



**An-Najah National University**  
**Faculty of Graduate Studies**

**THE EFFECT OF GREEN HUMAN  
RESOURCE MANAGEMENT PRACTICES ON  
SUSTAINABLE PERFORMANCE WITH  
GREEN INNOVATION AS MEDIATING  
VARIABLE: AN EMPIRICAL STUDY**

**By**

**Baha' Ahmed Abdelrahman Alja'ar**

**Supervisors**

**Dr. Mohammed Alsayed**

**Dr. Yahya Saleh**

**This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of  
Master of Engineering Management, Faculty of Graduate Studies, An-Najah National  
University, Nablus - Palestine.**

**2022**

# **THE EFFECT OF GREEN HUMAN RESOURCE MANAGEMENT PRACTICES ON SUSTAINABLE PERFORMANCE WITH GREEN INNOVATION AS MEDIATING VARIABLE: AN EMPIRICAL STUDY**

By:

Baha' Ahmed Abdelrahman Alja'ar

This Thesis was Defended Successfully on 17/02/2022 and approved by

Dr. Mohammed Alsayed  
Supervisor

  
Signature

Dr. Yahya Saleh  
Co-Supervisor

  
Signature

Dr. Majeed Mansour  
External Examiner

  
Signature

Dr. Mohammed Othman  
Internal Examiner

  
Signature

## **Dedication**

To my mother, to my father, to my family, and to everyone who wished me well, all  
thanks and unlimited gratitude.

## **Acknowledgment**

First of all, I thank God Almighty, who has given me the strength, patience and courage to complete this thesis.

Special appreciation goes to my supervisors, Dr. Yahya Saleh and Dr. Mohammed Alsayed for their supervision and constant support and for their valuable comments and suggestions which contributed to the success of the thesis.

I extend my thanks to the examining committee, for their efforts in reviewing the thesis and suggesting modifications to improve it.

I would also like to extend my thanks and gratitude to my family and my friends for their constant motivation and support to reach this moment. I would also thank all participants from the Palestinian various industrial sectors who reported their responses and providing the needed information via the questionnaire.

And all thanks to everyone who contributed directly or indirectly to help me complete the thesis.

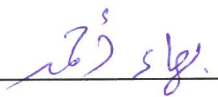
## Declaration

I, the undersigned, declare that I submitted the thesis entitled:

### **THE EFFECT OF GREEN HUMAN RESOURCE MANAGEMENT PRACTICES ON SUSTAINABLE PERFORMANCE WITH GREEN INNOVATION AS MEDIATING VARIABLE: AN EMPIRICAL STUDY**

I declare that the work provided in this thesis, unless otherwise referenced, is my own work, and has not been submitted elsewhere for any other degree or qualification.

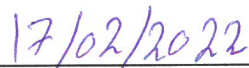
Student's Name:

\_\_\_\_\_ 

Signature:

\_\_\_\_\_ 

Date:

\_\_\_\_\_ 

## **List of Contents**

Dedication.....	III
Acknowledgment .....	IV
Declaration.....	V
List of Contents.....	VI
List of Tables .....	IX
List of Figures.....	X
List of Appendices .....	XI
Abstract.....	XII
Chapter One: Introduction and Literature Review .....	1
1.1 Chapter Overview .....	1
1.2 General Background .....	1
1.2.1 Problem Statement and the Research Questions.....	4
1.2.2 The Significance of Research .....	5
1.2.3 The Objectives of Research .....	6
1.2.4 The Research Hypotheses .....	7
1.2.5 The Structure of the Thesis .....	7
1.3 Theoretical Background.....	7
1.4 Environmental Management and Green Performance Management .....	9
1.5 Human Resource Management (HRM) and Green Human Resource Management (GHRM).....	10
1.5.1 Human Resource Management Practices .....	12
1.5.2 Green Analysis and Description of Job Position .....	14
1.5.3 Green Recruitment.....	14
1.5.4 Green Selection.....	15
1.5.5 Green Training .....	15
1.5.6 Green Performance Assessment .....	16
1.5.7 Green Rewards.....	16
1.6 Sustainable Performance.....	17
1.7 Green Innovation .....	19
1.8 GHRM and Sustainable Performance.....	23
1.9 GHRM Practices and Green Innovation .....	24

1.10 Green Innovation and Sustainable Performance.....	25
1.11 Green Innovation as a Mediator.....	26
1.12 GHRM and Manufacturing in Palestine .....	27
1.13 Conceptualization of the Proposed Model.....	29
Chapter Two: Methodology .....	31
2.1 Chapter Overview .....	31
2.2 Research Types .....	31
2.3 Research Approach .....	33
2.3.1 Quantitative Approach.....	34
2.3.2 Qualitative Approach.....	35
2.3.3 Mixed Method Approach.....	36
2.4 Research Methodology .....	36
2.5 Sampling Techniques.....	37
2.6 Measurement Development and Questionnaire Design.....	39
2.7 Data Analysis Techniques .....	40
Chapter Three: Data Analysis and Results .....	42
3.1 Chapter Overview .....	42
3.2 Analysis of Survey Response .....	42
3.2.1 Response Rates .....	42
3.2.2 Descriptive Analysis .....	43
3.3 Questionnaires Analysis .....	44
3.4 Assessment of Measurement Models (Outer Model) .....	46
3.4.1 Convergent Validity.....	46
3.4.2 Discriminant validity .....	47
3.4.3 Discriminant Validity Assessment of Formative Construct .....	49
3.5 Assessment of the Structural Model (Inner Model).....	51
3.5.1 The Coefficient of Determination ( $R^2$ ) .....	51
3.5.2 The Effect Size ( $F^2$ ) .....	51
3.5.3 Blindfolding and Predictive Relevance $Q^2$ .....	52
3.5.4 Goodness of Fit Index GoF.....	52
3.5.5 The Significance of the Path Coefficients - Hypotheses Test .....	53
3.6 Mediation Analysis .....	54
Chapter Four: Discussion, Conclusion and Recommendations.....	58

