhu and Sarkis (2004) ENVP refers to "the corporate operation in response to environmental challenges, covering all impacts from production, products and services". The main determinants of ENVP include the extent of pollution control, efficient resource utilization and environment management (Chiou et al., 2011; Zhu, Sarkis, & Lai, 2013). Literature highlights that, the ENVP of firms is also measured using other indicators , e.g. minimal usage of harmful materials (Akanmu, Hassan, & Bahaudin, 2020), reducing GHG emissions and waste generation (Iqbal, Ahmad, & Ahmad, 2018), reducing the environmental harmful effects and reporting the extent to which environmental policy compliance is met (Pislaru et al., 2019). However more specifically, researchers have also pointed out three important dimensions of ENVP, namely; pollution management, resource efficiency and environment control.

Whereas pollution management refers to evaluation of organizational performance with respect to polluting or carbon emissions, while "resource efficiency" refers to the use organizational especially natural resources in a way that no environmental degradation or harm is caused and the last aspect "Environment control" refers to the designing and development of physical workplace in a way so that organizational effectiveness is achieved (Giovanni, 2010; Yang, 2013; Zhu et al., 2013).

Hypothesis Development

Green innovation and sustainable performance

Organizations that put more efforts and resources to be an environmentally responsible entity can gain more advantages over their rivals (Wagner, 2015). According to Schumpeter (2013) who is also of the similar view that, green innovation not only is necessary to meet the demands of the customers but also plays a central role in protecting the environment. So the basic aim of GINNO is to meet the shareholders expectations, green expectations of customer and also of the society in general.

Singh et al. (2022); Song, Yu, and Xu (2020); Tang, Walsh, Lerner, Fitza, and Li (2018) pointed out that past researches that have examined the association between GINNO and performance are ambiguous and unclarity still prevails. Such inconclusive results prompted the researcher reconfirm the relationship.

It is important to highlight here that organizations have been giving more value to the economic aspects of the business because of obvious reasons (Neri, Cagno, Di Sebastiano, & Trianni, 2018; Van der Byl & Slawinski, 2015); but mere pursuits of economic objectives is not the way forward especially for organizations that looking to achieve sustainability. The social and environmental objectives are also important and need to be taken care off (Henri & Journeault, 2010). Because organizations that take care of the environment enjoy a better public image, increased no. of customers, strong market positioning , loyal employees (Fernando, Jabbour, & Wah, 2019) and the ability to attract and hire individuals with green mindset (Mehta & Chugan, 2015). This means that organizations that invest in social accountability enjoy more benefits than their rivals (Wagner, 2015; Yong et al., 2020). Like wise, Rodríguez-Antón, del Mar Alonso-Almeida, Celemín, and Rubio (2012) pointed out that organizations are facing many pressures from stakeholders to better their ENVP. These pressures are pushing the organizations to strive for gaining a more sustainable competitive advantage (DiPietro, Cao, & Partlow, 2013), increased operational efficiency and a better goodwill (Quazi, 1999). Asadi et al. (2020); Green and Inman (2005) revealed that organization that implement green practices enjoy better economic gains as a result of more satisfied customers, good market positioning and a better public image.

Results of many past studies have indicated that firms that pursued GINNO have remained highly successful (Albort-Morant, Henseler, Leal-Millán, & Cepeda-Carrión, 2017), outperformed their competitors in all dimensions of performance based upon their green resources, have inbuilt capacity to meet the customers' demands (Albort-Morant, Leal-Rodríguez, & De Marchi, 2018; Allameh, 2018; Del Giudice, Carayannis, Palacios-Marqués, Soto-Acosta, & Meissner, 2018), thus making valuable addition to both, tangible and intangible resources of the organization.

Multiple studies conducted in the recent past reported a strong positive relationship between GINNO and Sus_Performance. For example, Huang and Li (2017) highlighted that GINNO can be helpful in increasing overall performance. Similarly, Fernando et al. (2019) pointed out that eco-innovation can lead to a better service innovation which can ultimately guide the businesses towards an improved organizational performance. Tantayanubutr and

Panjakajornsak (2017) recently found positive link between GINNO and corporate sustainability. Asadi et al. (2020) in a latest's study carried out in hotel industry revealed that GINNO positively influences the Sus_Performance. Despite all this, there a notion that findings related to GINNO and Sus_Performance are still ambiguous (Tang et al., 2018). Even though many researchers have managed to highlight a positive association between organizational GINNO and firm performance, but there are several others who have reported the results that are vice-versa. For example, green practices are not significantly positively predicting the ENVP and Operational Performance (Eltayeb et al., 2011; Green et al., 2012; Perotti et al., 2012; Zhu et al., 2007). Similarly, Palmer, Oates, and Portney (1995) , suggest that firms engaging in GINNO could be inefficient and could end up with a decrease in productivity. This could be purely because GINNO demand more consistent efforts and deployment of various resources financial, technological, human etc. for its effectiveness. Sezen and Cankaya (2013) on the other hand found mixed results, as he tested positive impact of GPROC on sustainability but reported insignificant effect of GPROD on sustainability. Researchers have also reported about the ambiguity of results and lack of studies on the issue. For example, despite the significance of the issue, pressures form national and international bodies and forces, only few researches have investigated the issue of GINNO and Sus_Performance (Zailani et al., 2015). Another group of researchers also highlighted that, GINNOs are core competencies of the organizations and few researchers have paid attention to test it with Sus_Performance of the manufacturing industry (Zailani et al., 2015).

Therefore, using the RBV perspective, it is predicted that both Gprod and Gproc are critical organizational resources (Barney, 2001; Boxall & Steeneveld, 1999; Wright, Dunford, & Snell, 2001), that firm uses to enhance its performance (Singh et al., 2020). Therefore, based upon the above discussion this study hypothesized that

H: Green (product and process) innovation is positively associated with sustainable performance (1a: Environmental, 1b: Economic performance, 1c: Social Performance).

Theoretical framework

Current research draws upon the RBV to investigate the effects of GINNO practices on Sus_Performance. As per RBV theory Barney (1991), resources possessed by a firm are forms of tangible and intangible assets either permanently or semi permanently. Hajikhani (2015) is of the view that RBV considers three types of resources as most important; tangible, intangible and organizational related resources. Whereas, certain examples of resources include brand names, internal knowledge management systems, HR the procedures applied to get the work done, the mechanical equipments, organizational culture, leadership and its styles etc. These resources are considered to be valuable, rare, non-copy able and that enable the organizations achieve sustainable competitive advantage (Sirmon, Hitt, Ireland, & Gilbert, 2011; Wernerfelt, 1984). Resources possessed by the organizations are the fundamentals and set the tone for GINNO strategy (Chen, 2008; Song et al., 2020; Xie, Huo, & Zou, 2019). Organizations that provide more resources for creating green development/ products and service end up creating green value for the customers (Asadi et al., 2020). GINNO is an organizational resource and initiative that is intangible and that gets difficult for competitors to imitate (Asadi et al., 2020; Chiou et al., 2011). Organizations are facing many pressures from their stakeholders to go green (Weng, Chen, & Chen, 2015) therefore it has become inevitable for firms to develop green systems that can foster sustainability in all three dimensions (Asadi et al., 2020). Thus based upon RBV, this research predicts that GINNO (green product innovation, green process innovation) will be helpful achieving sustainable environmental, economic and social performance.

RESEARCH METHODOLOGY

This study applied quantitative research design as it is trying to investigate the direct relationships between variables i.e. GINNO Practices and Sus_Performance with the help of theories models and various hypothesis. According to Cooper, Schindler, and Sun (2006) the said research design proves to be highly effective when the researcher aim to find out cause and effect relationships. Population for this research is the manufacturing sector organizations which are listed on Pakistan Stock Exchange. Researcher selected listed manufacturing organizations purely because they pay more attention to issues (Guerci, Longoni, & Luzzini, 2016), because they have specialized HR departments and follow predefined HR practices (Tzafrir, 2005) and because regulatory bodies normally have a closer look and frequently audit such organizations (Amran, Ooi, Nejati, Zulkafli, & Lim, 2012). Moreover, according to PSX (2020) all the listed companies on Pakistan Stock Exchange are required to function in

accordance with the sustainable development goals sent by UNDP that's why the study will more specifically focus on manufacturing companies listed on Pakistan Stock Exchange (PSX).

