

'© 2023, Emerald Publishing Limited. This AAM is provided for your own personal use only. It may not be used for resale, reprinting, systematic distribution, emailing, or for any other commercial purpose without the permission of the publisher.

Mapping the Two-Way Relationship between Management Practices and Firm Innovation: The Mediating Role of Business Environment, Degree of Competition, and Energy Policies

Abstract

Purpose - This study aims to evaluate the two-way relationship between management practices and firm innovation along with the dual mediation of business environment, degree of competition, and energy policies in Greece, Italy, Turkey, and Portugal.

Design / Methodology / Approach - The study has derived data from the World Bank Enterprise Survey 2019 for Greece, Italy, Turkey, and Portugal and analyzed through Partial Least Squares Structural Equation Modelling (PLS-SEM) to find results.

Findings – The outcomes of PLS-SEM revealed that management practices and firm innovation have two-way positive significant relationship with each other in Greece, Italy, Turkey, and Portugal. The results exposed that the management practices and firm innovation have two-way positive significant relationship with the business environment, degree of competition, and energy policies in Greece, Italy, Turkey, and Portugal. The findings also clarified that the business environment, degree of competition, and energy policies have dual mediating role between management practices and firm innovation in Greece, Turkey, and Portugal. Surprisingly, business environment has not dual mediation in Italy.

Practical Implications - These useful insights would enable practitioners and direct policy makers to develop and apply more magnificent management practices to boost up innovation among firms.

Originality / Value - Although the topics of management practices and innovation have received a great concern of academia, but this is the first study that offers a comprehensive model of the relationship in these domains.

Keywords: Management Practices, Firm Innovation, Business Environment, Degree of Competition, and Energy Policies

1. Introduction

Over the past few decades, innovation has grabbed wide attention among researchers, practitioners, and professed as a strategic driver in exploring new opportunities, products and services innovation, values creation, economic development, and competitive advantage in embroidered business environment (Xie *et al.*, 2018; Zhang *et al.*, 2020; Yang *et al.*, 2021). It has become a value-added activity among firms and perceived as a main strategy of economic development, social and environmental performance (Xu and Duan, 2018; Zhang *et al.*, 2018; Zhang *et al.*, 2022). However, to achieve the desired level of firm innovation, managers and practitioners need to invent friendly business environment to promote the culture of innovation to gain wanted competitiveness (Li and Zheng, 2014; Tsai *et al.*, 2015; Zhang *et al.*, 2020). Usually, a motivated business environment among enterprises ensures a higher degree of innovation to gain competitiveness and build image in targeted market (Zhang *et al.*, 2020). Due to its ample importance and application, managers and practitioners are using various techniques to improve their operational and financial performance, gain competitive advantage, and achieve

a higher degree of innovation (Singh *et al.*, 2021; Vlas *et al.*, 2022). In this regard, researchers have conducted empirical studies to explore various management factors to achieve the higher degree of innovation among firms (Singh *et al.*, 2021).

Among many factors, the management practices, leadership style, and environmental policies can develop a trend and atmosphere for higher innovation performance (Xie *et al.*, 2018; Brunel, 2019; Chen *et al.*, 2019). Due to the reasons, many countries are increasingly focus on green innovation to tackle the environmental challenges and achieve higher economic growth. Today, the environmental degradation such as energy consumption, environmental pollution, depletion of resources etc. have led firms to launch the environment-based innovation practices to ensure sustainable development goals, economic development, and reduce the adverse effects on the environment (Liao, 2018; Chowdhury *et al.*, 2022). Though, prior studies have provided interesting insights into various management practices such as design of incentives, recruitment, training and development, firms' ability to manage spillovers of knowledge, firms' choice of organizational structure (Inkinen *et al.*, 2015; Kianto *et al.*, 2017; Haneda and Ito, 2018), but still few shortcomings exist in the emerging literature and various management practices in the relation to firm innovation have not been investigated in the previous empirical research.

Earlier studies have widely emphasized on some practices such as fashion drive markets, space and time, compensation, performance assessment, and structure of practices and consequences that are relatively more general and old (Clark, 2004; Mol and Birkinshaw, 2009; Kianto *et al.*, 2017) but the studies failed to highlight the role of management practices (in the context of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) in firm innovation, specially, in Greece, Italy, Turkey, and Portugal. In addition, most of the studies have examined one way relationship of various management factors with innovation among firms (Abrunhosa *et al.*, 2008; Kianto *et al.*, 2017; Chowdhury *et al.*, 2022), but prior studies failed to evaluate the two-way relationship between management practices (in the perspective of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) and firm innovation, particularly, in Greece, Italy, Turkey, and Portugal. In addition, prior studies have focused on environmental policies, emissions trading, customers' requirements, human resource management practices, corporate governance, and technological trajectory in direct ways (Amore and Bennesen, 2016; Saez-Martínez *et al.*, 2016; Oubrich *et al.*, 2022), but preceding studies failed to evaluate two-ways mediating role of business environment, degree of competition, and energy policies between management practices and firm innovation performance, specially, in Greece, Italy, Turkey, and Portugal. However, these countries were selected due to cultural diversity, economic condition, environmental differences, geographic structure, trade potential, and innovation capabilities. Although the prior studies helped to understand the role of some management practices in achieving the degree of firm innovation, but the existing research has the following shortcomings.

1. Does a two-way relationship exist between management practices (in the context of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) and firm innovation in Greece, Italy, Turkey, and Portugal?
2. Do business environment, degree of competition, and energy policies mediate in two-way between management practices (in the context of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) and firm innovation in Greece, Italy, Turkey, and Portugal?

Thus, the current study contributes to the prior literature by evaluating the reverse relationship between management practices and firm innovation in the context of Greece, Italy, Turkey, and Portugal. It also adds in the previous literature by examining the two-ways mediating role of business environment, degree of competition, and energy policies between management practices and firm innovation in the context of Greece, Italy, Turkey, and Portugal. The study also contributed to clarify the influence of external determinants (business environment, degree of competition, and energy policies) on the two-ways relationship between management practices and firm innovation in the context of Greece, Italy, Turkey, and Portugal. This study also underwrites in the methodological procedure by applying PLS-SEM in the defined context. This study merges the literature of business environment, degree of competition, and energy policies, management practices, and innovation based on the findings from Greece, Italy, Turkey, and Portugal. However, the remainder of this study is as following; after introduction, the second part thoroughly describes the theoretical framework and hypothesis development. Methodology and results are plainly described in the fourth section of this study. Discussion, implications, and conclusion are presented in the last section of this study.

2. Literature Review and Hypothesis Development

2.1 Relationship between Management Practices and Firm Innovation

Management practices is a set of strategies and initiatives that managers most often use to bring efficiencies and improve innovation performance among firms. Usually, managers undertake explorative and exploitative initiatives to create, transfer, and launch innovation practices among firms (Donate and Pablo, 2015). By the way, innovation is a most knowledge-intensive business process and requires continuous engagement of administration to sustain the degree of competitiveness (Jiménez-Jiménez *et al.*, 2014). For the reasons, managers need to initiate innovative practices to improve the organizational performance. The efficient management practices are helpful in upgrading the level of productivity, enhance the customer's services, and retain competitiveness among firms (Mol and Birkinshaw, 2009). Concisely, the implementation of various management practices at the same time can increase the probabilities of innovation among firms (Haneda and Ito, 2018). Kianto *et al.* (2017) found that knowledge-based human resource management practices (such as recruiting, training and development, compensation, performance assessment) have positive significant effects on the innovation performance among companies in Spain. Particularly, the human resource management practices such as workplace organization practices (teamwork, job rotation), training intensity, working time management, incentives payment schemes have a considerable role in enhancing the firm innovation (Arvanitis *et al.*, 2016). The study also observed that human resource management practices stimulate the innovation performance and creativity among firms but need further investigation to explore the influential factors in firm innovation. Consequently, the innovative management practices are enhancing the firm innovation performance and a sustainable source of competitive advantage (Mol and Birkinshaw, 2009). In the same manner, Haneda and Ito (2018) have noted a relationship between innovation and management practices in the context of teamwork, payment schemes, and training for workers. Further, Bag *et al.* (2022) found that eco-innovation has positive significant effects on the practices of green supply chain management (such as, design for the environment, internal environmental management, investment recovery etc.) among SMEs in South Africa. However, previous studies have widely evaluated only one-way relationship but never focused to analyze the two-way relationship between management practices and firm innovation especially in Greece, Italy, Turkey, and Portugal. Therefore, we can hypothesize that:

H1: There is two-way relationship between management practices and firm innovation in Greece, Italy, Turkey, and Portugal

2.2 Relationship between Management Practices, Business Environment, and Firm Innovation

Innovation is one of the driving force of economics growth in global competitiveness and a stunt to inspire various stakeholders around the business (Feldmann *et al.*, 2019). Traditionally, collaborative eco-system, agriculture, proactive sustainable behavior, identity creation, enhancement, engagement mechanisms, and sustainable business model are perceived as the factors of economic growth among practitioners (Adamashvili *et al.*, 2020; Pucci *et al.*, 2020; Fioreet *al.*, 2020). But due to the abundant importance of innovation, many governments perceive it as a prime strategy of growth and development in various sectors. Similarly, many academicians have admitted its role in upgrading the business performance. Such as, Ode and Ayavoo (2020) have empirically examined the relationship between knowledge management practices and firms' innovation along with the mediating role of knowledge application in the services sector at Nigeria. Particularly, sharing experience of good practices is perceived as a powerful tool to strengthen innovation and development among firms (Adamashvili *et al.*, 2020). Kraśnicka *et al.* (2018) have assessed the effects of innovative management practices on enterprises performance along with the mediating role of organizational culture. The study noted that organizational culture has mediating role between innovative management practices and enterprises performance. Mahmoud *et al.* (2021) have explored the effects of human resource management practices on the service innovation in hospitality sector along with the mediating role of human capital in Jordan.

Moreover, Imran and Anis-ul-Haque (2011) have investigated the role of organizational transformative characteristics in achieving the degree of innovation among firms along with the mediating role of organizational climate. The study noted a partial mediation of organizational climate on the relationship between transformative leadership and innovation among firms. Chen and Huang (2009) have examined the impacts of strategic human resource management practices on the innovation performance along with the mediating role of the knowledge management capacity among firms in Taiwan. Tan and Nasuridin (2011) have investigated the role of human resource management practices (in the context of performance appraisal, career management, training, reward system, and recruitment) in organizational innovation along with the mediating role of knowledge management effectiveness among the manufacturing firms at Malaysia. The study found interesting insights but was limited to only one-sided relationship. Syed and Xiaoyan (2013) have evaluated the role of human resource management practices in the enterprise innovation along with the mediating role of creative culture in software development among SMEs in China. However, the previous studies have widely evaluated only one-way relationship in management practices and firm innovation in developing countries along with various mediating factors. Nonetheless, prior studies have never been focused to analyze the two-way relationship between management practices (in the context of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) and firm innovation along with the dual mediating role of business environment especially in Greece, Italy, Turkey, and Portugal. Therefore, we can hypothesis that:

H2: Business environment has two-way mediating role between management practices and firm innovation in Greece, Italy, Turkey, and Portugal.