4.1 Chapter Overview .....	58
4.2 Discussion of Results.....	58
4.2.1 Discussion of GHRM Status in Palestine .....	58
4.2.2 Discussion of Green Innovation Status in Palestine .....	60
4.2.3 Discussion of Sustainable Performance Status in Palestine .....	61
4.2.4 Hypothesis Testing Discussion .....	62
4.3 Theoretical Implications .....	63
4.4 Practical Implications .....	64
4.5 Conclusions.....	64
4.6 Recommendations.....	66
4.7 Research Limitations .....	67
4.8 Future Research Directions.....	67
List of Abbreviations .....	68
References.....	70
Appendices.....	80
الملخص.....	ب



## List of Tables

Table1: The Main Indicators Which Cover The Main Aspects Of Sustainability Performance .....	18
Table 2: The Number Of Manufacturing Firms.....	39
Table 3: GHRM Practices, Green Innovation, And Sustainable Performance Level Of Implementation .....	44
Table 4: Cronbach's Alpha , Composite Reliabilities And AVE Values Of Constructs....	48
Table 5: Fornell-Larcker Criterion. ....	49
Table 6: Heterotrait-Monotrait Ratio (HTMT).....	50
Table 7: Weight, T- Values And Variance Inflation Factor (VIF) Values .....	50
Table 8: R <sup>2</sup> and F <sup>2</sup> Values .....	52
Table 9: The Results Of Direct Relations .....	53
Table 10: Indirect Relation (Mediation) Result.....	56

## **List of Figures**

Figure 1: The Innovation Matrix .....	20
Figure 2: The Number Of Industrial Enterprises And Workers In Palestine 2017-2019 ....	28
Figure 3: The Research Conceptual Model .....	30
Figure 4: The Research Cycle.....	32
Figure 5: Research Methodology Flow Chart.....	38
Figure 6: The Measurement Model .....	47
Figure 7: The General Mediator Model.....	54
Figure 8: The Mediator Analysis Procedure.....	54
Figure 9: PLS Bootstrapping Procedures.....	57

## **List of Appendices**

Appendix A: Research Questionnaire in English .....	80
Appendix B: Research Questionnaire in Arabic .....	89
Appendix C: Information and Data Analysis Tables .....	96

# **THE EFFECT OF GREEN HUMAN RESOURCE MANAGEMENT PRACTICES ON SUSTAINABLE PERFORMANCE WITH GREEN INNOVATION AS MEDIATING VARIABLE: AN EMPIRICAL STUDY**

**By**  
**Baha' Ahmed Abdelrahman Alja'ar**  
**Supervisors**  
**Dr. Mohammed Alsayed**  
**Dr. Yahya Saleh**

## **Abstract**

Green human resources management (GHRM) is a critical research issue that has been studied in recent decades. In this study, the question is how GHRM practices will affect the sustainable performance in presence of green innovation as a mediating variable in manufacturing firms in Palestine. To this end, the implementation level of GHRM practices, green innovation and sustainable performance is evaluated.

A research model was developed to link between variables. The data collected from manufacturing firms were done via questionnaire as an instrument for quantitative methods. More specifically, 58 valid questionnaires could be obtained from managers of the targeted manufacturing industries working in Palestine. The research model was assessed by partial least squares structural equation modeling (PLS-SEM) using Smart-PLS software.

The findings revealed that GHRM practices, green innovation and sustainable performance are implemented at a moderate level in manufacturing firms. It has been found that the most influence GHRM practices is green analysis and description of job position whereas green performance assessment was the least influential practice. In term of green innovation the findings confirmed that green product innovation followed by green process innovation were the most influence green innovation practices. Moreover, the results confirmed that GHRM practices and green innovation have significant positive effect on sustainable performance. Moreover, GHRM practices also positively and significantly affect green innovation. The results confirmed that the green innovation partially mediates the relation between GHRM practices and sustainable

performance. Accordingly, a conceptual framework was also developed which formed a guideline for policy makers in manufacturing firms on how to use GHRM practices in increasing the employee's commitment to environment in order to maximize sustainable performance. Furthermore, the study provides a useful information regarding to green innovation in manufacturing sector in Palestine which considered a base for researchers and managers in future research directions, as the literature revealed that there is no similar work which exploring the mediating effect of green innovation on the relationship between GHRM practices and sustainable performance in Palestinian manufacturing firms.