A total of 366 listed manufacturing firms available on PSX (Pakistan Stock Exchange) website were selected (PSX, 2020). Moreover, a large organizations is considered to be the one that can accommodate at least 200 employees (Yong et al., 2020), whereas (PBS, 2021) describes large scale manufacturing firms as the establishments having 10 or more employees and that is registered under the factories Act 1934. According Hair, Black, Babin, Anderson, and Tatham (2014); Hair, Ringle, and Sarstedt (2011) appropriate sample-size for SEM should be at least 200 for getting accurate results. Simple random sampling technique is applied to select the respondents form the available list of manufacturing firms on random basis. All the scales/items used in this study are validated and are adapted from previous researches. Moreover, this research has employed a 7-point-Likert-Scale purely because various researchers in the past have confirmed that data become significantly less accurate if the questions measured by scale that is either lesser than 5point Likert Scale or greater than 7-point Likert Scale (Johns, 2010).

Measures

The measures used in this study were taken from past researches & the operational definition of each construct along with the sample item is provided in this section. The concept of GINNO refers to product and process innovation in the manufacturing organizations that lead to the reduction in overall detrimental effects on the environment. Whereas, for this study "Green Product Innovation" refers to modifying the products of the manufacturing organization in way that it doesn't contain any compound which is harmful or toxic to the environment and sample item "Our firm uses less or non-polluting/toxic materials". This scale was adapted from the past studies by Chen (2008); Chen et al. (2006); Roper and Tapinos (2016). Moreover, the same scale was used by Wang (2019). Likewise the concept of green process innovation refers to "redesigning the entire production process of the manufacturing organizations with an aim to mitigate its negative environmental impacts" and sample item is "Our firm uses recycled, reused, or remanufactured materials". This scale was adapted from (Chen, 2008; Chen et al., 2006; Roper & Tapinos, 2016).

For this study the dimension of sustainability Environmental performance is conceptualized as "the ability of the organization to mitigate its air emissions, polluted water , wastes and the frequency of environmental mishaps along with an increase in the use of renewable energy at the same time" , economic performance refers "Improvement in organizational overall operational, financial and marketing performance resulting from the institutionalization of green initiatives" and social performance is conceptualized as "The improvement in the real positive effects of the organizational green practices in terms of better environment, health and other opportunities provided to the employees , community and society at large" adapted from ENVP (Zhu et al., 2013), ECP (Green & Inman, 2005; Zhu, Sarkis, & Geng, 2005) and SOP (De Giovanni, 2012).

To collect responses related to the questionnaire, the researcher first contacted HR managers/HR directors by means of a telephone call in order to gain insights about the adoption of green practices (Green Innovation) in their organization, to what extent these practices are followed and later the research instrument was forwarded to them. Once the data was collected, the research applied structural equation modeling (SEM) approach for its analysis. Whereas, preliminary data analysis and descriptive statistics were calculated by using SPSS 20 and subsequent analysis was performed with Mplus 7. Many researchers in the recent past have similarly used the two software packages for performing statistical analysis for example (AminiTehrani et al., 2021; Li, Guo, & Zhou, 2021; Saleem, Qadeer, Mahmood, Ariza-Montes, & Han, 2020; Zhou, Li, & Gao, 2020). to proceed with SEM technique, we examined the measures to assess, convergent validity and internal consistency reliability.

This study undertaken confirmatory factor analysis by utilizing Mplus (Muthén & Muthén, 2017) to examine the validity. According to Hair et al. (2010), Confirmatory factory analysis required the large sample size for effective results whereas a minimum of 150 respondents are required for the same. Moreover, Hair et al. (2014) recommended that in factor analysis, items having values of less than0.5 should be removed from the scale for the improvement in the quality of scale. After the analysis of the measurement model, the next step was to measure the structural model which focuses upon the dependencies amongst different variables of the model. Latent variable structural equation modeling (SEM) using ML estimation in Mplus 7 (Muthén & Muthén, 2017) was used to estimate our hypothesized model and to find out predictive capacity of the model.

RESULTS

The first section of the results presents the response rate of the study. Next, this section highlighted the findings of present study. Whereas, descriptive statistics for all variables obtained through SPSS 20 are discussed while the main results of the present study obtained thorough Mplus 7.0 are discussed in the subsequent sections. First the measurement model using STDYX-loadings was examined in order to confirm the item-reliability, internal-consistency-reliability, discriminant-validity and convergent-validity. Whereas, part two of the section represents the structural models that presents the coefficients and significance values of the variables for testing hypothesis of the direct effect.

Response Rate

For data collection, a total of 366 questionnaires were forwarded to the HR Managers/ HR Directors of the listed manufacturing firms on Pakistan Stock Exchange. For reminders, the concerned respondents were telephonically accessed to know and clarify their queries about the questionnaire if any, as this technique is suitable for increased response rate of the mailed survey (Traina, MacLean, Park, & Kahn, 2005). The respondents were offered the facility of interview if they need a more detailed discussion or understanding of the survey. The researcher received back a total 249 mail (courier) from the concerned respondents of the manufacturing firms and out of which 222 questionnaires were valid but only 209 were complete filled, while remaining 13 were rejected because a large no. of questions were left blank. So these 209 (Approx. 58% of 366) completely filled questionnaires were used for further analysis through SPSS 20 and Mplus 7.

Table 1: Response rate of the questionnaires

Items	Response Rate
Total distributed	366
Returned	249
Valid	222
Questionnaire with most part missing	13
Total no. of questionnaire used for analysis	209
Response Rate	58%

Descriptive Statistics

In order to quantitatively describe the summary and features of the variables involved in the research the descriptive analysis was performed using SPSS 20. The analysis involved all the variables including independent variable GINNO dimensions, Sus_Performance dimensions. The analysis revealed MEAN values of the variables and their standard deviation. The mean score of the variables range from 4.8 to 6.4 whereas the standard deviation ranges from 0.75 of Green Process Innovation to .98 of Green Product Innovation. More detailed and specific statistics are provided in Table 1.

Table 2: Descriptive statistics of all variables

Variables	Mean	Std.
Green Product Innovation (Gprod)	4.8947	.98164
Green Process Innovation (Gproc)	5.9694	.75206
Environmental Performance (ENVP)	6.3990	.84341
Economic Performance (ECP)	6.3914	.82958
Social Performance (SOP)	6.4094	.79984

N = 209, Mean = mean value of variables, Std = Standard Deviation

Measurement of Assessment Models

For this study, the researcher has implemented two step approach containing confirmatory factor analysis (CFA) and structural equation modeling (SEM) (Anderson & Gerbing, 1988). First of all, measurement model assessment was made taking into account the Convergent Validity and Discriminant Validity and in the next step SEM was assessed. (Anderson & Gerbing, 1988). But before moving ahead , it is important to first examine the model

fit indices to decide if the model is fit enough to pursue. For that purpose, various model fit indices provided (Chi-square, SRMR, RMSEA, CFI, TLI) in the Mplus 7 output were analyzed and compared with the minimum and maximum threshold values.

Determining Model Fitness

The model fitness was determined using the values of goodness fit indices provided in Mplus 7 output, Chi-square, root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker Lewis index (TLI) and standardized root mean square residual (SRMR) (Hu & Bentler, 1999). He also provided more details about the range of values lie in the "acceptable" category and the excellent category. According to Hu and Bentler (1999) root mean square error of approximation is excellent when it is less than 0.05 and is acceptable when it is less than 0.08, RMSEA is acceptable up to 0.08 and is categorized as excellent if it is less than 0.05, CFI, TLI > 0.90 are satisfactory and > 0.95 are considered as excellent and SRMR value is also acceptable if it ranges up to 0.08.

Moreover, it is recommended that the values of X^2 goodness-of-fit test (X^2 /df) should be used to determine the goodness of model (Medsker, Williams, & Holahan, 1994; Wang & Russell, 2005). Likewise, the maximum recommended value of (X^2 /df) is up to 5 (Zhang, Sun, Zheng, & Liu, 2019) and more strictly, for excellent model this value should be < 3. But various researchers have provided a range of values of 2-5 as cut offs (eg, Byrne,1989; Carmines & Mclver, 198 1 ; Marsh & Hocevar, 1985) but for this research the researcher has used a highly strict criteria and used 2 as cut off point for goodness of model. Moreover, the researcher has examined three different models, the first model examined in a way where all the indicators / items are loaded on their relevant latent variables (green product innovation, green process innovation, environmental performance etc.) for the measurement model, whereas, the in the Second model, items are loaded first on their relevant sub dimension i.e. green product innovation, environmental performance etc. of the main latent variables and then those sub-dimensions are loaded to their relevant latent variable, thus creating second order constructs of the main variables. Finally the third model comprised of the a second order construct of GINNO and first order latent variables i.e. environmental performance, economic performance and social performance (Sus_Performance dimensions). The researcher compared the fit indices and estimates of the models and found the third model as more reliable and suitable considering the criteria suggested by different researchers. Table 2 highlights more details which support the decision of selecting the second model.