2.3 Relationship between Management Practices, Degree of Competition, and Firm Innovation

Innovation has been acknowledged as a central theme and important source of economics growth and competitiveness among firms (Heneda and Ito, 2018). Due to its plenty application and importance, researchers are widely focusing to explore innovative theoretical and empirical prospective to define more influential business strategies in competitive environment (Heneda and Ito, 2018). In this regard, prior studies have empirically focused to explore the effectiveness of management practices in achieving the degree of innovation in competitive business environment among firms (Lederman *et al.*, 2013; Feldmann *et al.*, 2019), and found that best management practices mediate between innovation and global competitiveness. The studies have highlighted the efficiency of management practices in the relation of innovation and global competitiveness and accredited as an efficient business strategy (Christensen and Raynor, 2013; Feldmann *et al.*, 2019). Oubrich *et al.* (2022) have examined the mediating role of competitive work environment between human resource management practices and knowledge hiding. Likewise, Obeidat *et al.* (2021) have explored the mediating role of innovation on the relationship between intellectual capital and competitive advantage among the telecommunication companies in Jordan. Hojnik and Ruzzier (2017) have found that competitive benefits mediate and strengthen the relationship between eco-innovation and firm performance among Slovenia companies. While Zehir *et al.* (2016) have examined the effects of strategic human resource management (SHRM) practices on innovation performance along with the mediating role of global capabilities in banking sector at Turkey. The study found that SHRM practices have positive impacts on innovation performance and global capabilities mediate the relationship. However, the previous studies have widely evaluated only one-way relationship in management practices and innovation in developing countries along with various mediating factors. Nevertheless, prior studies have less focused to analyze the two-way relationship between management practices (in the context of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) and firm innovation along with the two-way mediating role of the degree of competition among firms especially in Greece, Italy, Turkey, and Portugal. Therefore, we can hypothesis that:

H3: Degree of competition has two-way mediating role between management practices and firm innovation in Greece, Italy, Turkey, and Portugal.

2.4 Relationship between Management Practices, Energy Policies, and Firm Innovation

Over the past few decades, the environmental issues have grabbed wide attention (Amjad *et al.*, 2021), and led to initiate industrial innovation around the world. Recently, the eco-friendly management practices become essential factors to integrate more innovative business processes and adopt innovative technologies to gain competitive advantage. In this regard, organizations need to launch sustainable and more efficient management practices to meet the standard of innovative market requirements, corporate social responsibility, and gain competitiveness (Rehman *et al.*, 2016; Amjad *et al.*, 2021). Due to the reasons, researchers have widely focused to develop more solid theoretical consideration to build more efficient business strategies for the long-lasting industries requirements. Evidently, Delgado *et al.* (2014) have examined the role of green organizational capital on the environmental product innovation along with the green social capital. Zhang and Ma (2021) have evaluated the impacts of environmental management practices on the firm's economic performance along with the mediating role of green innovation among Chinese companies. Alboushi *et al.* (2022) have assessed the impacts of total quality management practices on the corporate sustainable development along with the mediating role of

green innovation among manufacturing companies. Mathushan and Kengatharan (2022) found that human capital has mediating role between human resource management practices and firm innovation in Sri Lanka. Aslam *et al.* (2021) have evaluated the mediating role of environmental performance between environmental management practices and financial performance. Amjad *et al.* (2021) have examined the effects of green human resource management practices on the organizational sustainability along with the mediating role of environmental performance among the textile companies in Pakistan. Still, the previous studies have widely evaluated only one-way relationship in management practices and firm innovation in developing countries along with various mediating factors. Nevertheless, prior studies have less focused to analyze the two-way relationship between management practices (in the context of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) and firm innovation along with the two-way mediating role of energy policies among firms especially in Greece, Italy, Turkey, and Portugal. Therefore, we can hypothesis that:

H4: Energy policies have two-way mediating role between management practices and innovation among firms in Greece, Italy, Turkey, and Portugal.

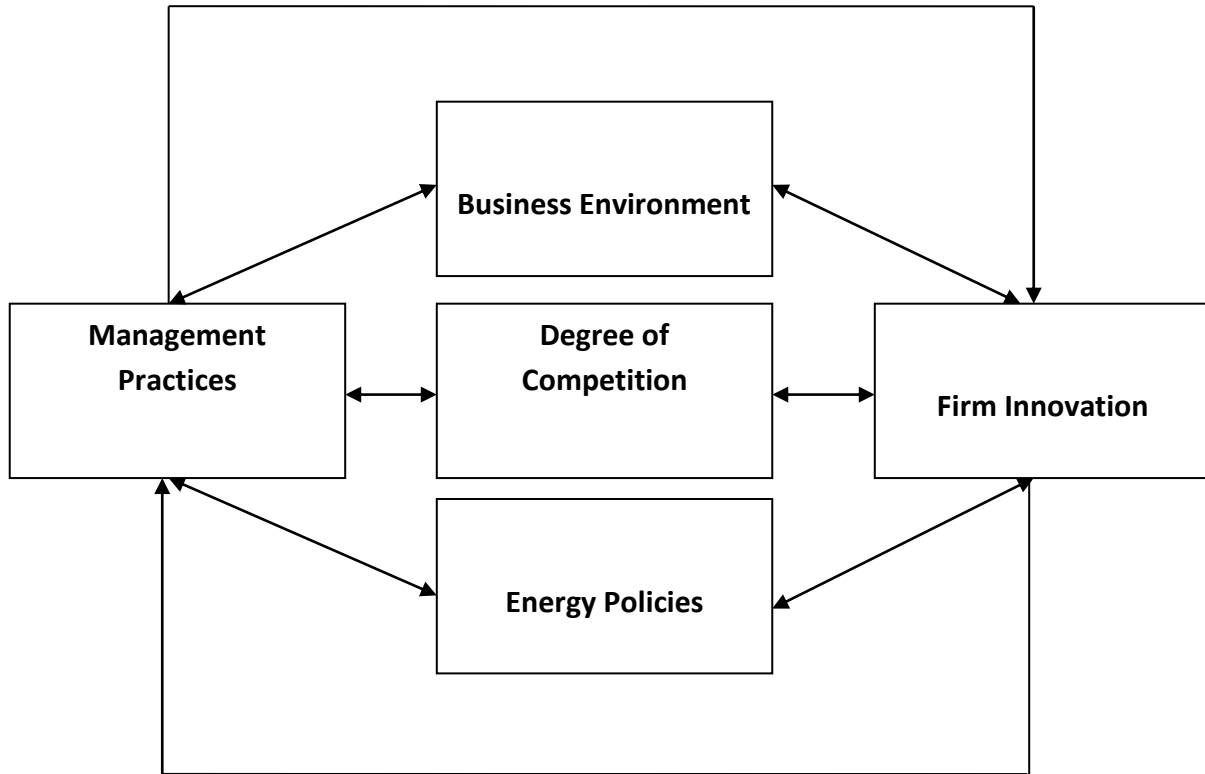


Figure.1 Conceptual Model

3. Methodology

3.1 Research design, data collection procedure, and variables descriptions

This study has employed exploratory approach in the first stage to discover the research problem and gaps in the previous literature. Based on the detected gaps and raised research questions, this study developed a theoretical framework and hypothesis to fix the research direction. In the next step, the study applied the descriptive approach to derive and understand the characteristics of

data. In the last stage, the study applied explanatory approach to evaluate the relationship between variables and reporting the results (**Figure. 2**). This study derived quantitative data from The World Bank Enterprise Survey 2019 for Greece, Italy, Turkey, and Portugal (The EBRD-EIB-World Bank Group Enterprise Survey). The World Bank Enterprise Survey is an international firm-level survey which includes topics on the business environment (like management practices, degree of competition, environmental policies, innovation, and others) along with a representative sample of an economy sector (The World Bank, 2021). The survey data includes manufacturing and services sectors and based on standardized survey instruments and stratified random sampling. The data were collected from the business owners, CEO, and senior managers of registered firms. For further details and the characteristics of data set, please see: www.enterprisesurveys.org/en/methodology).

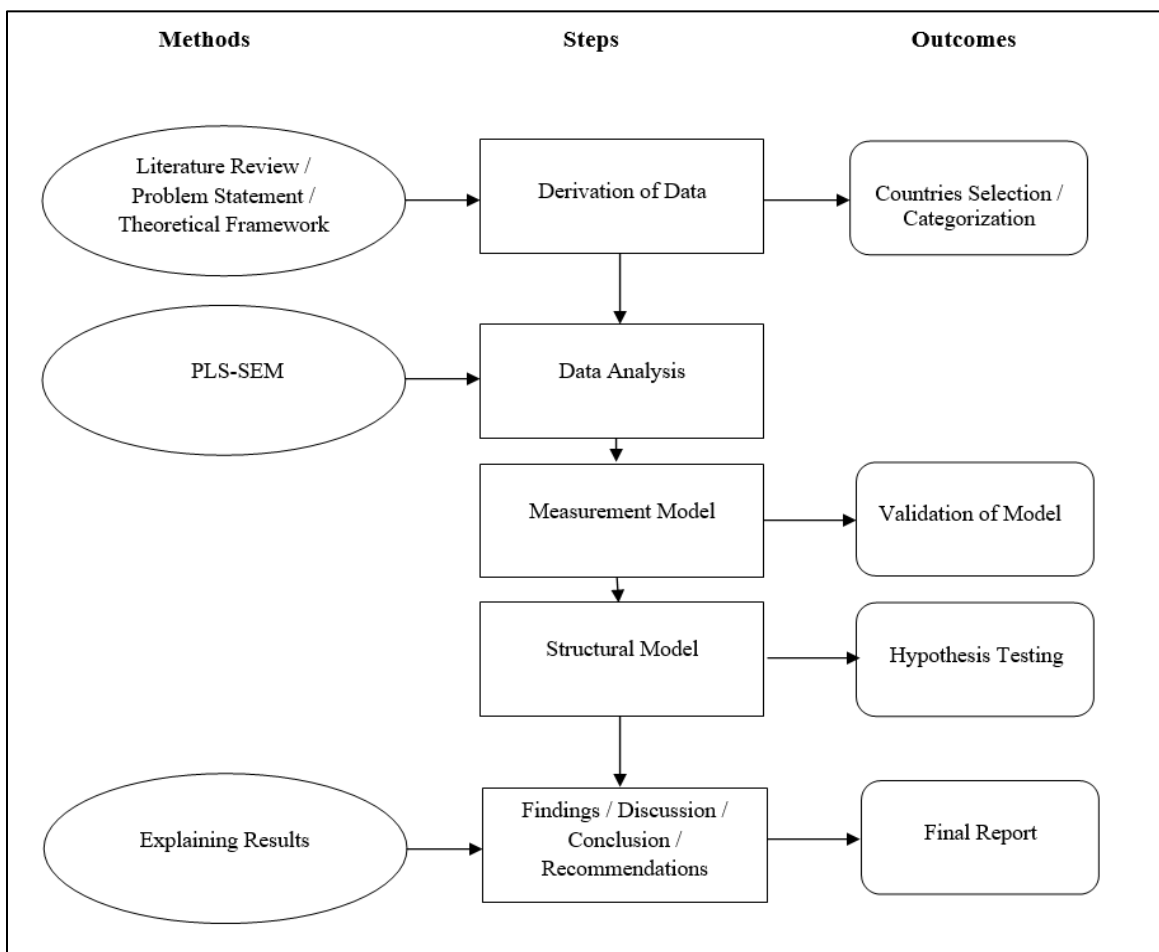


Figure 2. Research Design

Though, the theoretical framework (**Figure.1**) includes the following constructs: Management practices (problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) as independent variable, Innovation (product, services, and process innovation) is the dependent variable (**Table.1**). Business environment (trade regulation, labor regulation, political instability, tax rates, access to finance, and business licensing), degree of competition (main market, main products, number of competitors,

technology license, and practices of competitor in the informal sector), and energy policies (energy tax, energy performance standard in operation, energy performance standard quantity in usage) are the mediating variables (**Table.1**).