The study also contributes in deep understanding of the concepts of GHRM practices, green innovation and sustainable performance, and provides empirical evidence about the relation between these variables and recommends other studies to repeat this study with larger sample size which confirm the results or investigate the effect of other variables on sustainable performance.

**Keywords:** Green human resources management (GHRM), green innovation, sustainable performance, partial least squares structural equation modeling (PLS-SEM), manufacturing sector.

# **Chapter One**

## **Introduction and Literature Review**

### **1.1 Chapter Overview**

This chapter provides a general introduction to the subject of research and the theoretical background for the study. The sections of this chapter include a general background, the problem statement and the research questions, significance of research, the objectives of research, research hypotheses, and the structure of the thesis. Furthermore, the chapter reviews the literature related to the thesis topic. Which aims to provide a comprehensive background and knowledge about the green culture, the concepts of human resource management and green human resource management, in addition to defining the meaning of sustainability, sustainable performance, and green innovation? As well as the chapter presents the relationships between these variables and how to measure each one in Palestinian manufacturing context (i.e. chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry). Proposed hypotheses were developed in order to investigate and confirm the expected relations between research variables based on the existing literature related to these variables.

### **1.2 General Background**

In recent years, sustainability issues have become an important concern of organizations and institutions all around the world. The first use of the term sustainability development was in 1987, and it was defined in Brundtland report as development that enables the people to achieve their present needs, without affecting the ability of generations in the future to meet their needs (Brundtland, 1987). Moreover, BenEli (2006) expressed five core principles of sustainability which are related to material, economic, life, social, and spiritual domains. In addition sustainability was defined as “A dynamic equilibrium in the process of interaction between a population and the carrying capacity of its environment such that the population develops to express its full potential without producing irreversible, adverse effects on the carrying capacity of the environment upon which it depends”.

In this regard, organizations and firms nowadays want to upgrade their performance to achieve sustainable performance. According to the triple bottom line (TBL) approach, sustainable performance includes: (1) environmental performance, (2) social performance, (3) economic performance, (Hourneaux Jr et al., 2018). In order to enhance sustainable performance, these organizations have to investigate, explore and examine what tools, techniques, and behaviors significantly affect organizational sustainable performance. Green human resources management (GHRM) is considered one of the environmental tools concerned with how to make the human resources management (HRM) practices which include (selection, training, rewarding ...etc.) aligned with environmental interests. Many researchers try to explore the relation between GHRM and organizational sustainability such as Kim et al. (2019). They discovered in a study conducted in Thailand that GHRM enhances the environmental performance of hotels through employees' commitment and eco-friendly behavior, and advised HR managers and top management to support the adoption of GHRM policies. However, the study does not take into consideration the cultural differences which made the generalization of findings may be not correct. Similarly, Ji et al. (2012) revealed that training as one of human resource practices and environmental attitude found at organization have an important and positive effect on firms performance in sustainable development. In addition, the authors suggested taking other dimensions rather than environmental protection in measuring firm performance. Moreover, Acosta-Prado et al. (2020) presented through the study model conducted in non-profit hospitals in Colombia that HRM significantly influences innovative performance.

Furthermore, Chaudhary (2020) stated that GHRM practices include green involvement, green pay and reward, green performance management, green training, and green recruitment and selection significantly influenced the green behaviors of employees, and gave evidence of the role of GHRM to reach environmental sustainability in India's automobile sector. Although this study tried to interpret the effect of GHRM practices on employees green behaviors, but it's important to study other variables such as organization support and personality as mediators to improve understanding the relation, this is mentioned as one of the study limitations. Furthermore, authors encouraged future scholars to replicate the study for other sectors in order to expand the findings generality.

In conclusion, the existing literature provides evidence of the effect of GHRM practices on sustainable performance dimensions particularly on environmental performance. However, in developing countries the studies concerning green practices are still limited (Mousa & Othman, 2020).

Not far from GHRM practices, green innovation seems to have a positive effect on environmental performance. According to García-Machado and Martínez-Ávila (2019), they confirmed that green innovation has a positive influence on environmental performance, also presenting that green innovation mediates the relationship between green culture and environmental performance in Mexico's automotive industry. The study advises future researchers to replicate the study in other industrial sectors even in other countries with larger sample size to strengthen the results.

Referring to the role of green innovation and beliefs on the nexus between HRM and performance, Singh et al. (2020) asserted that GHRM practices influence indirectly environmental performance through green innovation represented by green product and green process innovation by a study conducting in manufacturing SMEs sector in UAE, and open the door for future studies to investigate this relation in other sectors and contexts to foster the study findings.

It is clear from this discussion, that, from one hand, GHRM practices have an impact on green innovation, from another hand, green innovation has an impact on sustainable performance. This indicates to a mediating effect of green innovation on the relation between GHRM practices and sustainable performance.

Green innovation can be applied to products, process, management and marketing activities in firms or related technologies to adhere to environmental interests such as energy savings, reduce waste, environmental audit and control systems and product eco labeling. So when the GHRM affects the employee's awareness in terms of green innovation the sustainable performance will be affected accordingly. In other words, when green innovation is the central axis supported by the GHRM practices of the organization in order to boost sustainable results, it will likely be a determining factor as well as a mediating construct. This mediating effect is little tested, and we believe that no research presented comprehensive models that investigate the role of green innovation in enhancing the relation between GHRM practices and sustainable



performance especially in manufacturing firms in Palestine. This means that scientific research is needed to investigate this mediating role in order to bridge the gap in this study area.