Table 3: Model fitness comparison

Model	X^2	X^2/df	CFI	TLI	RMSEA	SRMR
Quality Criteria	> 0	2	> 0.9	> 0.9	0.8	0.8
Model 1	293	293/240 = 1.22	0.985	0.983	0.033	0.036
Model 2	296	296/244 = 1.21	0.985	0.984	0.032	0.040
Model 3	294	294/242 = 1.21	0.986	0.984	0.032	0.036

X^2 = Chi sq. value, df = Deg. of freedom, RMSEA = Root mean sq. error of approximation,

CFI = Comparative fit index, TLI = Tucker Lewis index, SRMR = standardized root mean sq. residual.

CFA, Composite Reliability and Convergent Validity of Measurement Model (N = 209)

According to Hair (2009), convergent validity is determined by using the standardized loadings of all the items. The scale is said to have convergent validity if the STDYX loadings of all the items of the constructs are greater than 0.5, which stands true in this case. The scale has a total of 24 items wherein the standardized loadings range from .0696 to 0.881. These values prove that all the items show strong evidence of convergent validity. Table 3 depicts values of standardized loadings are greater than the minimum threshold. Standardized loadings of all the constructs are grouped under the symbol π in the following table.

Table 4: Items loadings, CR and AVE

Latent Variable	Measures/ Indicators	π	CR	AVE
Green Innovation	Green Product Innovation by		0.80	0.51
	Gprod1	0.732		
	Gprod2	0.721		
	Gprod3	0.701		
	Gprod4	0.696		
	Green Process Innovation by		0.83	0.62
	Gproc1	0.793		
	Gproc2	0.84		
	Gproc3	0.723		
Sustainable Performance	Environmental Performance by		0.94	0.75
	ENVP 1	0.875		
	ENVP 2	0.871		
	ENVP 3	0.855		
	ENVP 4	0.852		
	ENVP 5	0.877		
	Economic Performance by		0.96	0.77
	ECP 1	0.867		
	ECP 2	0.894		
	ECp 3	0.878		
	ECP 4	0.877		
	ECP 5	0.874		
	ECP 6	0.881		
	ECP 7	0.873		
	Social Performance by		0.87	0.57
	SOP 1	0.81		
	SOP 2	0.808		
	SOP 3	0.724		
	SOP 4	0.7		
	SOP 5	0.709		

π = standardized loadings, CR = Composite Reliability, AVE = Average Variance Extracted

Internal Consistency Reliability

Internal consistency is technique to judge how well an instrument is actually measuring what the researcher wants it to measure. Put another way, it is the "extent to which all items on a particular sub scale are measuring the same concept" (McCrae, Kurtz, Yamagata, & Terracciano, 2011). As it is mentioned in section 3 of the study, all the scales used in this study are adapted, were already validated and showed strong evidence of reliability in studies from where these scales are borrowed. But because the researcher conducted CFA in this study, it is important to compute composite reliability and AVE of the scale. According to Fornell and Larcker (1981), to insure the internal consistency of the scale, it is important the values of Composite Reliability are greater than 0.7 while the values of AVE should be greater than 0.5. Table 3 highlights the values of CR are greater than the minimum threshold, whereas, the values of AVE are beyond 0.5 which is a sign of the reliability of the measurement model. As far as the composite value is concerned, its minimum value mentioned in the table is 0.80 while its maximum value is 0.96. Whereas, the minimum value of AVE is 0.51 while the maximum value is 0.77. Moreover, construct wise values of AVE and CR are mentioned against each component and listed in Table 3.

Correlation and Discriminant Validity

Discriminant validity was established as the specific variance explained by each latent construct (AVE) was greater than its squared correlation coefficient (i.e. shared variance) with any other construct (Fornell & Larcker, 1981). According to Farrell and Rudd (2009), who defined discriminant validity as "the extent to which a particular

latent variable is different from other latent variables". Diagonal bolded values in the Table 4 represent squared root of AVE while other values represent the correlation amongst corresponding variables. Diagonal bolded values are clearly larger than the other corresponding correlation values, depicting a strong evidence of discriminant validity. This popular and most cited criteria of determining discriminant validity is put forward by Fornell and Larcker (1981) and is also applied in this research. The maximum value of squared root of AVE is 0.88 that corresponds to ECP, whereas, the minimum value as shown in the table is 0.71 which corresponds to Gprod that corresponds to ECP. To provide more specific details of discriminant validity, Table 4 placed as under.

Table 5: Correlation and discriminant validity

Sr.	Constructs	1	2	3	4	5
1	GPROD	0.71				
2	GPROC	0.487	0.79			
3	ENVP	0.416	0.467	0.87		
4	ECP	0.331	0.409	0.5	0.88	
5	SOP	0.156	0.177	0.25	0.11	0.75

**significant at p < 0.05, * significant at p > 0.01

Common Method Variance (CMV) with Harman's Single Factor Test

In order to check common method variance and systematic measurement error in survey data, Harman's single-factor test was also applied to establish common method variance. Table 5 shows the results of the first factor (Harman's Single Factor Test), it highlights that 37.37% variance is explained by the single factor, which is far below the standard limit of 37%. These values show that there is no issue with the data related to CMV

Table 6: Results of CMV analysis (total variance explained)

Component	Initial Eigen Values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.97	37.37	37.37	8.97	37.37	37.37

Structural Model

This section displays and discuss structural model aiming that aimed to assess direct association GINNO and Sus_Performance dimensions. The researcher used standardized path coefficients and their respective *p*-values to determine the validation or rejection of the hypothesis. The results mentioned in the Table 6 and as shown in fig 1, confirm that GINNO is positively significantly predicting environmental performance β = 642 p = 0.00, economic performance β = 543 p = 0.00 and social performance β = 0.250 p = 0.004. Likewise, as demonstrated by the standardized path coefficient between the holistic/ composite variables (GINNO, Sus_Performance) β = 0.806 and is significant with p = 0.000. The results reveal the strong link between GINNO and Sus_Performance and therefore all the hypothesis are "supported". To further confirm the holistic effect of GINNO (Second Order Construct) on the Sustainable Performance (second order construct), the study examined their relationship. Expectedly, the results demonstrated that GINNO has a positive effect on Sus_Performance and thereby validating the effect of GINNO on each dimension of Sus_Performance (Environmental Performance, Economic Performance and Social Performance). Therefore, it is proved that GINNO leads to Sus_Performance of the manufacturing organizations.

Table 7: Hypotheses testing

Hypothesis	β - Value	P – Value	Outcome
H6: → GINN Sus_Performance	0.806	0.000	Supported
H6 a: → GINN ENVP	0.642	0.00	Supported
H6 b: → GINN ECP	0.543	0.00	Supported
H6 c: → GINN SOP	0.250	0.004	Supported

Latent = Latent Variable, β = Standardized beta coefficient,

STDYX = Standardized path coefficients

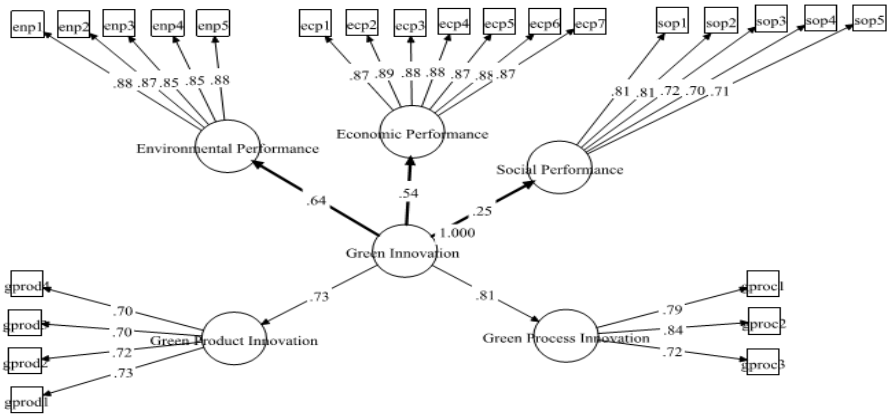

Figure 1: Green innovation effect on enviornmental performance, ecnomic performance, social performance

DISCUSSION AND CONCLUSION

Discussion

Broadly, this research aimed to find "how organizations can achieve Sus_Performance using green innovation practices". As per the researcher's knowledge, the study of this nature has rarely been carried out in past and to the best of knowledge the research framework used in this study is quite unique and novel in its nature which is makes it easier to understand how Sus_Performance in the manufacturing organizations can be achieved using GINNO (Gprod innovation, Gproc innovation). This is because the study examined direct paths between Green Innovation (GINNO) and Sus_Performance dimensions. In order to achieve the overall objectives of this research, a total of 3 hypothesis- sub hypothesis were formulated. Notably, all the above objectives and hypothesis are in line with the underpinning theory resource based view.