Table.1 Variables and Their Descriptions

Variable	Dimension	Description
Management Practices	Problem Solving	Over the last complete fiscal year [2019], what best describes what happened at this establishment when a problem in the production process arose?
	Performance Monitoring	Over the last complete fiscal year [2019], did this establishment monitor any performance indicators?
	Achieving Targets	Over the last complete fiscal year [2019], how many performance indicators were monitored at this establishment?
	Performance Bonuses	Over the last complete fiscal year [2019], what were managers' performance bonuses mostly based on?
	Way of Promotion	Over the last complete fiscal year [2019], what was the primary way non-managers were promoted at this establishment?
Degree of Competition	Main Market	In fiscal year [2019], which of the following was the main market in which this establishment sold its main product?
	Main Products	In fiscal year [2019], for the main market in which this establishment sold its main product, how many main products sold by establishment's?
	Number of Competitors	In fiscal year [2019], for the main market in which this establishment sold its main product? how many competitors did this establishment's main product face?
	Using Technology License	Does this establishment at present use technology licensed from a foreign-owned company, excluding office software?
	Practices of Competitors in the Informal Sector	Does this establishment compete against unregistered or informal establishments?
Energy Policies	Energy Tax	In fiscal year [2019], was this establishment subject to an energy tax or levy?
	Energy Performance Standard in Operation	In fiscal year [2019], was this establishment subject to an energy performance standard in its operations?
	EPS quantity in usage	In fiscal year [2019], was this establishment subject to an energy performance standard in its operations? How much EPS quantity was used
Business Environment	Trade Regulation	Trade regulation is currently the biggest obstacle faced by this establishment.
	Labor Regulation	Labor regulation is currently the biggest obstacle faced by this establishment.
	Political Instability	Political instability is currently the biggest obstacle faced by this establishment.
	Tax Rates	Tax rate is currently the biggest obstacle faced by this establishment.
	Access to Finance	Access to finance is currently the biggest obstacle faced by this establishment.
	Business licensing	Business Licensing is currently the biggest obstacle faced by this establishment.
Product & Service Innovation		During the last three years, has this establishment introduced new or improved products or services?
		During the last three years, has this establishment introduced any new or

Innovation	Process Innovation	improved process? These include: methods of manufacturing products or offering services; logistics, delivery, or distribution methods for inputs, products, or services; or supporting activities for processes?
------------	--------------------	---

Source: www.enterprisesurveys.org/en/methodology

3.2 Data Analysis Technique

The collected data were analyzed using PLS-SEM to find results. The PLS-SEM approach is used to test the conjectures, no condition of normally distributed data, preferred when a study focuses on the development of theory, and in exploratory study (Bhatia and Kumar, 2022; Rehman *et al.*, 2017). PLS-SEM validates the relationship in systematic way, deals with a complex model in a single click, and preferable in formative models (Rehman *et al.*, 2021; Rehman and Al-Ghazali, 2022). Therefore, PLS-SEM was the best option to explore the relationship among defined constructs in the proposed research framework.

4. Results

This study has applied the technique of Partial Least Square Structure Equation Modeling (PLS-SEM) to analyze the derived data and validating the proposed research model. The study applied the techniques of factors loading, composite reliability, and average variance extracted (AVE) to analyze the results of measurement model (Rehman and Zeb, 2022). In the assessment of measurement model, the results revealed that the values of factors loading (>0.7), composite reliability (>0.7), and AVE (>0.5) are greater than the recommended threshold values. The study used Fornell and Larcker (1981) procedure to evaluate the results of discriminant validity. However, the results of all the four cases revealed that the diagonal values are greater than the correlation between that construct and other constructs in corresponding rows and columns which have ensured that the results of discriminant validity are valid and accurate (**APPENDIX**). Though, to verify the authenticity and validation of discriminant validity, the heterotrait-monotrait ratio of correlations (HTMT) procedure was applied as a recent technique rather than cross-loadings. The results of HTMT have ensured that the outputs of discriminant validity are sound. In addition, to assess the multicollinearity among constructs, the study applied the technique of variance inflation factor (VIF) and ensured that there are no issues of multicollinearity among constructs.

Moreover, to achieve the results of structural model, the bootstrapping procedure was applied via PLS-SEM to test the developed hypothesis based on the proposed research model. In the first step, the results for the direct relationships were evaluated and noted that management practices have two-way positive significant relationship with the firm innovation in Greece, Italy, Turkey, and Portugal with various degrees (**Table.2**). The study also noted that management practices have two-way positive significant relationship with the business environment, degree of competition, and energy policies among firms in Greece, Italy, Turkey, and Portugal with various degrees. The results have also cleared that the firm innovation has two-ways positive significant relationship with the business environment, degree of competition, and energy policies in Greece, Italy, Turkey, and Portugal with various degrees. Though, in mapping the two-way relationship, the study observed that management practices have greater effects on firm innovation in Greece, Italy, Turkey, and Portugal with various degrees as compared to reverse effects. Moreover, the results of the study revealed that management practices have greater effects on the energy policies among firms in Greece, Italy, Turkey, and Portugal with various degrees as compared to reverse relationship.

Table. 2 Direct Effects (Hypothesis Testing)

Country	Relationship	Estimate	Sample Mean	SD	t-value	P-value	Decision
Greece	MP → INN	0.295	0.291	0.074	3.998	0.000	Supported
	MP ← INN	0.263	0.254	0.065	4.028	0.000	
	EP → INN	0.129	0.127	0.077	1.681	0.004	Supported
	EP ← INN	0.321	0.322	0.071	4.495	0.000	
	BE → INN	0.047	0.050	0.091	2.514	0.006	Supported
	BE ← INN	0.401	0.408	0.058	6.930	0.000	
	DOC → INN	0.217	0.220	0.086	2.531	0.047	Supported
	DOC ← INN	0.441	0.448	0.059	7.430	0.000	
	MP → EP	0.334	0.341	0.066	5.060	0.000	Supported
	MP ← EP	0.089	0.090	0.063	2.423	0.028	
	MP → BE	0.515	0.526	0.046	11.131	0.000	Supported
	MP ← BE	0.251	0.265	0.104	2.405	0.008	
	MP → DOC	0.499	0.506	0.054	9.273	0.000	Supported
MP ← DOC	0.177	0.179	0.100	2.763	0.039		
Italy	MP → INN	0.112	0.115	0.078	2.440	0.035	Supported
	MP ← INN	0.057	0.057	0.039	2.475	0.030	
	EP → INN	0.189	0.188	0.047	3.991	0.000	Supported
	EP ← INN	0.400	0.405	0.047	8.433	0.000	
	BE → INN	0.278	0.282	0.060	4.641	0.000	Supported
	BE ← INN	0.513	0.509	0.040	12.736	0.000	
	DOC → INN	0.190	0.187	0.079	2.409	0.008	Supported
	DOC ← INN	0.508	0.502	0.044	11.635	0.000	
	MP → EP	0.387	0.384	0.049	7.857	0.000	Supported
	MP ← EP	0.100	0.097	0.037	2.691	0.004	
	MP → BE	0.501	0.501	0.042	11.872	0.000	Supported
	MP ← BE	0.003	0.006	0.038	2.072	0.072	
	MP → DOC	0.815	0.815	0.018	44.278	0.000	Supported
MP ← DOC	0.751	0.750	0.031	23.942	0.000		
Turkey	MP → INN	0.256	0.255	0.063	4.059	0.000	Supported
	MP ← INN	0.226	0.227	0.056	4.035	0.000	
	EP → INN	0.191	0.186	0.049	3.877	0.000	Supported
	EP ← INN	0.401	0.405	0.048	8.334	0.000	
	BE → INN	0.109	0.113	0.061	1.792	0.037	Supported
	BE ← INN	0.473	0.478	0.039	12.21	0.000	
	DOC → INN	0.218	0.219	0.062	3.500	0.000	Supported
	DOC ← INN	0.508	0.510	0.042	12.06	0.000	
	MP → EP	0.367	0.372	0.046	7.904	0.000	Supported
	MP ← EP	0.096	0.091	0.043	2.207	0.014	
	MP → BE	0.567	0.572	0.034	16.48	0.000	Supported
	MP ← BE	0.247	0.254	0.067	3.703	0.000	
	MP → DOC	0.578	0.581	0.039	14.99	0.000	Supported
MP ← DOC	0.262	0.254	0.079	3.301	0.001		
Portugal	MP → INN	0.257	0.255	0.053	4.810	0.000	Supported
	MP ← INN	0.224	0.223	0.048	4.665	0.000	
	EP → INN	0.172	0.169	0.043	4.003	0.000	Supported
	EP ← INN	0.369	0.370	0.043	8.682	0.000	
	BE → INN	0.120	0.121	0.060	2.019	0.022	Supported
	BE ← INN	0.464	0.468	0.033	14.01	0.000	
	DOC → INN	0.208	0.211	0.057	3.678	0.000	Supported
	DOC ← INN	0.494	0.496	0.036	13.62	0.000	
	MP → EP	0.339	0.341	0.042	8.120	0.000	Supported
	MP ← EP	0.084	0.081	0.038	2.203	0.014	
	MP → BE	0.564	0.566	0.030	19.08	0.000	Supported
	MP ← BE	0.256	0.267	0.053	4.832	0.000	
	MP → DOC	0.572	0.574	0.032	18.07	0.000	Supported
MP ← DOC	0.261	0.253	0.061	4.260	0.000		

Similarly, the study noted that management practices have greater effects on the business environment among firms in Greece, Italy, Turkey, and Portugal with various degrees as compared to reverse effects. Additionally, the study observed that management practices have greater effects on the degree of competition among firms in Greece, Italy, Turkey, and Portugal with various degrees as compared to reverse relationship. In addition, the study noted that firm innovation has greater effects on the energy policies among firms in Greece, Italy, Turkey, and Portugal with various degrees as compared to reverse relationship. Further, the results indicated that firm innovation has greater effects on the business environment among firms in Greece, Italy, Turkey, and Portugal with various degrees as compared to reverse relationship. In the same way, the outcomes clarified that firm innovation has greater effects on the degree of competition among firms in Greece, Italy, Turkey, and Portugal with various degrees as compared to reverse relationship. Therefore, based on the results, it can be inferred that the firms in Greece, Italy, Turkey, and Portugal pay greeter attention to management practices to keep excellency in all segments of the organizations. It can be concluded that management practices are the driving tool among firms to enhance innovation, achieve higher degree of competition, control energy measures, and build favorable business environment.

Table. 3 Indirect Effects (Mediation)

Country	Relationship	Estimate	Sample Mean	SD	t-value	CILL	CIUL	Decision
Greece	MP → BE → INN	0.124	0.026	0.048	2.505	0.054	0.104	Supported
	MP ← BE ← INN	0.101	0.106	0.040	2.489	0.039	0.176	
	MP → EP → INN	0.143	0.044	0.030	2.450	0.000	0.092	Supported
	MP ← EP ← INN	0.029	0.029	0.022	2.294	0.004	0.067	
	MP → DOC → INN	0.108	0.111	0.044	2.433	0.033	0.186	
MP ← DOC ← INN	0.078	0.082	0.049	2.596	0.002	0.156	Supported	
Italy	MP → BE → INN	0.139	0.141	0.030	4.622	0.092	0.189	Not Supported
	MP ← BE ← INN	0.001	0.003	0.019	2.072	-0.030	0.033	
	MP → EP → INN	0.073	0.072	0.021	3.550	0.044	0.259	Supported
	MP ← EP ← INN	0.040	0.039	0.015	2.579	0.014	0.063	
	MP → DOC → INN	0.155	0.152	0.064	2.401	0.039	0.107	
MP ← DOC ← INN	0.381	0.377	0.036	10.61	0.319	0.436	Supported	
Turkey	MP → BE → INN	0.062	0.064	0.034	1.809	0.008	0.120	Supported
	MP ← BE ← INN	0.117	0.121	0.032	3.665	0.071	0.178	
	MP → EP → INN	0.070	0.070	0.022	3.153	0.037	0.110	Supported
	MP ← EP ← INN	0.038	0.039	0.019	2.007	0.011	0.073	
	MP → DOC → INN	0.126	0.127	0.037	3.432	0.068	0.190	
MP ← DOC ← INN	0.133	0.130	0.042	3.194	0.059	0.193	Supported	
Portugal	MP → BE → INN	0.068	0.069	0.033	2.037	0.014	0.126	Supported
	MP ← BE ← INN	0.119	0.125	0.025	4.747	0.083	0.165	
	MP → EP → INN	0.058	0.058	0.017	3.493	0.032	0.085	Supported
	MP ← EP ← INN	0.031	0.030	0.015	2.074	0.007	0.056	
	MP → DOC → INN	0.119	0.121	0.033	3.650	0.068	0.175	
MP ← DOC ← INN	0.129	0.126	0.032	4.066	0.074	0.177	Supported	

Subsequently, based on the results, it can be inferred that the firms in Greece, Italy, Turkey, and Portugal pay special attention to solve the organizational as well as individual problems to keep sustainable degree of innovation in competitive business environment. It can also be said that the firms have adopted stable energy measures to monitor the performance of

various unit to successfully achieve the desired innovation targets among firms. It can also be inferred based on results that the firms offer performance-based bonuses to promote the culture of innovation in competitive business environment. It is also possible that the firms have established a stable and fair promotion system to maintain the conflicts and politics free working environment. Similarly, it can be inferred based on the results that the firms widely focus on the product, services, and process innovation to maintain excellency in operations and upgrade the skills and efficiencies among employees. Likewise, based on the results, it can be said that the firms have adopted favorable trade and labor regulations to create stable environment for competitive innovation in target market. It can also be concluded that the standard of taxes has facilitated the firms to bring perfection in operations and energy usage. In the same way, the facilities of licensing and financing have the advantage to improve the level of innovation and degree of competitions among firms.