The manufacturing sector in Palestine is one of the most important sectors. According to Palestinian Central Bureau of Statistics (PCBS), transformative industries which include food industry have a relative importance constituting 87.89% of the total industry activities (Palestinian Central Bureau of Statistics [PCBS], 2021). However, chemical, pharmaceutical, and food sectors are considered the most pollutant manufacturing sectors (Zaid et al., 2018). Hence, it's important to use more environmentally friendly practices to reduce the environmental impact of this sector.

Regarding to previous studies limitations and recommendations, and responding to the lack of such studies in Palestine, this research intends to explore the relationship between GHRM practices and sustainable performance, and investigate the mediating effect of green innovation in improving this relationship in manufacturing firms (specifically, chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry).

### **1.2.1 Problem Statement and the Research Questions**

The studies reviewed in the previous section indicate the important role of sustainable performance for all institutions and companies, whether in developed or developing countries, and its role in enhancing competitiveness, which has become a requirement for the continuation and success of institutions in various fields of industry and services.

Although the manufacturing firms are considered a major source of climate change, water and air pollution, natural resource depletion, and other environmental issues. But, the environmental policy makers, practitioners in industry, and academics didn't pay attention to the environment a few decades ago (Kraus et al., 2020). According to the Applied Research Institute-Jerusalem (ARIJ), although there are many industrial zones in Palestine, most industries are located in residential or commercial areas (Applied Research Institute-Jerusalem [ARIJ], 2015). Hence, in order to mitigate the polluting effect of manufacturing firms, new green techniques, tools, and behaviors should take place to enhance sustainable performance.

Although, the results showed the role of GHRM practices in improving sustainable performance in manufacturing sector in Palestine through a number of studies that discussed the impact of some of those practices on environmental performance in particular (Masri & Jaaron, 2017; Zaid et al., 2018), but there is still a need of studies that investigate the role of other variables to improve the relationship between GHRM practices and sustainable performance in this important sector in order to reduce its polluting effect.

Regarding to green innovation, it has been found through previous studies that GHRM practices have an effect on it. Moreover, by looking at other researches, the effect of green innovation on environmental performance was investigated and presented evidence which supports the link between green innovation and environmental performance. This search indicates that there is a mediating relationship which needs to measure its impact and the importance of it.

In Palestine, as one of the developing countries, there are no studies that investigate the green innovation role as a mediator variable in manufacturing. Therefore, this research is designed to provide clarifications and confirmations about green innovation in Palestinian manufacturing companies (specifically, chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry). In other words, this thesis is designed mainly to answer the following research questions:

RQ<sub>1</sub>: How does a GHRM practices influence green innovation and sustainable performance?

RQ<sub>2</sub>: Is green innovation a mediating variable in the relation between GHRM practices and sustainable performance?

### **1.2.2 The Significance of Research**

The significance of this study comes from its contributions. First, the study will provide a comprehensive model for the role of GHRM practices on sustainable performance in its three dimensions: environmental, social, and economic performance. Second, this research attempts to add green innovation on the nexus between GHRM practices and sustainable performance and examines its mediating role which is believed to be the first study that addresses this topic in this way. Third, the results of the study add new

findings regarding to green innovation and complement the existing body of knowledge about GHRM practices and sustainable performance in manufacturing firms. In addition, it provides a road map and reference for decision-makers, top management, and human resource management departments in the manufacturing sector and encourages them to understand cleaner production trends, evaluate the current situation found at organizations, and adopt further green practices. Fourth, the study will also measure to what levels is the implementation of green innovation, in manufacturing industries in Palestine. In addition, it confirms the previous findings regarding to implementation level of GHRM practices and sustainable performance in the manufacturing sector at Palestinian territories.

### **1.2.3 The Objectives of Research**

The main goal of this study is a theoretical contribution by bridging the research gap in investigating the mediating role of green innovation in the relationship between GHRM practices and sustainable performance in the manufacturing sector in Palestine. In addition, the practical contribution in assisting decision-makers and researchers in identifying and applying practices that would enhance sustainable performance to achieve competitive advantage.

Specific objectives of this research are:

- To measure the level of implementation of GHRM practices and green innovation in Palestinian manufacturing sector (specifically, chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry).
- To emphasize the studies those examined the relation between GHRM practices and sustainable performance in Palestinian manufacturing sector (specifically, chemical industry, Pharmaceutical industry, and food industry), by adding metal & engineering industry to the study population.
- To determine the mediating role of green innovation on the relation between GHRM practices and sustainable performance in Palestinian manufacturing sector (specifically, chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry).

#### **1.2.4 The Research Hypotheses**

Based on the problem statement, and the previous discussion, and in order to achieve and answer the research questions, these hypotheses are developed:

- H<sub>1</sub>: GHRM practices positively affect the sustainable performance in manufacturing firms in Palestine.
- H<sub>2</sub>: GHRM practices positively affect the green innovation in manufacturing firms in Palestine.
- H<sub>3</sub>: Green innovation positively affects the sustainable performance in manufacturing firms in Palestine.
- H<sub>4</sub>: Green innovation mediates the relationship between GHRM practices and sustainable performance in manufacturing firms in Palestine.