To find answers of the research questions, data was collected from the listed manufacturing organizations of Pakistan. A survey questionnaire was designed and was distributed to the office/ head offices of the concerned organizations. The survey response rate is 58% which is considered acceptable given the circumstances. Next section of the study discussed the results of the study, that not only provides about the significance of the results but also highlights to what extent the overall objectives of the research have been achieved. Balancing the economic, environmental and social objectives are the key determinant of sustainable organizational development (Asadi et al., 2020). Keeping this in mind, current research analyzed the link between GINNO and Sus_Performance using the theoretical foundation of resource based view (Wernerfelt, 1984). RBV holds that organizational resources and capabilities are the driving forces of its performance (Xie et al., 2019) and are the main ingredients of successful strategy for gaining long term competitive advantage. GINN are those critical organizational resources that can be leveraged to attain environmental performance (Asadi et al., 2020), social and economic performance. Moving ahead with the analysis of the study, the results demonstrate a positive and significant relationship between GINNO dimensions and Sus_Performance dimensions. These findings are supported by Saudi et al. (2019); Singh et al. (2020) and Asadi et al. (2020) in their recent researches. As the results of the study proved that firms that have supported and implemented GINNO are able to gain more economic benefits, reduce their overall negative environmental impact and better their social image and contribution than their rival firms. Therefore, it has become mandatory for firms to adopt GINNO practices in order to boost their Sus_Performance. Survival without going will not be easier as many business organizations have already realized the importance of implementing green initiatives to gain competitive advantage and to standout out in the market (Asadi et al., 2020).

But it is important to point out that organizations have been emphasizing more on economic performance (Sheth, Sethia, & Srinivas, 2011) and need create a balance between other aspects of performance i.e. environmental and social performance (Gürlek & Tuna, 2018). Previously, scholars have confirmed a positive association between GINNO practices and social performance in the automotive industry (Asadi et al., 2020; Zailani et al., 2015). This indicates that, firms can offer higher quality of novel products and services to make their customers satisfied. Once the customers are happy, the revenues of the organizations will increase and which in turn will provide more funds to the firms for spending on their employees. Consequently, satisfied employees will provide better serve the

customers and the society in general. Likewise, organizations normally adopt GINNO practices to lessen harmful impact of their operations on the natural environment (Asadi et al., 2020; Miroshnychenko, Barontini, & Testa, 2017). The result revealed that manufacturing organizations in Pakistan have started realizing the significance of the GINNO practices in protecting their natural environment and in achieving the environmental performance (Adegbile, Sarpong, & Meissner, 2017). Similarly, Weng et al. (2015) pointed out that GINNO helps in reducing cost of production and production wastes and thus boost the environmental performance. Therefore, using the RBV foundations, this study confirms that GINNO are unique organizational resources and organizations that better implement the environmental management systems, improve their production procedures are in great position to increase their environmental performance. However, the man focus of the organizations remains fixed on the economic performance. The results of the study have proved that GINNO practices lead to financial performance of the organizations. These results are in line with the findings of the (Asadi et al., 2020; Cai, Lysova, Khapova, & Bossink, 2019; Miroshnychenko et al., 2017; Sezen & Cankaya, 2013; Zailani et al., 2015). Organizations that provide green products and services are able to reduce their operational cost by purchasing lower cost material, reducing the energy consumption, better discharge of waste and by adopting differentiation strategy and thus can strengthen their financial position (Asadi et al., 2020; Ayuningrat, Noermijati, & Hadiwidjojo, 2016; de Azevedo Rezende, Bansi, Alves, & Galina, 2019). GINNO provides better solutions for using organizational resources to achieve sustainable environmental, economic and social performance. The adoption of GINN practices will not only improve the current performance indicators but also will open more windows of opportunities that will enable the organizations to attract talented employees, improve employer image, improve customer satisfaction create more wealth, control operational cost, win more contracts and better the organizational image.

Theoretical and Practical Implications

The deteriorating environmental and social conditions, stakeholders pressure and concern for future are constantly haunting the policy makers , researchers and managers and encouraging them to think of new ways of doing businesses. Therefore, the study has addressed this serious issue , encourages the firms to adopt green practices in order to achieve sustainable environmental , economic and social performance and empirically, based upon the theoretical perspective of RBV, analyzed the relationship between green innovation (green product innovation, green process innovation) and environmental , economic and social performance. Drawing upon the RBV, which suggests that organizations must develop such resources RBV asks the firm to possess strategic resources that are valuable, rare, inimitable, and non-substitutable (Barney, 2001), that enable the organizations to achieve and sustain their competitive position. The study has brought forward multiple implications for managers and researchers and highlighted the importance of the adoption of GINNO practices for the achievement of environmental, economic and social performance of the manufacturing organizations. Theoretically, this study has highlighted to the role of GINNO practices as strategic resource that can trigger organizational environmental, social and economic performance. As the concept of green innovation is still emerging (Asadi et al., 2020) and lesser developed countries are specially lagging behind on its adoption, this research has proved that GINNO practices can be leveraged to foster organizational environmental, economic and social performance.

Similarly, for long term and Sus_Performance specifically in the shape of environmental goals, economic goals and social goals, organizations should immediately adopt green production practices and processes. As the results of the study highlighted that GINNO practices lead to improved environmental performance, therefore organizations should invest in green technologies and provide clear guidelines to their employees about the adoption and the use of green practices in order to achieve sustainable competitive advantage. Consequently, firms will earn good scores on the environment performance indicators and will attract more customers which strengthen their financial base. This fact has been supported by the results of the study that GINNO practices are helpful in achieving a better financial performance owing to its ability to reduce carbon emissions, wastage control, lesser use of resources and provision of environment friendly products. Therefore mangers should seriously concentrate on the adoption and implementation of GINNO practices. Likewise, the study also confirms that GINNO is very useful to support organizational social performance indicators and social responsibility initiatives. The managers of the organizations should therefore integrate the environmental and social aspects into their strategic decision making process.

The study also highlighted implications for government and policy makers. Economic gains and economic growth is not possible without organizational greening (Lin & Ahmad, 2017; Raza, Wang, & Lin, 2021), imple-

mentation of the environment management system (EMS) (Khan, Wu, et al., 2021) and knowing that Pakistan is amongst the countries that are defenseless against climate change, the policy makers need to take serious actions (Lin & Raza, 2019). Manufacturing sector of Pakistan should be encouraged to adopt and develop environment friendly technologies and processes so that there is lesser use and wastage of resources. Strict monitoring policy must be adopted to ensure that the organizations are implementing the guidelines of Vision (2025) and Vision (2035) to lessen the environmental degradation (Raza, 2022). Government agencies should encourage and facilitate the organizations to get ISO 14001 certifications, this will facilitate the smooth transformation to organizational greening and will also improve organizational performance.

Limitations of the Study and Future Research Guidelines

Despite making some notable contributions, the study has some limitations too. The research design of this study emphasized on a survey research questionnaire which was designed to collect cross-sectional data. Future studies can be carried out with longitudinal data to gain more insights about the model. Likewise the scope of the study was limited to the manufacturing organizations of Pakistan that are listed with the PSX, future studies should include non-listed manufacturing companies or organizations from services sector in the population which will create more chances for having a larger sample size and better understanding of the phenomenon. Moreover, the study was only limited to the manufacturing sector of Pakistan and the results may not be applicable to other context. Therefore, future studies should probe this model in cross cultural settings/ other countries too. This research has investigated the effect two dimensional GINNO construct on the three dimensions of Sus_Performance. Future studies however, can add more dimensions i.e. technological innovation, administrative innovation, to the construct to understand the true effect green innovation.