In the second step, the results for indirect relationship were evaluated through PLS-SEM (Table.3). The outcomes of PLS-SEM have clarified that business environment has two-ways mediating role on the relationship between management practices and firm innovation in Greece, Turkey, and Portugal. Surprisingly, business environment has one-way mediating role on the relationship between management practices and firm innovation in Italy. Therefore, based on the results, it can be inferred that the trade and labor regulations, political instability, tax rate, financings, business licensing may not be so interesting for managers to enhance the products, services, and process innovations among firms in Italy. In addition, energy policies have two-ways mediating role between the relationship of management practices and firm innovation in Greece, Italy, Turkey, and Portugal (Figure.3). In the same manner, degree of competition has two-ways mediating role between the relationship of management practices and firm innovation in Greece, Italy, Turkey, and Portugal.

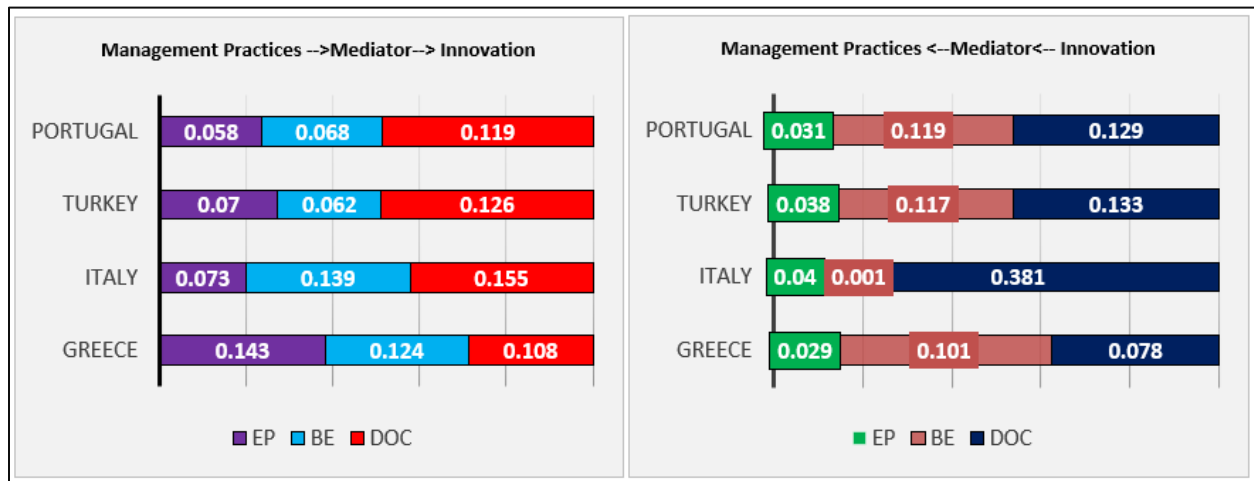


Figure.3 Comparison of Two-Way Mediation

5. Discussion

The purpose of this study was to evaluate the two-way relationship between management practices and firm innovation along with the dual mediating role of energy policies, business environment, and the degree of competition among firms in Greece, Italy, Turkey, Portugal. The results of the study have important implications for managers and policy makers and

significantly contributed to the body of knowledge. Hence, the practices of problems solving, monitoring performance, targets achievement, performance bonuses, methods of promotions have the advantages to meet the required level of innovation among firms specially in Greece, Italy, Turkey, Portugal. Likewise, focusing on the products, services and processes innovations have the benefits to create the market fit solutions to achieve the environmental and economical target in competitive business environment. Specifically, the degree of innovation and energy policies are the important aspects along with the management practices to efficiently meet the targets of innovation among firms. While the managerial impeding was to examine the two-way relationship among the defined constructs to provide the answers to the come-up research questions of this study. However, the outcomes of PLS-SEM analysis have clarified the association among constructs and filled up the identified gap of knowledge to increase the boundary lines in the relevant field.

Interestingly, our findings align with the prior research on management practices and firm innovation in various settings. Such as Theyel (2000) observed that the environmental management practices have an influence on the environmental innovation among US chemical firms. The study is inline in the context of management practices and its impacts on innovation in the perspective of environment. But for the creative innovation, firms should pay special attention to problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion to achieve the higher degree of product, services, and process innovation among firms. Likewise, Sofiyabadi and Valmohammadi (2020) have noted that the top management practices have positive significant effects on innovation among firms in the banking sector of Iran. Particularly, the engagement of top management has the advantage to clarify the confusions of employees and create sense of creativity and responsibility among them that can lead to promote the trend of innovation among firms. Gambi *et al.* (2020) realized that the quality management practices have positive significant effects on the innovation performance through innovation practices among Brazilian companies. As solving problems of employees and providing bonuses to them can divert their focus to produce good quality products and pay attention to superior performance to achieve the desired level of innovation among firms. In addition, Zeeshanullah and Arshad (2021) discovered that the product and process innovation have considerable influence on the firm performance. Romano (2019) remarked that the product and process innovation have positive impacts on the management practices (such as, turnover, employment, and labor productivity) among the Italian manufacturing companies. Paulo *et al.* (2017) found that open innovation can enhance technological development, internal process, and degree of competitiveness among firms. Therefore, based on the previous results and findings of current study, we can confirm that the management practices (in term of problem solving, performance monitoring, achieving targets, performance bonuses, and way of promotion) have two-way relationship with the firm innovation in Greece, Italy, Turkey, and Portugal.

Likewise, Syed and Xiaoyan (2013) have evaluated the role of human resource management practices in the enterprise innovation along with the mediating role of creative culture in software development among SMEs in China. Particularly, the cooperative business environment, fair trade regulation, favorable labor policies, solid political environment, tax relaxation, government incentives, licensing facility have the advantages to define creative business strategies to sustain the culture of innovation among firms. Mathushan and Kengatharan (2022) acknowledged that the human capital has mediating role between human resource management practices and firm innovation in Sri Lanka. The valuable human capital can competently follow the desired working conditions and achieve the anticipated targets for

innovation among firms. Hu *et al.* (2022) have noted the mediating role of supply chain agility between knowledge management capacity (in term of absorptive capacity and transformative capacity) and firm competitive advantage. Küçükoğlu and Pınar (2016) found partial mediation effects of green organizational culture between sustainability and green innovation. Al-Nimer *et al.* (2021) found that business model innovation mediates the relationship between risk management practices and firm performance in Jordan. In addition, Skordoulis *et al.* (2022) confirmed the mediating role of firm strategies between green entrepreneurship, green innovation, and competitive advantage among SMEs in Greece. Therefore, based on the previous results and findings of current study, we can conclude that the business environment has dual mediation between management practices and firm innovation in Greece, Turkey, and Portugal.

Polas *et al.* (2021) found that some of the knowledge management practices have positive significant effects on the green innovation among SMEs in UAE. The study also noted that the environmental awareness mediates in some of the knowledge management practices and green innovation. Specifically, establishing the rules of energy taxes, energy performance standard in operations and usage have the advantage to control the business process, reduce environmental degradation, and promote a healthy working environment among firms. However, the results of this study are inline due to the mediating role of environmental factors on the relationship between knowledge management practices and green innovation. Grekova *et al.* (2013) have found the mediating effects of environmental process innovation on the relationship between environmental management and firm performance in term of cost efficiency. The energy taxes and energy performance standards help to upgrade the business model of firms that can improve the environmental efficiencies among firms. Mushtaq *et al.* (2019) discovered a partial mediation effect of environmental commitment on the relationship between green organizational identity and green innovation performance. Zhang *et al.* (2015) have noted a mediating role of senior managers environmental concerns between firms' energy saving practices and external pressure. Chien (2022) has found the mediating role of improved energy efficiency between reasonable use of energy resources, enhanced energy resources efficiency, reduced energy cost, and the sustainable development goals among the manufacturing firms in China. Zhang *et al.* (2019) have discovered a partial mediating effect of sustainability on the relationship between management innovation and organization performance. The study also noted a partial mediating effect of sustainability on the relationship between technological innovation and organizational performance. Therefore, based on the previous results and findings of current study, we can confirm that the energy policies have dual mediation between management practices and firm innovation in Greece, Italy, Turkey, and Portugal.

Moreover, Niyi *et al.* (2022) have discovered the mediating effects of competitive strategy on the relationship between knowledge management and SME performance. As launching the key products in the main markets can improve the competencies and skills of employees and turns firm to innovative practices. Ibrahim and Mahmood (2016) observed that competitive advantage mediates the relationship between entrepreneurial orientation and SMEs performance. Likewise, Wuen *et al.* (2021) have found that competitive strategy mediates the relationship between strategic human resource management and SMEs performance in Brunei Darussalam. Setyawati *et al.* (2017) have discovered that competitive advantage mediates the relationship between innovation and business performance among SMEs. Therefore, based on the previous results and findings of current study, we can conclude that the degree of competition has dual mediation between the management practices and firm innovation in Greece, Italy, Turkey, and Portugal. However, the results of the current study are unique as compared to the

previous in line studies due to exploring the two-way relationship between management practices and firm innovation. The results are also unique due to evaluating the influential factors of management practices (in the context of problem solving, performance monitoring, targets achieving, performance bonuses, and methods of promotion), to increase the level of product, services, and process innovation among firms especially in Greece, Italy, Turkey, Portugal, in a comparative context. The results of this study are also unique as compared to inline studies due to assessing the two-way mediating role of energy policies, business environment, and degree of competition in the relationship between management practices and firm innovation especially in Greece, Italy, Turkey, and Portugal.

5.1 Implications of the Study

5.1.1 Practical Implications

The findings of this study imply that the firms should stream their focus on management practices (in the context of problem solving, performance monitoring, targets achieving, performance bonuses, and methods of promotion), energy policies, degree of competitions, and business environment, and the combination of these factors would be an important management strategy to promote the level of product, services, and process innovation among firms. The findings of the study also imply that the practices of firm innovation can improve the efficiencies of management and lead to formulate more innovative strategies in the context of environment to achieve their goals in competitive business environment. The efficient management practices, energy taxes, energy performance standards, trade and labor regulations, political instability, lower level of taxes, access to financing and licensing, competition practices, focus on the main products and markets would be important influential factors to create greater innovation among firms. These strategies would be helpful for practitioners and policy makers to create greater innovation in competitive business environment. Solving the problems of employees, monitoring workers performance, achieving targets, providing bonuses on better performance, and flexible promotional practices would increase the confidence of workers to strive for greater innovation among various firms. Particularly, the adoption of sustainability and energy measures among firms can upgrade internal efficiencies, bring perfection among skills, and build image in target market. The sustainable energy practices can also improve the competitive advantage and set new directions for innovation among firms. Ultimately, the secrets of sustainable innovation and energy measure can draw consumes attention and lead to enhance profitability in target market. Consequently, the excellency in sustainable innovation and energy measure can create monopoly in the market and uplift firm to the leadership position in communities.

The application of stable management practices can lead firms to develop some unique innovation practices that better suit to their long term environmental and economic benefits. The unique management practices can lead firms to gain competitive advantage in business environment, efficient energy usage, prevention of pollutions, and be perceived as a market leader for innovation. The performance-based bonuses and promotion can provide the opportunity of better innovation, motivate workers, and can positively lead firms towards innovation in competitive business environment. In the same way, the practices of product, services, and process innovation can enhance the confidence among employees, improve their skills, and bring perfection in management practices. Implementing the product, services, and process innovation strategies can bring perfection in energy consumption, environmental performance, improve competitiveness, and keep stability in business environment. The

innovation among firms can also support administration to control the wastage of resources, efficiencies in energy consumptions, and gain competitive advantage in target markets.