#### **1.2.5 The Structure of the Thesis**

The thesis includes four chapters. The first chapter includes a general overview and background of the study, the research problem statement and the research questions, the significance and objectives of the research. The chapter also demonstrates a theoretical background and literature review about environmental management, GHRM practices, sustainable performance and green innovation in addition to discussing the relation between them. In addition it provides a proposed conceptual model for the study containing the formulated hypotheses. The second chapter outlines the methodology used in the research, the research types and approaches addressed, data collection and sampling techniques, measurement development and data analysis techniques discussed in chapter sections. Chapter three presents the data analysis, descriptive statistics, and assessment of the proposed model. The study hypotheses are tested and the results tabulated in chapter sections. Finally, the fourth chapter addressed the discussion of results obtained and highlights the implications. Furthermore the chapter includes the conclusion, recommendations, limitations and the expected future research directions.

#### **1.3 Theoretical Background**

Resources and products are in the same line, because all products require usage of resources. For example, the human resource is considered one of any firm or organization resources. Wernerfelt (1984) tried to look at firms according to their

resources not on their products, and argued that looking at a firm in terms of its resources gives different insights than traditional firm product perspective (resource-based view) theory RBV. In the same vein, Dunford et al. (2001) concluded that RBV has a significant and independent effect on strategy and strategic human resource management (SHRM). García-Machado and Martínez-Ávila (2019) stated that by using the natural resources that RBV is looking at, a competitive advantage can be reached. This approach lies in using new strategies to prevent pollution, managing products, sustainable development, giving a competitive advantage, and motivating environmental forces.

The issue of sustainability has become an important need in many countries because the issue of sustainability is linked to natural resources such as water and oil. D. Zhang et al. (2021) mentioned that the planet earth is facing a global water crisis and water scarcity is a crucial issue but unfortunately it has not received enough attention in the past. In Palestine, the climate change expected to drop the rainfall and temperature rise which increased the water scarcity. This will affect the agricultural sector productivity, social instability, and more poverty (ARIJ, 2015). Likewise, the use of more electricity produced from nonrenewable sources and carelessness about recycling which increase the wastes also affect the environmental issues. Hence, it's clear that the natural resources are interrelated and need sustainable development steps that preserve the environment.

Referring to sustainable development, Glavič and Lukman (2007) in their reviewing study provided a framework to understand the concept of sustainable development, which consists of many principles, approaches, subsystems, sustainable system, and sustainable policy interrelated to each other's, related to environmental, economic, societal dimensions. In the same vein, Wheelen et al. (2018) discussed that the use of business practices in order to manage TBL which involves financial, environmental and social responsibilities of organizations refer to the term sustainability. Although, Hourneaux Jr et al. (2018) illustrated some opinions about adoption of TBL approach to measure sustainability performance and other opinions criticize the usage of this approach. But, it's clear that it is not easy to define sustainability (Glavič & Lukman, 2007), and TBL was accepted and adopted among several studies.

In the GHRM field, Anwar et al. (2020) mentioned according to (Appelbaum et al., 2000) that ability, motivation, and opportunity (AMO) theory provides better comprehension of greening HRM and environmental outcome. Also, this theory was considered the basic one in understanding the effect of HRM on organizational performance, which grouped the HR practices into three areas: ability, motivation, and opportunity. There are studies using AMO theory and RBV theory in investigating the influence of GHRM on green innovation and environmental performance (Sobaih et al., 2020). In conclusion, this study used RBV theory, TBL approach, and AMO theory as a basis to build the relationships between the research variables.

#### **1.4 Environmental Management and Green Performance Management**

Weng et al. (2015) mentioned that the “going green” issue was becoming a driver for companies to implement green initiatives continuously in order to improve performance and protect the environment. Referring to Pane Haden et al. (2009) green management “is the organization-wide process of applying innovation to achieve sustainability, waste reduction, social responsibility, and a competitive advantage via continuous learning and development and by embracing environmental goals and strategies that are fully integrated with the goals and strategies of the organization”.

In addition, Jabbour and Santos (2008) defined green performance management as “a system of evaluating activities of employees performance in the process of environmental management”.

In organizations there is an environmental management system that should control environmental issues. In this arena, Ikram et al. (2019) introduced that environmental management system (EMS) is a part of integrated management system (IMS). Moreover, IMS was defined as “a combination of various management standards required for sustainable organizational development”.

The International Organization of Standards (ISO) in 1996 adopted a new international standard ISO 14001 in the field of EMS in order to facilitate trade and diminish the barriers of trade, and fostering the environmental practices expectations worldwide (Melnik et al., 2002).

In this regard, Jabbour et al. (2010) mentioned that ISO14001 is the most EMS has been recognized, and the adoption of EMS in organizations has many benefits related to the environment.

For instance, Melnyk et al. (2002) proved that the firms that have a formal EMS have a critical positive impact on operation performance. Also, the impact on performance for those firms having experience on the road of EMS certification, more than the firms that didn't have certified EMS. In addition, EMS is used to manage the environmental performance of organizations (Glavič & Lukman, 2007).