Conclusion

Manufacturing organizations are the major contributors to the economic development of Pakistan but factually, at the same time are significantly damaging the country's eco system. Therefore, sustainability has gained more importance owing to increasing competition at local and international level, pressures from stakeholders and regulatory bodies and due to ever depleting natural resources. To counter these issues, business organizations are constantly searching for the best practices and new approaches like green innovation practices to remain and standout in the competition. Therefore this study under the umbrella of theoretical lens of RBV has investigated the direct link between green innovation practices, environmental, social and economic performance. A research questionnaire was designed to obtain data from the manufacturing organizations of Pakistan registered with PSX. The data was analyzed with the help of MPLUS 7.0 version where both measurement & structural models were examined. All the research questions are answered, the objectives of the study are met and conclusion is drawn in the light of the findings of the study thereafter. Moving ahead, this research aimed "To evaluate the influence of green innovation practices on sustainable (environmental, economic and social) performance". The statistical analysis highlighted a positive link between Green Innovation and Sustainable Performance of the organizations in the manufacturing sector. Despite all major contributions of the study it had certain limitations and researchers are encouraged to tap these avenues in future.

ACKNOWLEDGEMENT

The author of the study would like to be grateful of the respondents who took their time out to participate in this research. The author would like to express his gratitude to Dr. Imran Khan Nawaz, Associate Professor, IUB, for his timely guidance in the completion of this research. The researcher would also like to thank the anonymous reviewers for highlighting and recommending revisions in the manuscript before its publication.

REFERENCES

Abdullah, R., Mohamad, M. N., & Thurasamy, R. (2015). Green supply chain management: The role of supply chain integration.

Adegbile, A., Sarpong, D., & Meissner, D. (2017). Strategic foresight for innovation management: A review and research agenda. *International Journal of Innovation and Technology Management, 14*(04), 1750019.

Ahmad, D., & Afzal, M. (2021). Impact of climate change on pastoralists' resilience and sustainable mitigation in Punjab, Pakistan. *Environment, Development and Sustainability, 23*(8), 11406-11426.

Akanmu, M. D., Hassan, M. G., & Bahaudin, A. Y. B. (2020). A preliminary analysis modeling of the relationship between quality management practices and sustainable performance. *Quality Management Journal, 27*(1), 37-61.

Albort-Morant, G., Henseler, J., Cepeda-Carrión, G., & Leal-Rodríguez, A. L. (2018). Potential and realized absorptive capacity as complementary drivers of green product and process innovation performance. *Sustainability, 10*(2), 381.

Albort-Morant, G., Henseler, J., Leal-Millán, A., & Cepeda-Carrión, G. (2017). Mapping the field: A bibliometric analysis of green innovation. *Sustainability, 9*(6), 1011.

Albort-Morant, G., Leal-Rodríguez, A. L., & De Marchi, V. (2018). Absorptive capacity and relationship learning mechanisms as complementary drivers of green innovation performance. *Journal of Knowledge Management*.

Ali, S., Kiani, R. S., Reboita, M. S., Dan, L., Eum, H. I., Cho, J., . . . Shreshta, M. L. (2021). Identifying hotspots cities vulnerable to climate change in Pakistan under CMIP5 climate projections. *International Journal of Climatology, 41*(1), 559-581.

Allameh, S. M. (2018). Antecedents and consequences of intellectual capital. *Journal of Intellectual Capital*.

Alraja, M. N., Imran, R., Khashab, B. M., & Shah, M. (2022). Technological Innovation, Sustainable Green Practices and SMEs Sustainable Performance in Times of Crisis (COVID-19 pandemic). *Information Systems Frontiers*, 1-25.

AminiTehrani, M., Zamanian, H., Daryaafzoon, M., Andikolaei, S., Mohebbi, M., Imani, A., . . . Jalali, Z. (2021). Body image, internalized stigma and enacted stigma predict psychological distress in women with breast cancer: A serial mediation model. *Journal of Advanced Nursing*.

Amran, A., Ooi, S. K., Nejati, M., Zulkafli, A. H., & Lim, B. A. (2012). Relationship of firm attributes, ownership structure and business network on climate change efforts: evidence from Malaysia. *International Journal of Sustainable Development & World Ecology, 19*(5), 406-414.

Amui, L. B. L., Jabbour, C. J. C., de Sousa Jabbour, A. B. L., & Kannan, D. (2017). Sustainability as a dynamic organizational capability: a systematic review and a future agenda toward a sustainable transition. *Journal of Cleaner Production, 142*, 308-322.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411.

Armbruster, H., Bikfalvi, A., Kinkel, S., & Lay, G. (2008). Organizational innovation: The challenge of measuring non-technical innovation in large-scale surveys. *Technovation, 28*(10), 644-657.

Asadi, S., Pourhashemi, S. O., Nilashi, M., Abdullah, R., Samad, S., Yadegaridehkordi, E., . . . Razali, N. S. (2020). Investigating influence of green innovation on sustainability performance: A case on Malaysian hotel industry. *Journal of Cleaner Production*, 120860.

ASEIC. (2016). ASEM Eco-Innovation Index (ASEI). Retrieved from https://bit.ly/3jxkz6d

Ayuningrat, M. P., Noermijati., & Hadiwidjojo, D. (2016). Green product innovation's effect on firm performance of managerial environmental concern and green communication. *Journal of Administrative and Business Studies, 2*(2), 56-63.

Ayuso, S., Rodríguez, M. A., García-Castro, R., & Ariño, M. A. (2014). Maximizing stakeholders' interests: An empirical analysis of the stakeholder approach to corporate governance. *Business & society, 53*(3), 414-439.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17*(1), 99-120.

Barney, J. B. (2001). Is the resource-based "view" a useful perspective for strategic management research? Yes. *Academy of management review, 26*(1), 41-56.

Boxall, P., & Steeneveld, M. (1999). Human resource strategy and competitive advantage: A longitudinal study of engineering consultancies. *Journal of Management studies, 36*(4), 443-463.

Brik, A. B., Rettab, B., & Mellahi, K. (2011). Market orientation, corporate social responsibility, and business performance. *Journal of Business ethics, 99*(3), 307-324.

Burki, U., & Dahlstrom, R. (2017). Mediating effects of green innovations on interfirm cooperation. *Australasian Marketing Journal (AMJ), 25*(2), 149-156.

Cai, W., Lysova, E. I., Khapova, S. N., & Bossink, B. A. (2019). Does entrepreneurial leadership foster creativity among employees and teams? The mediating role of creative efficacy beliefs. *Journal of Business and Psychology, 34*(2), 203-217.

Carroll, A. B., & Shabana, K. M. (2010). The business case for corporate social responsibility: A review of concepts, research and practice. *International Journal of Management Reviews, 12*(1), 85-105.

Chang, C.-H. (2011). The influence of corporate environmental ethics on competitive advantage: The mediation role of green innovation. *Journal of Business Ethics, 104*(3), 361-370.

Chardine-Baumann, E., & Botta-Genoulaz, V. (2014). A framework for sustainable performance assessment of supply chain management practices. *Computers & Industrial Engineering, 76*, 138-147.

Chen, Y.-S. (2008). The driver of green innovation and green image–green core competence. *Journal of Business ethics, 81*(3), 531-543.

Chen, Y.-S., Lai, S.-B., & Wen, C.-T. (2006). The influence of green innovation performance on corporate advantage in Taiwan. *Journal of Business ethics, 67*(4), 331-339.

Chiou, T.-Y., Chan, H. K., Lettice, F., & Chung, S. H. (2011). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation Research Part E: Logistics and Transportation Review, 47*(6), 822-836.

Chu, Z., Wang, L., & Lai, F. (2019). Customer pressure and green innovations at third party logistics providers in China: The moderation effect of organizational culture. *The International Journal of Logistics Management*.

Clarkson, M. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of management review, 20*(1), 92-117.

Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods* (Vol. 9). New York, NY: Mcgraw-hill.

Cuadrado Quesada, G., Klenke, T., & Mejía-Ortíz, L. M. (2018). Regulatory challenges in realizing integrated coastal management—lessons from Germany, Costa Rica, Mexico and South Africa. *Sustainability, 10*(10), 3772.

Ćurić, M., Zafirovski, O., & Spiridonov, V. (2022). Climate Change and Health Essentials of Medical Meteorology. Heidelberg, Germany: Springer.