The environmental initiatives and protection policies inspire the firms in competitive business environment to focus on the products, services, and process innovation to ensure their survivals, get favorable responses from consumers, and attention of government agencies in target market. Precisely, this study contributes to the previous literatures by evaluating the two-ways relative importance of management practices, energy policies, business environment, degree of competition, and innovation among firms. Thus, the management practitioners can add the most efficient factors in the daily practices to ensure a sustainable innovation among firms. The results are helpful for management practitioners and policy makers to develop a waste and pollution free environment, and energy efficient business system as per the communities' requirement. The management practices also allow workers to adopt more novel production processes to ensure the product and service innovation and improve the firm image in communities. The study noted that management practices have much better results in the creation of innovation as compared to energy policies, business environment, and degree of competition especially in Greece, Italy, Turkey, Portugal. Therefore, the policy makers should pay special attention to management practices while formulating the innovation strategies for their firms.

5.1.2 Theoretical Implications

This study merged the literature of management practices, firm innovation, energy policies, business environment, degree of competition based on the findings from Greece, Italy, Turkey, and Portugal, and validated the proposed research model in a comparative context. The application of PLS-SEM and subsequently validating the proposed research model based on the data of World Bank Enterprise Survey, is also a novel methodological contribution in the relevant literature. The validated model interestingly contributes to the body of knowledge and clarifies the managers understandings in systematic way to focus on the effective management practices, energy policies, business environment, degree of competition, and innovation and the integration of these factors to develop more efficient business setup. This study also extends the relevant literature of management practices (in the context of problem solving, performance monitoring, targets achieving, performance bonuses, and methods of promotion), energy policies (in the context of energy performance standard) that can enhance the degree of product, services, and process innovation among firms. These influential factors can update the degree of innovation among firms with various grade especially in Greece, Italy, Turkey, Portugal. This study also adds in the previous literature by evaluating the two-way relationship between management practices and innovation among firms. It also contributes by examining the two-ways mediation role of business environment, degree of competition, energy policies on the relationship between management practices and firm innovation in Greece, Italy, Turkey, and Portugal.

6. Conclusion and Future Directions

This study intends to examine the two-ways relationship between management practices and firm innovation along with the two-ways mediating role of business environment, degree of competition, energy policies among firms in Greece, Italy, Turkey, and Portugal. The results of the study have encouraged by providing empirical evidence that the effective management practices in the sight of energy policies, degree of competition, and business environment play a greater role to enhance the level of innovation (products, services, and process) among firms. The results have also clarified that innovation among firms can improve the standard of

management practices, bring perfection in the energy consumptions, enhance degree of competition, and develop more sound business environment. The results of the study have contributed to the prior literature by testing the developed hypotheses based on the data from the World Bank Enterprise Survey. Eventually, it is believed that the findings of this study will significantly contribute to the theoretical literature and highlight the valuable information to apply more influential management practices and improve the level of firm innovation. It will guide the management practitioners to design more significant innovation practices that can better suit with the energy policies in competitive business environment. However, while interpreting results, the readers should know the specifications and scope of collected data. To get better understand and enrich the knowledge area, the future studies can examine the mediating role of management practices between the relationship of business environment, degree of competition, energy policies, and firm innovation. Further, this study was only limited to energy policies while evaluating the factors of Triple Bottom lines in the defined and other cultural context would be a significant contribution in the relevant knowledge area.

References

- Abrunhosa, A., Moura, E., and Sa, P., (2008), "Are TQM principles supporting innovation in the Portuguese footwear industry?", *Technovation*, Vol. 28 No.4, pp. 208–221.
- Adamashvili, N., Fiore, M., Cont, F., and La Sala, P. (2020), "Ecosystem for successful agriculture. Collaborative approach as a driver for agricultural development", *European Countryside*, Vol. 12 No. 2, pp. 242-256.
- Adamashvili, N., Colantuono, F., Conto, F., and Fiore, M. (2020), "Investigating the role of community of practice for sharing knowledge in agriculture sector", *Journal for Global Business Advancement*, Vol. 13 No. 2, pp. 162-184.
- Albloushi, B., Alharmoodi, A., Jabeen, F., Mehmood, K., and Farouk, S. (2022), "Total quality management practices and corporate sustainable development in manufacturing companies: the mediating role of green innovation", *Management Research Review*. Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/MRR-03-2021-0194>
- Al-Nimer, M., Abbadi, S. S., Al-Omush, A., and Ahmad, H. (2021), "Risk Management Practices and Firm Performance with a Mediating Role of Business Model Innovation. Observations from Jordan", *Journal of Risk and Financial Management*, Vol.14 No. 3, pp.113.
- Amjad, F., Abbas, W., Zia-UR-Rehman, M., Baig, S. A., Hashim, M., Khan, A., and Rehman, H. U. (2021), "Effect of green human resource management practices on organizational sustainability: the mediating role of environmental and employee performance", *Environmental Science and Pollution Research*, Vol. 28 No. 22, pp. 28191-28206.
- Amore, M.D., and Bennesen, M., (2016), "Corporate governance and green innovation", *J. Environ. Econ. Manag.* Vol.75, pp. 54e72.
- Arvanitis, S., Seliger, F., and Stucki, T. (2016), "The relative importance of human resource management practices for innovation", *Economics of Innovation and New Technology*, Vol. 25 No. (8), pp. 769-800.
- Aslam, S., Elmagrhi, M. H., Rehman, R. U., and Ntim, C. G. (2021), "Environmental management practices and financial performance using data envelopment analysis in Japan: The mediating role of environmental performance", *Business Strategy and the Environment*, Vol. 30 No.4, pp.1655-1673.
- Bag, S., Dhamija, P., Bryde, D. J., and Singh, R. K. (2022), "Effect of eco-innovation on green supply chain management, circular economy capability, and performance of small and medium enterprises", *Journal of Business Research*, Vol.141, pp. 60-72.

- Bhatia, M. S., and Kumar, S. (2022), "Linking stakeholder and competitive pressure to Industry 4.0 and performance: Mediating effect of environmental commitment and green process innovation", *Business Strategy and the Environment*, Vol. 31, pp.1905–1918.
- Brunel, C. (2019), "Green innovation and green Imports: Links between environmental policies, innovation, and production", *Journal of environmental management*, Vol.248, 109290.
- Chen, J. X., Sharma, P., Zhan, W., and Liu, L. (2019), "Demystifying the impact of CEO transformational leadership on firm performance: Interactive roles of exploratory innovation and environmental uncertainty", *Journal of Business Research*, Vol. 96, pp. 85-96.
- Chen, C. J., and Huang, J. W. (2009), "Strategic human resource practices and innovation performance—The mediating role of knowledge management capacity", *Journal of business research*, Vol. 62 No. 1, pp.104-114.
- Chien, F. (2022). The mediating role of energy efficiency on the relationship between sharing economy benefits and sustainable development goals (Case Of China). *Journal of Innovation & Knowledge*, Vol. 7 No. 4, 100270.
- Chowdhury, S., Dey, P. K., Rodríguez-Espíndola, O., Parkes, G., Tuyet, N. T. A., Long, D. D., and Ha, T. P. (2022), "Impact of Organizational Factors on the Circular Economy Practices and Sustainable Performance of Small and Medium-sized Enterprises in Vietnam", *Journal of Business Research*, Vol.147, pp. 362-378.
- Christensen, C., and Raynor, M. (2013), "*The innovator's solution: Creating and sustaining successful growth*", Harvard Business Review Press.
- Clark, T. (2004), "The fashion of management fashion: a surge too far?. *Organization*, Vol. 11 No.2, pp. 297-306.
- Delgado-Verde, M., Amores-Salvadó, J., Martín-de Castro, G., and Navas-López, J. E. (2014), "Green intellectual capital and environmental product innovation: the mediating role of green social capital", *Knowledge Management Research & Practice*, Vol. 12 No. 3, pp. 261-275.
- Donate, M. J., and de Pablo, J. D. S. (2015), "The role of knowledge-oriented leadership in knowledge management practices and innovation", *Journal of business research*, Vol. 68 No .2, pp. 360-370.
- Feldmann, P. R., Jacomossi, R. R., Barrichello, A., and Morano, R. S. (2019), "The relationship between innovation and global competitiveness: The mediating role of management practices evaluated by structural equation modeling", *Revista Brasileira de Gestão de Negócios*, Vol. 21, pp.195-212.
- Fiore, M., Galati, A., Gołębiewski, J., and Drejerska, N. (2020), "Stakeholders' involvement in establishing sustainable business models: The case of Polish dairy cooperatives", *British Food Journal*, Vol. 122 No. 5, pp.1671-1691.
- Gambi, L. D. N., Lizarelli, F. L., Junior, A. R. R., and Boer, H. (2020), "The impact of quality management practices on innovation: an empirical research study of Brazilian manufacturing companies", *Benchmarking: An International Journal*, Vol. 28 No.3, pp. 1059-1082.
- Grekova, K., Bremmers, H. J., Trienekens, J. H., Kemp, R. G. M., and Omta, S. W. F. (2013), "The mediating role of environmental innovation in the relationship between environmental management and firm performance in a multi-stakeholder environment", *Journal on Chain and Network Science*, Vol.13 No.2, pp. 119-137.
- Hojnik, J., and Ruzzier, M. (2017), "Does it pay to be eco? The mediating role of competitive benefits and the effect of ISO14001", *European Management Journal*, Vol.35 No. 5, pp.581-594.
- Haneda, S., and Ito, K. (2018), "Organizational and human resource management and innovation: which management practices are linked to product and/or process innovation?", *Research Policy*, Vol.47 No.1, pp.194-208.
- Hu, Z., Sarfraz, M., Khawaja, K. F., Shaheen, H., and Mariam, S. (2022), "The influence of knowledge management capacities on pharmaceutical firms competitive advantage: The mediating role of supply chain agility and moderating role of inter functional integration", *Frontiers in Public Health*, Vol.10, 953478.