Ikram et al. (2019) addressed at the study conducted in 211 manufacturing companies in Pakistan that the adoption of an EMS can improve environmental protection in organizations. Furthermore, the performance of companies having EMS into their IMS was better than those companies that didn't practice EMS, and they concluded that through EMS, organizations can improve corporate business, increase long-term corporate sustainability, and handle issues related to economic, social and environment.

### **1.5 Human Resource Management (HRM) and Green Human Resource Management (GHRM)**

Torrington et al. (2017) discussed that it is not easy to define HRM, they also differentiated between two meanings of HRM. The first one is HRM mark1 which refers to achievement of five basic objectives of HR functions including: (1) staffing objectives, (2) performance objectives, (3) change management objectives, (4) administration objectives and (5) reputational objectives. The second meaning of HRM was denoted by HRM mark2 which includes different approaches and ways of carrying out and managing people and the previously mentioned activities which make this approach differ from the traditional personal management concept.

According to Mutsuddi (2011) HRM has four mainly functions which are:

- 1- Acquiring, that starts with planning the needed employees.
- 2- Development which consists of training, management development, career development and succession planning.
- 3- Motivation is very important in employee retention.
- 4- Retention which is the most challenging for a competitive business environment.

Furthermore, three important concerns of HRM were discussed that include: (1) the concern of people, (2) concern in organizational performance and (3) concern for innovation in addition to its role in achieving competitive advantage for organization.

Similarly, Ivancevich (2010) stated that HRM is concerned with people through programs performed at organizations in order to manage people effectively at work to achieve organizational and individual goals. Although there are similarities between personnel management and HRM, personnel management is considered work force centered directed to employees while HRM is resource centered directed to management. From another hand personnel management has an operational function but HRM has strategic in nature (Mutsuddi, 2011). In this context Mutsuddi (2011) stated that personnel management was a traditional approach used only to command and control the manager and employee relationship. Also, it's defined as "a set of programmes, functions and activities taken by an organization designed so as to maximize both personal and organizational goals and objectives" (p. 20).

Now, with increasing concern about environmental management and green culture, organizations, companies and institutions are looking for environmental tools and techniques in order to green the presented systems, policies, strategies, and resources. Although the concern about "go green" concept and GHRM practices have increased among organizations in recent years, studies of environmental perspective in HRM (GHRM) have been rare (Jing Yi and Mohd-Yusoff, 2016). Renwick et al. (2013) mentioned through a review study about GHRM that studying the impact of GHRM on environmental outcomes (firm performance metrics) as one research gap. Also, there was research needed to investigate the relation between GHRM bundles, environmental performance and organizational performance.

HR is considered one of the most important resources of any organization. Hence, researchers tried to combine the concept of HRM with environmental requirements and add the phrase (green) beside HRM to be GHRM which refers to making the HRM concerns, tools, and objectives aligned with environmental concerns and objectives. In this manner, Renwick et al. (2013) mentioned that GHRM is the HRM aspect of environmental management (EM).



In this context, Tang et al. (2018) defined GHRM as “Greening the human resources involves a set of policies and practices for protecting the environment such as green recruitment and selection, green training, green performance management, green pay and rewards, green involvement”.

In more detail with nearly the same soul in the mentioned definition, Amrutha and Geetha (2020) presented nine definitions of GHRM for a period of 25 years (1995-2019) by reviewing previous articles, and illustrated the agreement and arguments in definitions.

Although GHRM is important for improving the green innovation abilities of firms, this relationship was seldom investigated among literature (Song et al., 2020).

### **1.5.1 Human Resource Management Practices**

Mutsuddi (2011) confirmed that HR practices include any practice needed to enhance the competences, culture building and commitment. Also, these practices may be any way, activity, process, system, rule in doing things connected to the culture, vision and values of organization.

Furthermore, Robbins and Coulter (2009) illustrated that HRM is important because it represents a significant source of competitive advantage, and for its importance for organizational strategies, alongside with its effect on organizational performance. The authors also identified that the HRM process includes eight activities, the first three are: HR planning, recruitment, and selection. These practices are important to ensure identifying and selecting competent employees. The following two activities are orientation and training to provide employees with skills and knowledge. The final three activities are performance management, compensation, and career development which are essential in high performing and employee retention.

From a green perspective, Amrutha and Geetha (2020) reported that much concern about adoption of GHRM practices from 2016, mostly in European and Asian countries. Amrutha and Geetha (2020) revealed that corporate social responsibility (CSR) is a driver for GHRM initiatives in many organizations. Where the CSR requires from every company to consider equality, well-being and health to enhance the environmental sustainability by using environmentally friendly practices such as reduction of the use

of electricity during day hours and use of natural sunlight, decreasing use of paper works, tree plantation, and teleconferences. Hence, CSR is in relation with green management.

Chaudhary (2020) concluded that GHRM is essential for organizations to develop green behaviors and attitudes among employees because the green behaviors cannot be imagined without active participation of HR, in order to have successful implementation of environmental sustainability to achieve organizational goals, and GHRM is one of strategies to do this. Moreover, Yong et al. (2020) mentioned that environmental practices of HR help in many issues related to the environment like elimination of waste, reinforcing green behavior, enhancing efficiency, and cost reduction. Also, GHRM has a role in aligning employees with the environmental strategy of the company.