Dangelico, R. M. (2015). Improving firm environmental performance and reputation: The role of employee green teams. *Business Strategy and the Environment, 24*(8), 735-749.

Dangelico, R. M. (2016). Green product innovation: Where we are and where we are going. *Business Strategy and the Environment, 25*(8), 560-576.

De Azevedo Rezende, L., Bansi, A. C., Alves, M. F. R., & Galina, S. V. R. (2019). Take your time: Examining when green innovation affects financial performance in multinationals. *Journal of Cleaner Production, 233*, 993-1003.

De Giovanni, P. (2012). Do internal and external environmental management contribute to the triple bottom line? *International Journal of Operations & Production Management*.

Del Giudice, M., Carayannis, E. G., Palacios-Marqués, D., Soto-Acosta, P., & Meissner, D. (2018). The human dimension of open innovation. *Management Decision*.

Diabat, A., Khodaverdi, R., & Olfat, L. (2013). An exploration of green supply chain practices and performances in an automotive industry. *The International Journal of Advanced Manufacturing Technology, 68*(1-4), 949-961.

DiPietro, R. B., Cao, Y., & Partlow, C. (2013). Green practices in upscale foodservice operations: Customer perceptions and purchase intentions. *International Journal of Contemporary Hospitality Management*.

Eckstein, D., Künzel, V., Schäfer, L., & Winges, M. (2019). Global climate risk index 2020. Germanwatch Available at https://germanwatch.org/sites/germanwatch.org/files/20-2-01e%20Global,20.

Elkington, J. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California Management Review, 36*(2), 90-100.

Eltayeb, T. K., Zailani, S., & Ramayah, T. (2011). Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes. *Resources, Conservation and Recycling, 55*(5), 495-506.

EPI. (2020). Environmental Peformance Index. Retreived from https://epi.yale.edu/

FadzlinaMohdFahmi, F. G., & Ismail, A. M. (2020). Sustainability Reporting Practices from The Lens Of Resource Based View Theory: A Case of Masra Award Companies. *Journal of Critical Reviews, 7*(18), 960-971.

Fauzi, H., Svensson, G., & Rahman, A. A. (2010). Triple bottom line as Sustainable corporate performance: A proposition for the future. *Sustainability, 2*(5), 1345-1360.

Fernando, Y., Jabbour, C. J. C., & 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*, 8-20.

Finance Deparment. (2020). Climate Change. Retrieved from https://www.finance.gov.pk/survey/chapter_20/16_Climate_Change.pdf.

Fliaster, A., & Kolloch, M. (2017). Implementation of green innovations–The impact of stakeholders and their network relations. *R&D Management, 47*(5), 689-700.

Fornell, C., & Larcker, D. F. (1981). *Structural equation models with unobservable variables and measurement error: Algebra and statistics*. Los Angeles, CA: Sage Publications Sage CA.

Furnish, A., Kay, A., & Xia, S. (2013). Evaluation of triple bottom line impacts of resourceful communities' creating new economies fund. Duke University.

Gençay, G., Birben, Ü., & Durkaya, B. (2018). Effects of legal regulations on land use change: 2/B applications in Turkish forest law. *Journal of Sustainable Forestry, 37*(8), 804-819.

Gile, P. P., Buljac-Samardzic, M., & Van De Klundert, J. (2018). The effect of human resource management on performance in hospitals in Sub-Saharan Africa: a systematic literature review. *Human Resources for Health, 16*(1), 1-21.

Green, K., & Inman, R. (2005). Using a just-in-time selling strategy to strengthen supply chain linkages. *International Journal of Production Research, 43*(16), 3437-3453.

Green, K. W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: impact on performance. *Supply Chain Management: An International Journal*.

Guerci, M., Longoni, A., & Luzzini, D. (2016). Translating stakeholder pressures into environmental performance–the mediating role of green HRM practices. *The International Journal of Human Resource Management, 27*(2), 262-289.

Gunasekaran, A., Papadopoulos, T., Dubey, R., Wamba, S. F., Childe, S. J., Hazen, B., & Akter, S. (2017). Big data and predictive analytics for supply chain and organizational performance. *Journal of Business Research, 70*, 308-317.

Gürlek, M., & Tuna, M. (2018). Reinforcing competitive advantage through green organizational culture and green innovation. *The Service Industries Journal, 38*(7-8), 467-491.

Haffar, M., & Searcy, C. (2017). Classification of trade-offs encountered in the practice of corporate sustainability. *Journal of Business ethics, 140*(3), 495-522.

Hair, J., Black, W. C., Babin, B., Anderson, R. E., & Tatham, R. (2014). Pearson new international edition. Multivariate data analysis, Seventh Edition. Pearson Education Limited Harlow, Essex.

Hair, J. F. (2009). Multivariate data analysis.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice, 19*(2), 139-152.

Hamayun, M., Khan, M. A., & Adil, M. (2020). Green Human Resource Management Practices and Firm Performance in Manufacturing Industry of Khyber Pakhtunkhwa, Pakistan. *Discourse, 6*(01).

Hameed, Z., Khan, I. U., Islam, T., Sheikh, Z., & Naeem, R. M. (2020). Do green HRM practices influence employees' environmental performance? *International Journal of Manpower*.

Henri, J. F., & Journeault, M. (2010). Eco-control: The influence of management control systems on environmental and economic performance. *Accounting, Organizations and Society, 35*(1), 63-80.

Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55.

Huang, J.-W., & Li, Y.-H. (2017). Green innovation and performance: The view of organizational capability and social reciprocity. *Journal of Business ethics, 145*(2), 309-324.

Hur, W. M., Kim, Y., & Park, K. (2013). Assessing the effects of perceived value and satisfaction on customer loyalty: A 'Green'perspective. *Corporate Social Responsibility and Environmental Management, 20*(3), 146-156.

Hussain, N., Rigoni, U., & Orij, R. P. (2018). Corporate governance and sustainability performance: Analysis of triple bottom line performance. *Journal of Business ethics, 149*(2), 411-432.

Imran, R., Alraja, M. N., & Khashab, B. (2021). Sustainable Performance and Green Innovation: Green Human Resources Management and Big Data as Antecedents. *IEEE Transactions on Engineering Management*.

Iqbal, Q., Ahmad, N. H., & Ahmad, B. (2018). Enhancing sustainable performance through job characteristics via workplace spirituality. *Journal of Science and Technology Policy Management*.

Iqbal, Q., Ahmad, N. H., Nasim, A., & Khan, S. A. R. (2020). A moderated-mediation analysis of psychological empowerment: Sustainable leadership and sustainable performance. *Journal of Cleaner Production, 262*, 121429.

Irfan, M., Razzaq, A., Chupradit, S., Javid, M., Rauf, A., & Farooqi, T. J. A. (2021). Hydrogen production potential from agricultural biomass in Punjab province of Pakistan. *International Journal of Hydrogen Energy*.

Jennings, P. D., & Zandbergen, P. A. (1995). Ecologically sustainable organizations: An institutional approach. *Academy of Management Review, 20*(4), 1015-1052.

Jia, J., Liu, H., Chin, T., & Hu, D. (2018). The continuous mediating effects of GHRM on employees' green passion via transformational leadership and green creativity. *Sustainability, 10*(9), 3237.

Jin, C., Shahzad, M., Zafar, A. U., & Suki, N. M. (2022). Socio-economic and environmental drivers of green innovation: evidence from nonlinear ARDL. *Economic Research-Ekonomska Istraživanja*, 1-21.

Johns, R. (2010). Likert items and scales. *Survey question bank: Methods fact sheet, 1*(1), 11.

Junaid, M., Zhang, Q., & Syed, M. W. (2022). Effects of sustainable supply chain integration on green innovation and firm performance. *Sustainable Production and Consumption, 30*, 145-157.

Kanstrup, N., Swift, J., Stroud, D. A., & Lewis, M. (2018). Hunting with lead ammunition is not sustainable: European perspectives. *Ambio, 47*(8), 846-857.

Khan, N. A., Gao, Q., Abid, M., & Shah, A. A. (2021). Mapping farmers' vulnerability to climate change and its induced hazards: evidence from the rice-growing zones of Punjab, Pakistan. *Environmental Science and pollution research, 28*(4), 4229-4244.

Khan, N. U., Wu, W., Saufi, R. B. A., Sabri, N. A. A., & Shah, A. A. (2021). Antecedents of sustainable performance in manufacturing organizations: A structural equation modeling approach. *Sustainability, 13*(2), 897.