- Ibrahim, N. M. N., and Mahmood, R. (2016), "Mediating role of competitive advantage on the relationship between entrepreneurial orientation and the performance of small and medium enterprises", *International business management*, Vol.10 No.12, pp. 2444-2452.
- Imran, R., and Anis-ul-Haque, M. (2011), "Mediating effect of organizational climate between transformational leadership and innovative work behaviour", *Pakistan Journal of Psychological Research*, pp. 183-199.
- Inkinen, H. T., Kianto, A., and Vanhala, M. (2015), "Knowledge management practices and innovation performance in Finland", *Baltic Journal of Management*, Vol. 10 No. 4, pp. 432-455.
- Jiménez-Jiménez, D., Martínez-Costa, M., and Sanz-Valle, R. (2014), "Knowledge management practices for innovation: a multinational corporation's perspective", *Journal of Knowledge Management*, Vol.18 No.5, pp.905-918.
- Kianto, A., Sáenz, J., and Aramburu, N. (2017), "Knowledge-based human resource management practices, intellectual capital, and innovation", *Journal of Business Research*, Vol. 81, pp. 11-20.
- Kraśnicka, T., Głód, W., and Wronka-Pośpiech, M. (2018), "Management innovation, pro-innovation organisational culture and enterprise performance: testing the mediation effect", *Review of managerial science*, Vol.12 No. 3, pp. 737-769.
- Küçükoğlu, M. T., and Pinar, R. İ. (2016), "The mediating role of green organizational culture between sustainability and green Innovation: A research in Turkish companies", *Business & Management Studies: An International Journal*, Vol. 6, pp.64-85.
- Lederman, D., Messina, J., Pienknagura, S., and Rigolini, J. (2013), "*Latin American entrepreneurs: many firms but little innovation*", World Bank Publications.
- Liao, Z. (2018), "Environmental policy instruments, environmental innovation and the reputation of enterprises", *Journal of Cleaner Production*, Vol.171, pp.1111-1117.
- Li, X., and Zheng, Y., (2014), "The influential factors of employees' innovative behavior and themanagement advices", *J. Serv. Sci. Manag.* Vol.7 No. 06, 446.
- Mahmoud, R., Al-Mkhadmeh, A. A., and Alananzeh, O. A. (2021), "Exploring the relationship between human resources management practices in the hospitality sector and service innovation in Jordan: the mediating role of human capital", *Geo Journal of Tourism and Geosites*, Vol.35 No. 2, pp.507-514.
- Mathushan, P., and Kengatharan, N. (2022), "Human Resource Management Practices and Firm Innovation: Mediating role of Human Capital", *Management Research and Practice*, Vol.14 No. 2, pp.25-36.
- Mol, M. J., and Birkinshaw, J. (2009), "The sources of management innovation: When firms introduce new management practices", *Journal of business research*, Vol. 62 No. 12, pp.1269-1280.
- Mushtaq, S., Zubair, D. S. S., Khan, M., and Khurram, S. (2019), "Mediating role of environmental commitment between green organizational identity and green innovation performance", *Pakistan Journal of Commerce and Social Sciences*, Vol.13 No.2, pp.385-408.
- Niyi A., Rita A.A., and Mathew O.O. (2022), "Mediating role of competitive strategy on relationship between knowledge management and performance of Nigerian small and medium enterprises", *International Journal of Entrepreneurship*, Vol.26 No.4, pp.1-7.
- Obeidat, U., Obeidat, B., Alrowwad, A., Alshurideh, M., Masadeh, R., and Abuhashesh, M. (2021), "The effect of intellectual capital on competitive advantage: the mediating role of innovation", *Management Science Letters*, Vol. 11 No. 4, pp.1331-1344.
- Ode, E., and Ayavoo, R. (2020), "The mediating role of knowledge application in the relationship between knowledge management practices and firm innovation", *Journal of Innovation & Knowledge*, Vol.5 No. 3, pp. 210-218.
- Oubrich, M., Hakmaoui, A., Benhayoun, L., Söilen, K. S., and Abdulkader, B. (2021), "Impacts of leadership style, organizational design and HRM practices on knowledge hiding: The indirect roles of organizational justice and competitive work environment", *Journal of Business Research*, Vol. 137, pp.488-499.

- Paulo, A. F. D., Oliveira, S. V. W. B. D., and Porto, G. S. (2017), "Mapping impacts of open innovation practices in a firm competitiveness", *Journal of technology management & innovation*, Vol.12 No.3, pp.108-117.
- Polas, M. R. H., Tabash, M. I., Bhattacharjee, A., and Dávila, G. A. (2021), "Knowledge management practices and green innovation in SMES: the role of environmental awareness towards environmental sustainability", *International Journal of Organizational Analysis*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/IJOA-03-2021-2671>.
- Pucci, T., Casprini, E., Galati, A., and Zanni, L. (2020), "The virtuous cycle of stakeholder engagement in developing a sustainability culture: Salcheto winery", *Journal of Business Research*, Vol. 119, pp.364-376.
- Rehman, M.A., Seth, D., and Shrivastava, R.L. (2016), "Impact of green manufacturing practices on organisational performance in Indian context: an empirical study", *J Clean Prod*, Vol. 137, pp. 427–448.
- Rehman, F.U., Yusoff, R. B. M., Zabri, S. B. M., and Ismail, F. B. (2017), "Determinants of personal factors in influencing the buying behavior of consumers in sales promotion: a case of fashion industry", *Young Consumers*, Vol.18 No.4, pp.408-424.
- Rehman, F. U., and Zeb, A. (2022), "Translating the impacts of social advertising on Muslim consumers buying behavior: the moderating role of brand image", *Journal of Islamic Marketing*, (ahead-of-print).
- Rehman, F. U., and Al-Ghazali, B. M. (2022), "Evaluating the Influence of Social Advertising, Individual Factors, and Brand Image on the Buying Behavior toward Fashion Clothing Brands", *SAGE Open*, Vol. 12 No.1, 21582440221088858.
- Rehman, F. U., Ismail, H., Al Ghazali, B. M., Asad, M. M., Shahbaz, M. S., and Zeb, A. (2021), "Knowledge management process, knowledge based innovation: Does academic researcher's productivity mediate during the pandemic of covid-19?", *PloS one*, Vol. 16 No.12, e0261573.
- Saez-Martínez, F.J., Díaz-García, C., and Gonzalez-Moreno, A., (2016), "Firm technological trajectory as a driver of eco-innovation in young small and medium-sized enterprises", *J. Clean. Prod.* Vol.138, 28e37.
- Setyawati, S. M., Rosiana, M., and Shariff, M. N. M. (2017), "Competitive advantage as mediating variable on the relationship between innovation and business performance on SMES in Purwokerto Province", *Saudi Journal of Business and Management Studies*, Vol. 2 No.7, pp. 693-699.
- Singh, S. K., Gupta, S., Busso, D., and Kamboj, S. (2021), "Top management knowledge value, knowledge sharing practices, open innovation, and organizational performance", *Journal of Business Research*, Vol.128, pp. 788-798.
- Skordoulis, M., Kyriakopoulos, G., Ntanos, S., Galatsidas, S., Arabatzis, G., Chalikias, M., and Kalantonis, P. (2022), "The Mediating Role of Firm Strategy in the Relationship between Green Entrepreneurship, Green Innovation, and Competitive Advantage: The Case of Medium and Large-Sized Firms in Greece", *Sustainability*, Vol.14 No. 6, 3286.
- Sofiyabadi, J., and Valmohammadi, C. (2020), "Impact of knowledge management practices on innovation performance", *IEEE Transactions on Engineering Management*.
- Syed, N., and Xiaoyan, L. I. N. (2013), "Relationship between human resource management practices and enterprise innovation: Mediating role of creative culture", In *Proceedings of the 2013 International Conference on Information, Business and Education Technology (ICIBET 2013)* (772-775). Atlantis Press.
- Tan, C. L., and Nasurdin, A. M. (2011), "Human resource management practices and organizational innovation: assessing the mediating role of knowledge management effectiveness", *Electronic journal of knowledge management*, Vol. 9 No.2, pp.155-167.
- Tsai, C.Y., Horng, J.S., Liu, C.H., and Hu, D.C. (2015), "Work environment and atmosphere: the role of organizational support in the creativity performance of tourism and hospitality organizations", *Int. J. Hosp. Manag.*, Vol. 46, pp.26–35.

- Theyel, G. (2000), "Management practices for environmental innovation and performance", *International journal of operations & production management*, Vol.20 No.2, pp.249-266.
- Vlas, C. O., Richard, O. C., Andreovski, G., Konrad, A. M., and Yang, Y. (2022), "Dynamic capabilities for managing racially diverse workforces: Effects on competitive action variety and firm performance", *Journal of Business Research*, Vol.141, pp.600-618.
- Wuen, C. H., Ibrahim, F., and Ringim, K. J. (2021), "Mediating effect of competitive strategy in the relationship between strategic human resource management and performance of small and medium enterprises in Brunei Darussalam", *Middle East Journal of Management*, Vol. 8 No.(2-3), pp.254-277.
- Xie, Y., Xue, W., Li, L., Wang, A., Chen, Y., Zheng, Q., and Li, X. (2018), "Leadership style and innovation atmosphere in enterprises: An empirical study", *Technological Forecasting and Social Change*, Vol.135, pp. 257-265.
- Xu, L.D., and Duan, L. (2018), "Big data for cyber physical systems in industry 4.0: a survey", *Enterp. Inf. Syst.*, pp.1–22. <http://dx.doi.org/10.1080/17517575.2018.1442934>.
- Yang, M., Wang, J., and Zhang, X. (2021), "Boundary-spanning search and sustainable competitive advantage: The mediating roles of exploratory and exploitative innovations", *Journal of Business Research*, Vol.127, pp. 290-299.
- Zeeshanullah, and Arshad, H. (2022), "Impact of Internal Innovation on Firm performance with moderating role of collaborative innovation", Master Thesis, University of Gavle.
- Zehir, C., Üzmez, A., and Yıldız, H. (2016), "The effect of SHRM practices on innovation performance: The mediating role of global capabilities", *Procedia-Social and Behavioral Sciences*, Vol.235, pp. 797-806.
- Zhang, Q., and Ma, Y. (2021), "The impact of environmental management on firm economic performance: The mediating effect of green innovation and the moderating effect of environmental leadership", *Journal of Cleaner Production*, Vol.292, 126057.
- Zhang, Q., Yang, Y., and Lei, J. (2018), "Science-based innovation in China: a case study ofartemisinin from laboratory to the market", *J. Ind. Integr. Manag.*, Vol.3 No.2.
- Zhang, Z., Zhu, H., Zhou, Z., and Zou, K. (2022), "How does innovation matter for sustainable performance? Evidence from small and medium-sized enterprises", *Journal of Business Research*, Vol. 153, pp. 251-265.
- Zhang, J. A., O'Kane, C., and Chen, G. (2020), "Business ties, political ties, and innovation performance in Chinese industrial firms: The role of entrepreneurial orientation and environmental dynamism", *Journal of Business Research*, Vol.121, pp. 254-267.
- Zhang, Y., Khan, U., Lee, S., and Salik, M. (2019), "The influence of management innovation and technological innovation on organization performance. A mediating role of sustainability", *Sustainability*, Vol. 11 No. 2, 495.
- Zhang, B., Wang, Z., and Lai, K. H. (2015), "Mediating effect of managers' environmental concern: Bridge between external pressures and firms' practices of energy conservation in China", *Journal of Environmental Psychology*, Vol.43, pp.203-215.

APPENDIX

Table. 2(a) Factors Loading, Composite Reliability, AVE

Construct	Items	Greece						Italy					
		Case-1			Case-II (Reverse Model)			Case-1			Case-II (Reverse Model)		
		F. L	C.R	AVE	F. L	C.R	AVE	F. L	C.R	AVE	F. L	C.R	AVE
Management Practices	BMR1	0.771	0.900	0.645	0.771	0.900	0.645	0.852	0.914	0.680	0.851	0.914	0.680
	BMR2	0.821			0.820			0.897			0.898		
	BMR3	0.901			0.902			0.781			0.786		
	BMR9	0.702			0.702			0.796			0.796		
	BMR10	0.806			0.807			0.790			0.787		
Environmental Policies	BMGD6	0.843	0.902	0.754	0.843	0.902	0.754	0.879	0.917	0.787	0.879	0.917	0.787
	BMGD7	0.881			0.881			0.903			0.903		
	BMGD8	0.881			0.881			0.880			0.880		
Business Environment	M1(Tra)	0.704	0.819	0.534	0.704	0.819	0.534	0.824	0.932	0.697	0.824	0.932	0.697
	M1(Lab)	0.782			0.782			0.817			0.817		
	M1(P.In)	0.703			0.704			0.918			0.918		
	M1(Tax)	0.563			0.563			0.786			0.786		
	M1(Fin)	0.620			0.620			0.810			0.810		
	M1 (Per)	0.547			0.547			0.850			0.850		
Degree of Competition	E-1	0.813	0.874	0.582	0.813	0.874	0.582	0.852	0.907	0.663	0.852	0.907	0.663
	E-2	0.733			0.733			0.785			0.785		
	E-2a	0.772			0.772			0.791			0.791		
	E6	0.702			0.703			0.803			0.803		
	E30	0.788			0.788			0.837			0.837		
Innovation	H1	0.884	0.902	0.822	0.881	0.902	0.822	0.886	0.905	0.827	0.885	0.905	0.826
	H2	0.929			0.931			0.932			0.933		