Yong et al. (2020) affirmed that green recruitment and green training have a positive impact on sustainability in 112 Malaysian large manufacturing firms. Moreover, Singh et al. (2019) suggested that three HR practices bundles should work with each other in order to obtain sustainable environmental management practices in the organization. The first bundle is recruitment and selection. The second is training and development. The third is performance appraisal, and rewards management.

Renwick et al. (2013) categorized GHRM practices into three parts according to AMO theory. Part one is developing green abilities including attracting or selecting, training and development. Part two is motivating green employees including performance management or appraisal, pay and reward system. Part three provides green opportunities which include employee involvement, empowerment and engagement, supportive climate / culture, and union role in employee involvement and environmental management.

As an application for this theory, Anwar et al. (2020) proved in the study on academic staff at two campuses of a renowned public research university in Malaysia, that GHRM practices classified according to AMO theory framework and organizational citizenship behavior towards the environment (OCBE) have positive consequence on environmental performance, by surveying 122 respondents. The study also found that

OCBE of academic staff mediates the positive effect of GHRM practices on environmental performance of a university campus.

In another service sector , Hadjri et al. (2019) affirmed that GHRM practices which include green recruitment and selection, green training , and green compensation directly affect the environmental performance in Republic of Indonesia hospitals especially South Sumatra.

In conclusion, HRM practices affect the environmental performance of organizations either manufacturing or services.

### **1.5.2 Green Analysis and Description of Job Position**

Workforce planning or personnel planning is defined as “ the process of deciding what positions the firm has to fill, and how to fill them” (Dessler, 2013, p. 139). According to Jabbour (2011), the analysis and description of job positions should enhance the environmental performance of an organization by enabling employees to engage, expand, and have environmental management knowledge. Job description is useful for other GHRM practices. For example, in recruitment and green performance management it’s considering a reference in identifying sustainability requirements and green targets (Mukherjee et al., 2020).

### **1.5.3 Green Recruitment**

In order to fulfill the shortages in HR needs, organizations should find the person who is qualified and wants the job. Hence, the recruitment is tied to HR planning and selection (Ivancevich, 2010). In this regard, recruitment may be internal recruitment from current employees to fill the vacancy, or external recruitment from external sources to supplement the shortage in the workforce.

It can be concluded that the recruitment talks about the process of searching, screening people for a vacancy in an organization and this process affects the future and success of companies (Mutsuddi, 2011).

In terms of green perspective, organizations should select employees who adhere to environmental issues (Yong et al., 2020). For instance, Jabbour (2011) stated that if the recruitment process contains the environmental dimension, this means using the

environmental performance in attracting applicants for the company. Renwick et al. (2013) reported that green recruitment and selection refer to “the use of job descriptions and personnel specifications that emphasize environmental aspects of the job and interview protocols that probe applicant environmental knowledge, values and beliefs”.

#### **1.5.4 Green Selection**

Referring to selection, Ivancevich (2010) defined it as “a process that enables organizations to choose a person who meets the selection criteria from a list of applicants considering equal employment opportunity legislation.”

From green perspective, Chaudhary (2020) addressed that green recruitment and selection refer to “giving preference to environmentally aware and sensitive employees in the recruitment and selection process of the organization”.

#### **1.5.5 Green Training**

Ivancevich (2010) defined training and development as the process that the employee gains information and skills that helped him to understand the organization and its goals. Also training assists employees to do their work better, development prepares the workforce for the future.

Similarly, Mutsuddi (2011) defined training as: “a planned and systematic effort to modify or develop knowledge/skills, attitude through learning experience, so as to achieve effective performance in an activity or range of activities” ( p. 137). However, development is considered as more general than training which includes organization needs beside individual needs.

From the green perspective, Yong et al. (2020) defined green training according to (Jabbour et al., 2010) as environmental training that “provides employees with the needed knowledge about the environmental policy of a company, its practices, and necessary attitudes” (p. 1057).

Ji et al. (2012) provided empirical evidence from 218 manufacturing firms in both South and North China that the relation between the environment attitude of firms and its performance can be better understood through employee training in sustainable

development. Also, Habibie and Mustika (2020) discovered that training on work and motivation affect employee performance.

### **1.5.6 Green Performance Assessment**

In general, the process of performance evaluation of employees aims to determine if the work performed effectively by employees, and it is useful for the development process to determine who needs training, and to evaluate training programs for the employees (Ivancevich, 2010).

In green performance management environmental goals of employees are identified, then the performance of employees is evaluated according to these goals (Mukherjee et al., 2020). Renwick et al. (2013) addressed that green performance assessment deals with some topics like environmental incidents and how to utilize the responsibilities and policies related to the environment.

### **1.5.7 Green Rewards**

The compensation was defined as the payment given to the employee instead of doing several work at organization. The compensation is divided into two types; the first one is direct compensation which refers to employees' salary, wage, commissions, etc. The second type is called remuneration which includes compensation that the employee received against his contribution to the organization such as: fringe benefits (medical care, canteen and health insurance) and perquisites (company car and paid holidays). This type is also called indirect compensation. Furthermore, non-financial remuneration includes recognition of merits, competent supervision and job sharing (Mutsuddi, 2011).