Khan, R. U., Arif, H., Sahar, N. E., Ali, A., & Abbasi, M. A. (2022). The role of financial resources in SMEs' financial and environmental performance: The mediating role of green innovation. *Green Finance, 4*(1), 36-53.

Khan, S. N., Busari, A. H., Abdullah, S. M., & Mughal, Y. H. (2018). Followership moderation between the relationship of transactional leadership style and employees reactions towards organizational change. *Polish Journal of Management Studies, 17*.

Koo, C., Chung, N., & Ryoo, S. Y. (2014). How does ecological responsibility affect manufacturing firms' environmental and economic performance? *Total Quality Management & Business Excellence, 25*(9-10), 1171-1189.

Kumar, A., Singh, P., Raizada, P., & Hussain, C. M. (2022). Impact of COVID-19 on greenhouse gases emissions: A critical review. *Science of The Total Environment, 806*, 150349.

Lee, H., & Kim, K. H. (2010). Relationships between bilingualism and adaptive creative style, innovative creative style, and creative strengths among Korean American students. *Creativity Research Journal, 22*(4), 402-407.

Li, X., Guo, Y., & Zhou, S. (2021). Chinese Preschool Teachers' Income, Work-Family Conflict, Organizational Commitment, and Turnover Intention: A Serial Mediation Model. *Children and Youth Services Review*, 106005.

Lin, Tan, K.-H., & Geng, Y. (2013). Market demand, green product innovation, and firm performance: evidence from Vietnam motorcycle industry. *Journal of Cleaner Production, 40*, 101-107.

Lin, B., & Ahmad, I. (2017). Analysis of energy related carbon dioxide emission and reduction potential in Pakistan. *Journal of Cleaner Production, 143*, 278-287.

Lin, B., & Raza, M. Y. (2019). Analysis of energy related CO2 emissions in Pakistan. *Journal of Cleaner Production, 219*, 981-993.

Lin, C. Y. Y., & Chen, M. Y. C. (2007). Does innovation lead to performance? An empirical study of SMEs in Taiwan. *Management Research News*.

Lopes de Sousa Jabbour, A. B., VazquezBrust, D., Chiappetta Jabbour, C. J., & Andriani Ribeiro, D. (2020). The interplay between stakeholders, resources and capabilities in climate change strategy: converting barriers into cooperation. *Business Strategy and the Environment, 29*(3), 1362-1386.

Madhani, P. M. (2010). Resource based view (RBV) of competitive advantage: An overview. *Resource based view: concepts and practices, Pankaj Madhani, ed*, 3-22.

Maduekwe, N. I., & Adesina, F. A. (2022). Can remittances contribute to financing climate actions in developing countries? Evidence from analyses of households' climate hazard exposure and adaptation actors in SE Nigeria. *Mitigation and Adaptation Strategies for Global Change, 27*(1), 1-22.

Maletic, M., Podpečan, M., & Maletic, D. (2015). ISO 14001 in a corporate sustainability context: A multiple case study approach. *Management of Environmental Quality: An International Journal*.

Malik, S. Y., Hayat Mughal, Y., Azam, T., Cao, Y., Wan, Z., Zhu, H., & Thurasamy, R. (2021). Corporate Social Responsibility, Green Human Resources Management, and Sustainable Performance: Is Organizational Citizenship Behavior towards Environment the Missing Link? *Sustainability, 13*(3), 1044.

Mathiyazhagan, K., Vimal, K., Kumar, H., Ramesh, A., & Agarwal, V. (2022). Lean and Green Manufacturing. Heidelberg, Germany: Springer.

McCrae, R. R., Kurtz, J. E., Yamagata, S., & Terracciano, A. (2011). Internal consistency, retest reliability, and their implications for personality scale validity. *Personality and Social Psychology Review, 15*(1), 28-50.

Medsker, G. J., Williams, L. J., & Holahan, P. J. (1994). A review of current practices for evaluating causal models in organizational behavior and human resources management research. *Journal of Management, 20*(2), 439-464.

Mehta, K., & Chugan, P. K. (2015). Green HRM in pursuit of environmentally sustainable business. Pursuit of Environmentally Sustainable Business (June 1, 2015). *Universal Journal of Industrial and Business Management, 3*(3), 74-81.

Menezes, E., & Drigo, E. (2017). Analysis of organizational and human factors in the local production arrangement of the hotel chain to avoid social and environmental impacts, case study of Maragogi, Alagoas, Brazil Advances in Social & Occupational Ergonomics (pp. 421-433). Heidelberg, Germany: Springer.

Miroshnychenko, I., Barontini, R., & Testa, F. (2017). Green practices and financial performance: A global outlook. *Journal of Cleaner Production, 147*, 340-351.

Mitra, S., & Datta, P. P. (2014). Adoption of green supply chain management practices and their impact on performance: an exploratory study of Indian manufacturing firms. *International Journal of Production Research, 52*(7), 2085-2107.

Morant, G. A., Henseler, J., Leal-Millán, A. G., & Cepeda-Carrión, G. (2017). Mapping the field: A bibliometric analysis of green innovation performance. *Sustainability, 9*(6), 1011.

Muthén, B., & Muthén, L. (2017). Boca Raton, FL: Chapman and Hall/CRC.

Neri, A., Cagno, E., Di Sebastiano, G., & Trianni, A. (2018). Industrial sustainability: Modelling drivers and mechanisms with barriers. *Journal of Cleaner Production, 194*, 452-472.

Nicolăescu, E., Alpopi, C., & Zaharia, C. (2015). Measuring corporate sustainability performance. *Sustainability, 7*(1), 851-865.

Nilashi, M., Ahani, A., Esfahani, M. D., Yadegaridehkordi, E., Samad, S., Ibrahim, O., . . . Akbari, E. (2019). Preference learning for eco-friendly hotels recommendation: A multi-criteria collaborative filtering approach. *Journal of Cleaner Production, 215*, 767-783.

Palmer, K., Oates, W. E., & Portney, P. R. (1995). Tightening environmental standards: the benefit-cost or the no-cost paradigm? *Journal of Economic Perspectives, 9*(4), 119-132.

Parida, S., & Brown, K. (2021). *Green Human Resource Management and Green Innovation Responsible Management in Emerging Markets*. Heidelberg, Germany: Springer.

PBS. (2021). Industry. Retrieved from https://www.pbs.gov.pk/content/industry

Perotti, S., Zorzini, M., Cagno, E., & Micheli, G. J. (2012). Green supply chain practices and company performance: The case of 3PLs in Italy. *International Journal of Physical Distribution & Logistics Management*.

Pislaru, M., Herghiligiu, I. V., & Robu, I.-B. (2019). Corporate sustainable performance assessment based on fuzzy logic. *Journal of Cleaner Production, 223*, 998-1013.

PSX. (2020). What are the Minimum Goals & Indicators outlined for listed companies. Retrieved from https://www.psx.com.pk/psx/resources-and-tools/sustainable-development-goal

Qin, Y., & Horvath, A. (2022). What contributes more to life-cycle greenhouse gas emissions of farm produce: Production, transportation, packaging, or food loss? *Resources, Conservation and Recycling, 176*, 105945.

Quazi, H. A. (1999). Implementation of an environmental management system: The experience of companies operating in Singapore. *Industrial Management & Data Systems*.

Raza, M. Y. (2022). Towards a sustainable development: Econometric analysis of energy use, economic factors, and CO_2 emission in Pakistan during 1975–2018. *Environmental Monitoring and Assessment, 194*(2), 1-19.

Raza, M. Y., Wang, X., & Lin, B. (2021). Economic progress with better technology, energy security, and ecological sustainability in Pakistan. *Sustainable Energy Technologies and Assessments, 44*, 100966.

Rehman, S. U., Kraus, S., Shah, S. A., Khanin, D., & Mahto, R. V. (2021). Analyzing the relationship between green innovation and environmental performance in large manufacturing firms. *Technological Forecasting and Social Change, 163*, 120481.

Roca-Puig, V. (2019). The circular path of social sustainability: An empirical analysis. *Journal of Cleaner Production, 212*, 916-924.

Rodríguez-Antón, J. M., del Mar Alonso-Almeida, M., Celemín, M. S., & Rubio, L. (2012). Use of different sustainability management systems in the hospitality industry. The case of Spanish hotels. *Journal of Cleaner Production, 22*(1), 76-84.