Table. 2(b) Factors Loading, Composite Reliability, AVE

Construct	Items	Turkey						Portugal					
		Case-1			Case-II (Reverse Model)			Case-1			Case-II (Reverse Model)		
		F. L	C.R	AVE	F. L	C.R	AVE	F. L	C.R	AVE	F. L	C.R	AVE
Management Practices	BMR1	0.832	0.922	0.702	0.832	0.922	0.702	0.805	0.911	0.673	0.805	0.911	0.673
	BMR2	0.818			0.821			0.823			0.823		
	BMR3	0.919			0.919			0.907			0.907		
	BMR9	0.794			0.794			0.756			0.756		
	BMR10	0.818			0.818			0.804			0.804		
Environmental Policies	BMGD6	0.874	0.917	0.787	0.874	0.917	0.787	0.863	0.909	0.769	0.863	0.909	0.769
	BMGD7	0.901			0.901			0.894			0.894		
	BMGD8	0.886			0.886			0.874			0.874		
Business Environment	M1(Tra)	0.745	0.837	0.664	0.745	0.837	0.664	0.724	0.830	0.552	0.724	0.830	0.552
	M1(Lab)	0.751			0.751			0.757			0.757		
	M1(P.In)	0.728			0.728			0.711			0.711		
	M1(Tax)	0.660			0.660			0.644			0.644		
	M1(Fin)	0.589			0.589			0.590			0.591		
	M1 (Per)	0.593			0.593			0.585			0.585		
Degree of Competition	E-1	0.855	0.907	0.663	0.855	0.907	0.663	0.840	0.897	0.636	0.841	0.897	0.636
	E-2	0.786			0.786			0.771			0.771		
	E-2a	0.794			0.794			0.775			0.775		
	E6	0.801			0.801			0.787			0.787		
	E30	0.831			0.831			0.813			0.813		
Innovation	H1	0.886	0.905	0.827	0.884	0.905	0.826	0.880	0.900	0.818	0.878	0.899	0.817
	H2	0.932			0.934			0.928			0.929		

Table. 3(a)Discriminant Validity and HTMT

Country	Discriminant Validity						HTMT					
Greece	Case-I											
		MP	BE	DOC	EP	INO		MP	BE	DOC	EP	INO
	MP	0.859					MP					
	BE	0.695	0.763				BE	0.601				
	DOC	0.392	0.345	0.868			DOC	0.496	0.421			
	EP	0.400	0.441	0.321	0.907		EP	0.500	0.544	0.392		
	INO	0.515	0.499	0.334	0.470	0.803	INO	0.553	0.587	0.393	0.563	
	Case-II											
	MP	0.859					MP					
	BE	0.695	0.763				BE	0.601				
	DOC	0.392	0.345	0.868			DOC	0.496	0.421			
EP	0.400	0.441	0.321	0.907		EP	0.500	0.544	0.392			
INO	0.515	0.499	0.334	0.470	0.803	INO	0.553	0.587	0.393	0.563		
Italy	Case-I											
	MP	0.825					MP					
	BE	0.576	0.814				BE	0.645				
	DOC	0.364	0.350	0.887			DOC	0.409	0.401			
	EP	0.512	0.507	0.400	0.909		EP	0.595	0.477	0.602		
	INO	0.501	0.403	0.387	0.479	0.835	INO	0.557	0.627	0.441	0.562	
	Case-II											
	MP	0.825					MP					
	BE	0.576	0.814				BE	0.645				
	DOC	0.364	0.350	0.887			DOC	0.409	0.401			
	EP	0.512	0.507	0.400	0.909		EP	0.595	0.477	0.602		
INO	0.501	0.403	0.387	0.479	0.835	INO	0.557	0.627	0.441	0.562		

Table. 3(b)Discriminant Validity and HTMT

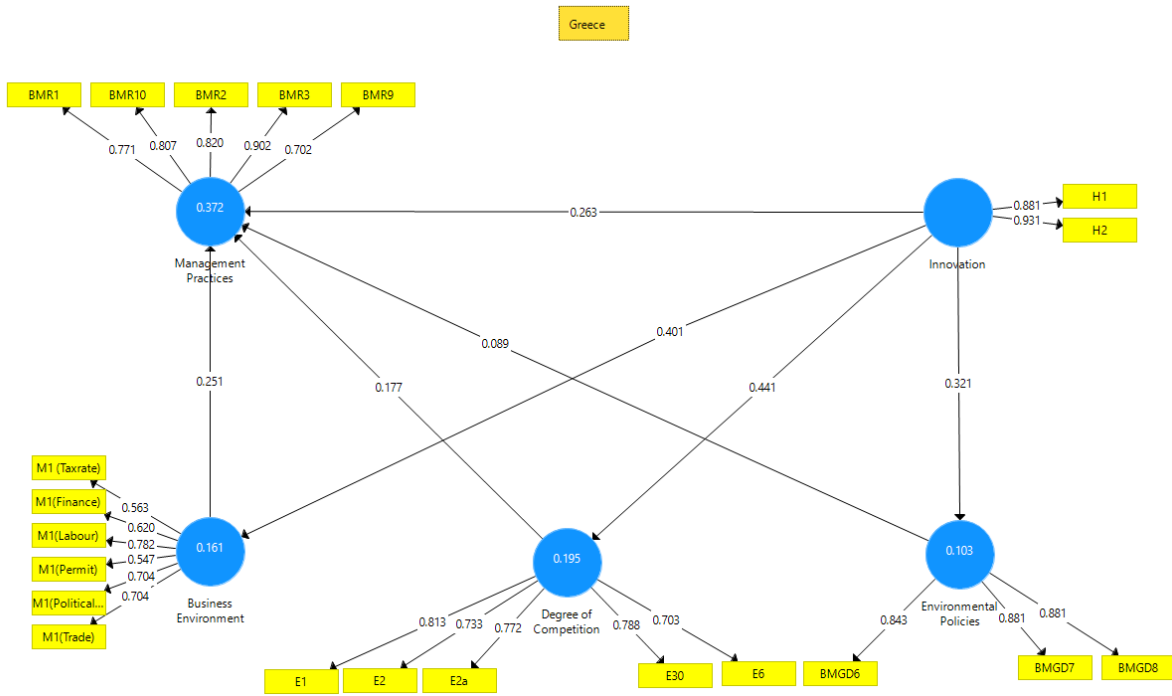
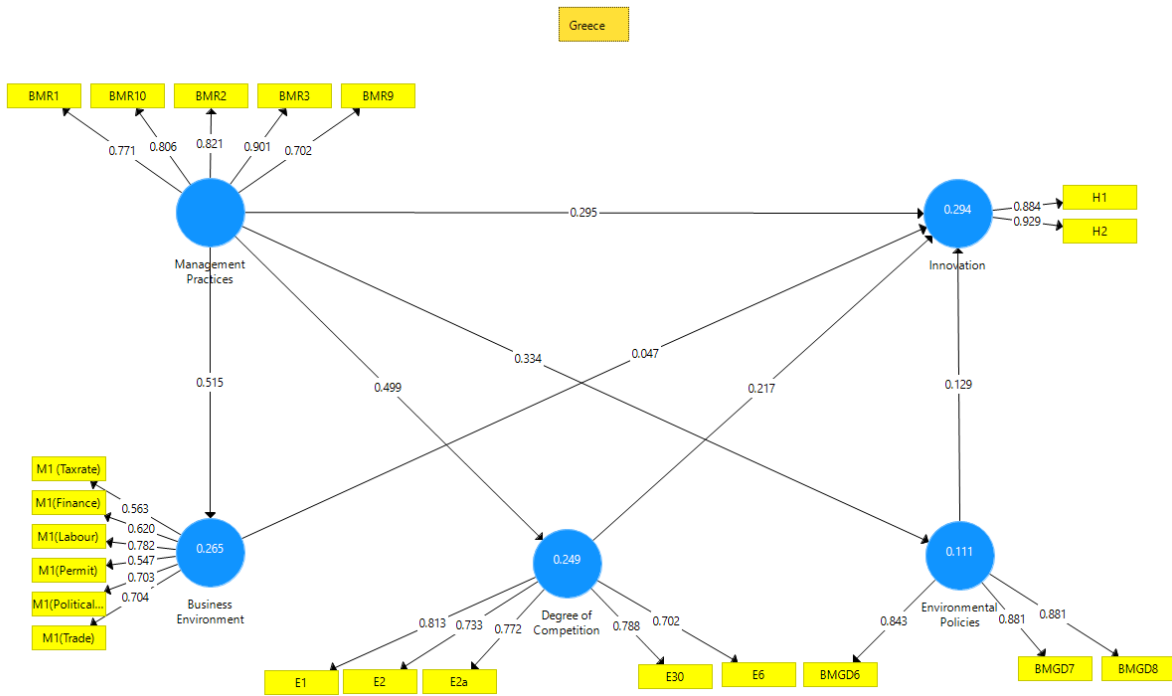
Country	Discriminant Validity						HTMT					
Turkey	Case-I											
		MP	BE	DOC	EP	INO		MP	BE	DOC	EP	INO
	MP	0.881					MP					
	BE	0.682	0.814				BE	0.528				
	DOC	0.361	0.349	0.887			DOC	0.431	0.401			
	EP	0.472	0.507	0.400	0.909		EP	0.568	0.302	0.477		
	INO	0.567	0.578	0.367	0.514	0.838	INO	0.518	0.554	0.417	0.504	
	Case-II											
	MP	0.881					MP					
	BE	0.682	0.814				BE	0.528				
	DOC	0.361	0.349	0.887			DOC	0.431	0.401			
EP	0.472	0.507	0.400	0.909		EP	0.568	0.302	0.477			
INO	0.567	0.578	0.367	0.514	0.838	INO	0.518	0.554	0.417	0.504		
Portugal	Case-I											
	MP	0.772					MP					
	BE	0.673	0.798				BE	0.530				
	DOC	0.337	0.332	0.877			DOC	0.410	0.389			
	EP	0.464	0.493	0.369	0.904		EP	0.569	0.597	0.448		
	INO	0.564	0.572	0.339	0.502	0.821	INO	0.621	0.656	0.393	0.501	
	Case-II											
	MP	0.772					MP					
	BE	0.673	0.798				BE	0.530				
	DOC	0.337	0.332	0.877			DOC	0.410	0.389			
	EP	0.464	0.493	0.369	0.904		EP	0.569	0.597	0.448		
INO	0.564	0.572	0.339	0.502	0.821	INO	0.621	0.656	0.393	0.501		

Table .4 Two-Way Relationship (R^2 , F^2 , VIF, Q^2)