Rojšek, I. (2001). From red to green: Towards the environmental management in the country in transition. *Journal of Business ethics, 33*(1), 37-50.

Roper, S., & Tapinos, E. (2016). Taking risks in the face of uncertainty: An exploratory analysis of green innovation. *Technological Forecasting and Social Change, 112*, 357-363.

Russo, M. V. (2003). The emergence of sustainable industries: Building on natural capital. *Strategic Management Journal, 24*(4), 317-331.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal, 40*(3), 534-559.

Saleem, M., Qadeer, F., Mahmood, F., Ariza-Montes, A., & Han, H. (2020). Ethical leadership and employee green behavior: A multilevel moderated mediation analysis. *Sustainability, 12*(8), 3314.

Sanderson, B. M., & O'Neill, B. C. (2020). Assessing the costs of historical inaction on climate change. *Scientific Reports, 10*(1), 1-12.

Saudi, M. H. M., Obsatar Sinaga, G., & Zainudin, Z. (2019). The effect of green innovation in influencing sustainable performance: Moderating role of managerial environmental concern. *Int. J Sup. Chain. Mgt Vol, 8*(1), 303.

Schumpeter, J. A. (2013). *Capitalism, socialism and democracy*. London, UK: Routledge.

Sezen, B., & Cankaya, S. Y. (2013). Effects of green manufacturing and eco-innovation on sustainability performance. *Procedia-Social and Behavioral Sciences, 99*, 154-163.

Sheth, J. N., Sethia, N. K., & Srinivas, S. (2011). Mindful consumption: A customer-centric approach to sustainability. *Journal of the Academy of Marketing Science, 39*(1), 21-39.

Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review, 20*(4), 936-960.

Singh, Del Giudice, Chierici, & Graziano. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change, 150*, 119762.

Singh, R. L. (2017). *Principles and applications of environmental biotechnology for a sustainable future*. Heidelberg, Germany: Springer.

Singh, S. K., Del Giudice, M., Chiappetta Jabbour, C. J., Latan, H., & Sohal, A. S. (2022). Stakeholder pressure, green innovation, and performance in small and mediumsized enterprises: The role of green dynamic capabilities. *Business Strategy and the Environment, 31*(1), 500-514.

Sirmon, D. G., Hitt, M. A., Ireland, R. D., & Gilbert, B. A. (2011). Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects. *Journal of Management, 37*(5), 1390-1412.

Song, W., Yu, H., & Xu, H. (2020). Effects of green human resource management and managerial environmental concern on green innovation. *European Journal of Innovation Management*.

Székely, F., & Knirsch, M. (2005). Responsible leadership and corporate social responsibility: Metrics for sustainable performance. *European Management Journal, 23*(6), 628-647.

Takalo, S. K., & Tooranloo, H. S. (2021). Green innovation: A systematic literature review. *Journal of Cleaner Production, 279*, 122474.

Tang, Walsh, G., Lerner, D., Fitza, M. A., & Li, Q. (2018). Green innovation, managerial concern and firm performance: An empirical study. *Business Strategy and the Environment, 27*(1), 39-51.

Tantayanubutr, M., & Panjakajornsak, V. (2017). Impact of green innovation on the sustainable performance of Thai food industry. *Business and Economic Horizons (BEH), 13*(1232-2017-2416), 192-209.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533.

Traina, S. B., MacLean, C. H., Park, G. S., & Kahn, K. L. (2005). Telephone reminder calls increased response rates to mailed study consent forms. *Journal of clinical epidemiology, 58*(7), 743-746.

Tseng, M.-L., Tan, R. R., & Siriban-Manalang, A. B. (2013). Sustainable consumption and production for Asia: sustainability through green design and practice. *Journal of Cleaner Production, 40*, 1-5.

Tzafrir, S. S. (2005). The relationship between trust, HRM practices and firm performance. *The International Journal of Human Resource Management, 16*(9), 1600-1622.

Van der Byl, C. A., & Slawinski, N. (2015). Embracing tensions in corporate sustainability: A review of research from win-wins and trade-offs to paradoxes and beyond. *Organization & Environment, 28*(1), 54-79.

Vanalle, R. M., Ganga, G. M. D., Godinho Filho, M., & Lucato, W. C. (2017). Green supply chain management: An investigation of pressures, practices, and performance within the Brazilian automotive supply chain. *Journal of Cleaner Production, 151*, 250-259.

Wagner, B. (2015). Implementing and managing economic, social and environmental efforts of business sustainability. *Management of Environmental Quality: An International Journal, 26*(2), 195-213.

Wang, C.-H. (2019). How organizational green culture influences green performance and competitive advantage: The mediating role of green innovation. *Journal of Manufacturing Technology Management*.

Wang, M., & Russell, S. S. (2005). Measurement equivalence of the job descriptive index across Chinese and American workers: Results from confirmatory factor analysis and item response theory. *Educational and Psychological Measurement, 65*(4), 709-732.

Weng, H.-H. R., Chen, J.-S., & Chen, P.-C. (2015). Effects of green innovation on environmental and corporate performance: A stakeholder perspective. *Sustainability, 7*(5), 4997-5026.

Wernerfelt, B. (1984). A resourcebased view of the firm. *Strategic Management Journal, 5*(2), 171-180.

Wong, C. W., Lai, K.-h., Shang, K.-C., Lu, C.-S., & Leung, T. (2012). Green operations and the moderating role of environmental management capability of suppliers on manufacturing firm performance. *International Journal of Production Economics, 140*(1), 283-294.

Woo, C., Chung, Y., Chun, D., Han, S., & Lee, D. (2014). Impact of green innovation on labor productivity and its determinants: An analysis of the Korean manufacturing industry. *Business Strategy and the Environment, 23*(8), 567-576.

Wright, P. M., Dunford, B. B., & Snell, S. A. (2001). Human resources and the resource based view of the firm. *Journal of Management, 27*(6), 701-721.

Xie, X., Huo, J., & Zou, H. (2019). Green process innovation, green product innovation, and corporate financial performance: A content analysis method. *Journal of Business Research, 101*, 697-706.

Xiu, L., Liang, X., Chen, Z., & Xu, W. (2017). Strategic flexibility, innovative HR practices, and firm performance: A moderated mediation model. *Personnel Review*.

Yang, L.-R., Chen, J.-H., & Li, H.-H. (2016). Validating a model for assessing the association among green innovation, project success and firm benefit. *Quality & Quantity, 50*(2), 885-899.

Yang, M. G. (2013). Developing a focal firm's sustainable supply chain framework: Drivers, orientation, practices and performance outcomes. The University of Toledo.

Yong, J. Y., Yusliza, M. Y., Ramayah, T., Chiappetta Jabbour, C. J., Sehnem, S., & Mani, V. (2020). Pathways towards sustainability in manufacturing organizations: Empirical evidence on the role of green human resource management. *Business Strategy and the Environment, 29*(1), 212-228.

Zailani, S., Govindan, K., Iranmanesh, M., Shaharudin, M. R., & Chong, Y. S. (2015). Green innovation adoption in automotive supply chain: the Malaysian case. *Journal of Cleaner Production, 108*, 1115-1122.

Zeng, H., Zhao, J. L., & Zhao, X. Y. (2020). Inclusive Leadership and Taking Charge Behavior: Roles of Psychological Safety and Thriving at Work. *Frontiers in Psychology, 11*, 62.

Zhang, Q., Sun, S., Zheng, X., & Liu, W. (2019). The role of cynicism and personal traits in the organizational political climate and sustainable creativity. *Sustainability, 11*(1), 257.

Zhou, S., Li, X., & Gao, B. (2020). Family/friends support, work-family conflict, organizational commitment, and turnover intention in young preschool teachers in China: A serial mediation model. *Children and Youth Services Review, 113*, 104997.

Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management, 22*(3), 265-289.

Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. *International Journal of operations & production management*.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2007). Green supply chain management: Pressures, practices and performance within the Chinese automobile industry. *Journal of Cleaner Production, 15*(11-12), 1041-1052.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2012). Green supply chain management innovation diffusion and its relationship to organizational improvement: An ecological modernization perspective. *Journal of Engineering and Technology Management, 29*(1), 168-185.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management, 19*(2), 106-117.

Zimmerling, E., Purtik, H., & Welpe, I. M. (2017). End-users as co-developers for novel green products and services–an exploratory case study analysis of the innovation process in incumbent firms. *Journal of Cleaner Production, 162*, S51-S58.