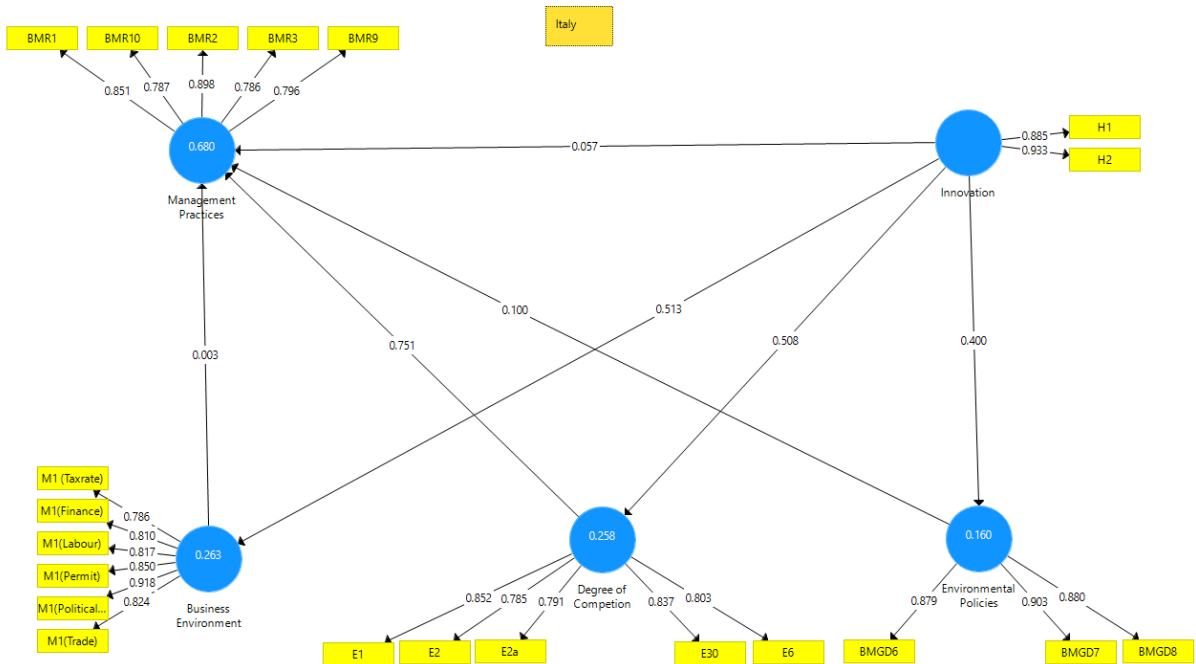
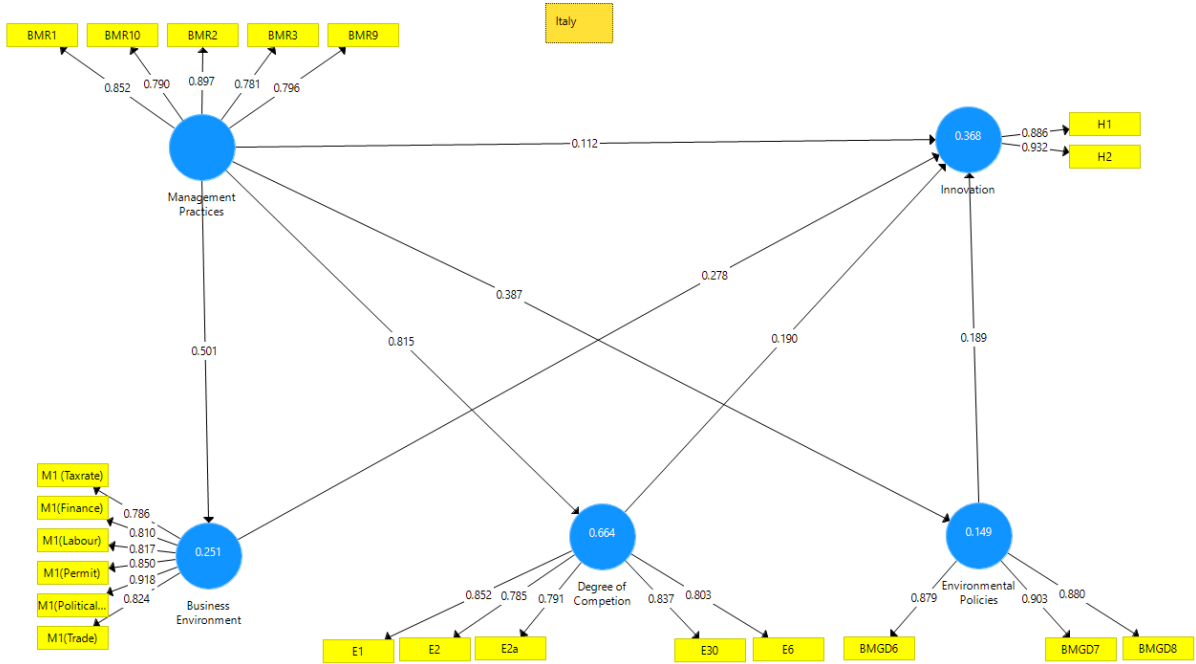
Country	Relationship	R-Square	F-Square	VIF	Q-Square
Greece	MP → INN	0.352	0.058	1.654	0.278
	EP → INN		0.038	1.181	
	BE → INN		0.010	1.895	
	DOC → INN		0.042	1.951	
	MP → EP	0.112	0.127	1.000	0.084
	MP → BE	0.304	0.437	1.000	0.105
	MP → DOC	0.323	0.477	1.000	0.200
	EP ← INN	0.103	0.040	1.233	0.073
	BE ← INN	0.161	0.049	2.062	0.064
	DOC ← INN	0.195	0.024	2.069	0.111
	MP ← EP	0.372	0.115	1.000	0.226
	MP ← BE		0.191	1.000	
	MP ← DOC		0.242	1.000	
	MP ← INN		0.084	1.308	
Italy	MP → INN	0.368	0.006	3.089	0.290
	EP → INN		0.046	1.232	
	BE → INN		0.078	1.568	
	DOC → INN		0.017	3.354	
	MP → EP	0.149	0.176	1.000	0.115
	MP → BE	0.251	0.335	1.000	0.173
	MP → DOC	0.664	0.979	1.000	0.438
	EP ← INN	0.160	0.025	1.257	0.124
	BE ← INN	0.263	0.049	1.691	0.182
	DOC ← INN	0.258	0.054	1.668	0.169
	MP ← EP	0.680	0.191	1.000	0.456
	MP ← BE		0.357	1.000	
	MP ← DOC		0.347	1.000	
	MP ← INN		0.046	1.574	
Turkey	MP → INN	0.370	0.061	1.691	0.293
	EP → INN		0.048	1.213	
	BE → INN		0.009	2.073	
	DOC → INN		0.036	2.098	
	MP → EP	0.135	0.156	1.000	0.104
	MP → BE	0.321	0.473	1.000	0.120
	MP → DOC	0.335	0.503	1.000	0.220
	EP ← INN	0.160	0.053	1.255	0.124
	BE ← INN	0.223	0.055	1.983	0.095
	DOC ← INN	0.258	0.060	2.051	0.169
	MP ← EP	0.443	0.191	1.000	0.306
	MP ← BE		0.288	1.000	
	MP ← DOC		0.347	1.000	
	MP ← INN		0.061	1.497	
Portugal	MP → INN	0.351	0.061	1.667	0.276
	EP → INN		0.039	1.183	
	BE → INN		0.011	2.027	
	DOC → INN		0.033	2.047	
	MP → EP	0.115	0.130	1.000	0.087
	MP → BE	0.318	0.467	1.000	0.115
	MP → DOC	0.327	0.486	1.000	0.205
	EP ← INN	0.136	0.052	1.216	0.102
	BE ← INN	0.215	0.060	1.933	0.154
	DOC ← INN	0.242	0.060	1.933	0.091
	MP ← EP	0.435	0.158	1.000	0.287

	MP ← BE		0.275	1.000	
	MP ← DOC		0.323	1.000	
	MP ← INN		0.061	1.454	

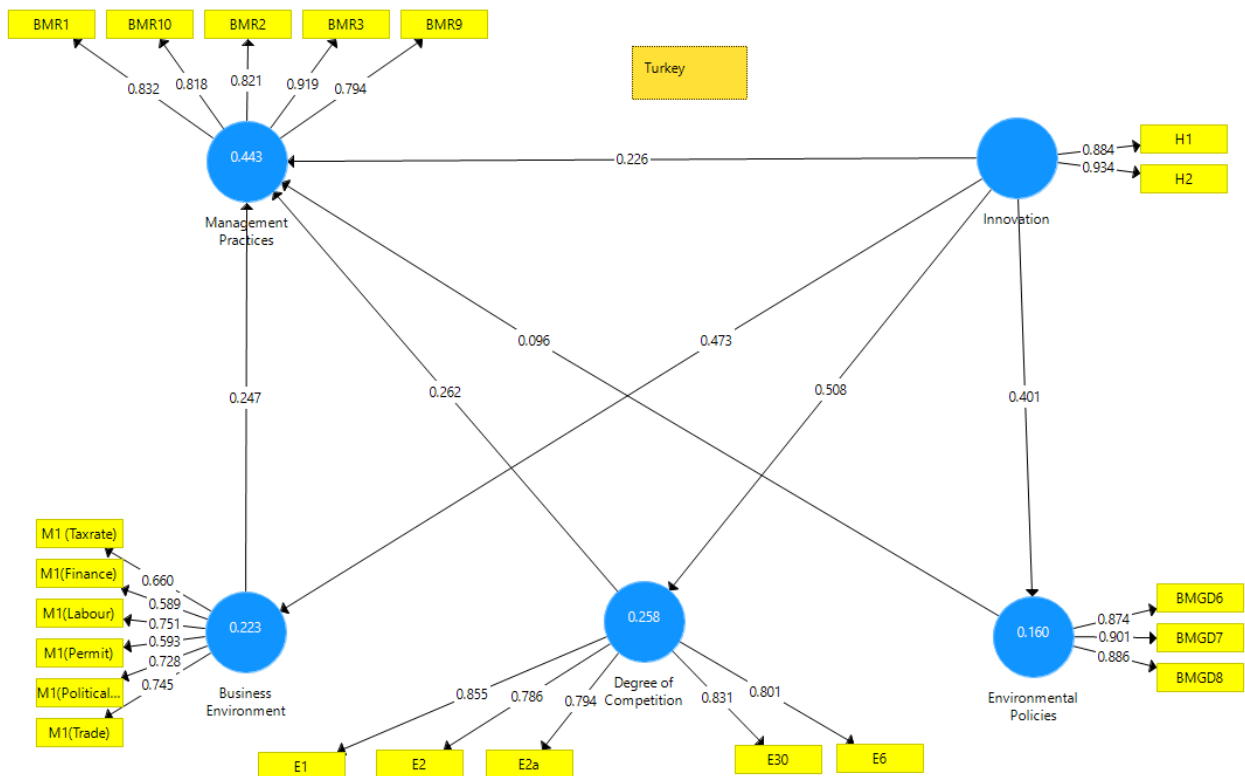
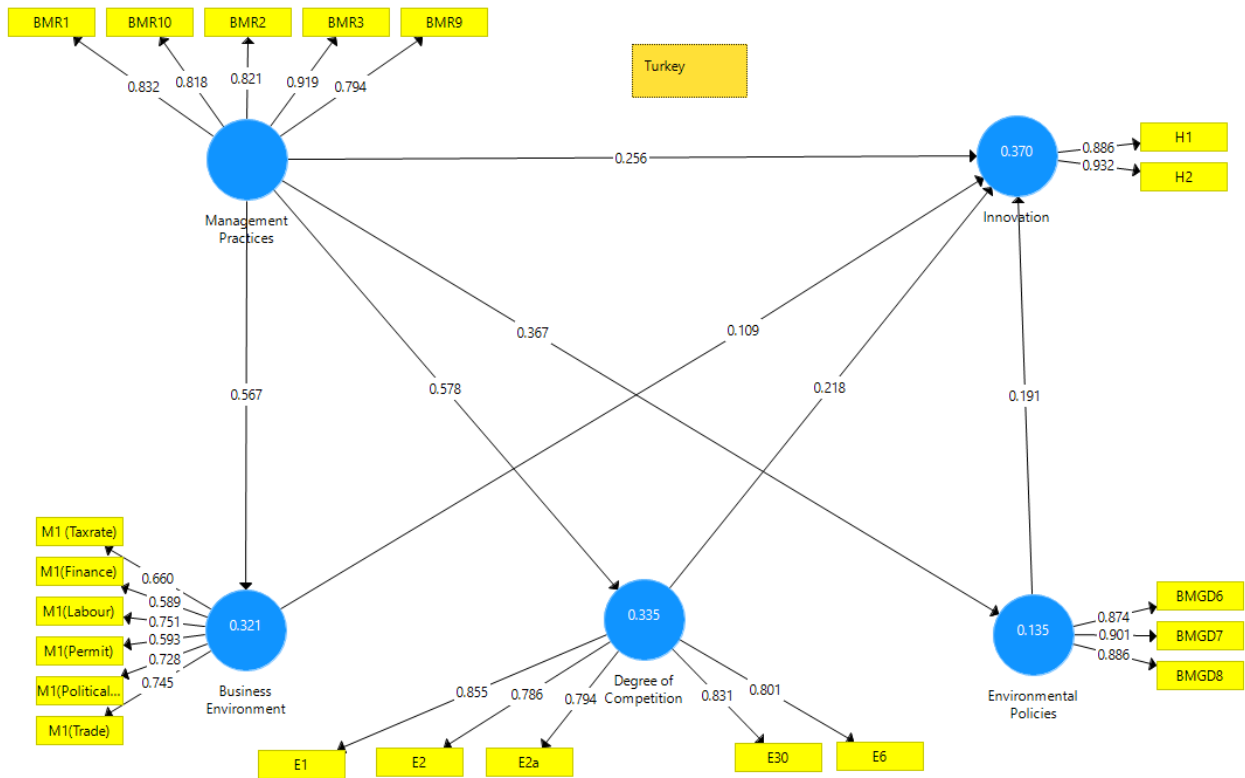
Greece



Italy



Turkey



Portugal