In the same manner, Ivancevich (2010) mentioned that compensation as one of HRM functions, deals with any type of rewarding the employees instead of performing organizational tasks. The compensation may be financial such as wages, or non-financial like praise, which aim to create an equitable system of reward for employee and employer.

Referring to green compensation, Chaudhary (2020) highlighted that green compensation management means “distributing financial and nonfinancial rewards to employees for displaying environmentally friendly attitudes and behaviors”. Moreover,

Jabbour et al. (2010) addressed that either financial or non-financial rewards for employees contribute to environmental management.

## **1.6 Sustainable Performance**

Traditionally, economic growth was an indicator used usually to express development, but it was found that there is an adverse effect on the environment (Maiti & Bidinger, 1981). In order to describe business sustainability John Elkington in 1994 was the first one who used the phrase triple bottom line (TBL). The term is derived from companies' annual reports which include three different bottom lines. The first is profit or loss, the second is social organizational responsibility and the third is environmental organizational responsibility (TheEconomist, 2009). Similarly, Hourneaux Jr et al. (2018) confirmed that the view of performance was toward economic dimension until the TBL approach added environmental and social dimensions to economic dimension in order to look at performance from a sustainable perspective.

Torrington et al. (2017) defined bottom line as “A term derived from accountancy, where it is the final total in a profit and loss statement or other financial document. In management generally it is used as the ultimate criterion or most important factor: financial viability” (p. 671). Along with the increasing need for environmental and social responsibility and because of climate change and laws, the interest of sustainability is increasing among organizations (Yong et al., 2020).

Referring to three pillars of sustainability, environmental sustainability means that the business puts its effect on the environment into consideration. Economic sustainability concerns about the financial success of an organization. Social sustainability represents factors related to the human context of business (Yong et al., 2020).

In this fashion, Glavič and Lukman (2007) addressed that social responsibility as one term of societal principles refers to “safe, respectful, liberal, equitable and equal human development, contributing to humanity and the environment”. In addition, they illustrated that environmental performance can be described by environmental principles such as, renewable resources, minimization of resource usage, repair, recycling, and reuse, etc., in order to minimize the usage of hazardous energy or

resources. The economic performance is evaluated based on economic growth with environmental protection and improving the quality of life (Abdul-Rashid et al., 2017).

Hourneaux Jr et al. (2018) investigated by the study done in 149 industrial companies in Brazil different indicators in terms of three dimensions of TBL, and provided an instrument for assessing the sustainable performance in industrial companies. According to Hourneaux Jr et al. (2018) the main indicators which cover the main aspects of sustainability performance and useful for industrial companies management are presented in Table 1.

**Table1**

*The Main Indicators Which Cover The Main Aspects Of Sustainability Performance*

Economic Dimension	Environmental dimension	Social dimension
On-time delivery	Materials	Labour/management relations
Number of customer complaints	Energy	Occupational health and safety
Survey of customer satisfaction	Water	Training and education
Materials efficiency variance	Biodiversity	Non-discrimination
Rate of material scrap loss	Emissions, effluents and waste	Freedom of association and collective bargaining
Labour efficiency variance	Environmental aspects of products and services	Child labour
	Environmental compliance	Forced and compulsory labour
	Transporting	Security practices
	General environmental issues	Compliance

Source: (Hourneaux Jr et al., 2018).

In the services sector like hotels, Kim et al. (2019) defined the environmental performance of hotels as “a hotel’s environmental outcome from the environmental activities to reduce negative effects on the environment”. Also they considered GHRM as one feature of the EMS in the study conducted at Thailand hotels.

Ji et al. (2012) stated that there was increasing focus on CSR and sustainable development issues among communities and stakeholders. Further, they claim that all developing economies should handle sustainable development issues, so they can

influence the performance of international firms and economies of their countries (i.e. developed countries). However, Amrutha and Geetha (2020) found that social sustainability is the least one of sustainability pillars investigated through literature. For the purpose of the study, sustainable performance can be defined as the output of implementation both of GHRM practices and green innovation on the organization's environmental, social, and economic performance.

### **1.7 Green Innovation**

*"Innovation can be systematically managed if one knows where and how to look".  
Peter Drucker.*

According to Drucker (1998), innovation is the way to create wealth through new producing resources or enhance existing resources. Or "the effort to create purposeful, focused change in an enterprise's economic or social potential". In addition, Wheelen et al. (2018) stated that innovation in business is used to have extraordinary returns by using new products or services, ways and approaches in organizations.

The study of Jabbour and Santos (2008) defined innovation as "the term used to demonstrate how organizations increase value by developing either new knowledge or new processes for the use of knowledge already available" (P. 2139).

In this regard, Davila et al. (2006) identified three main areas at which business model change ( three levers) can drive innovation as follows:

- Value proposition: what is delivered to the market, (products or services).
- Supply chain: how value is created and delivered to market, or the way of producing, organizing, and operating to deliver products or services.
- Target customer: to whom you sell and deliver, by identifying the segment of customers.

In addition to the business model, new technologies sometimes represent a major part of innovation through the offering of product and service, process technologies, and enabling technologies.



According to Tidd and Bessant (2009), they described that innovation is related to change in several forms, and they discussed four dimensions of innovation called “4Ps” approach referring to the following:

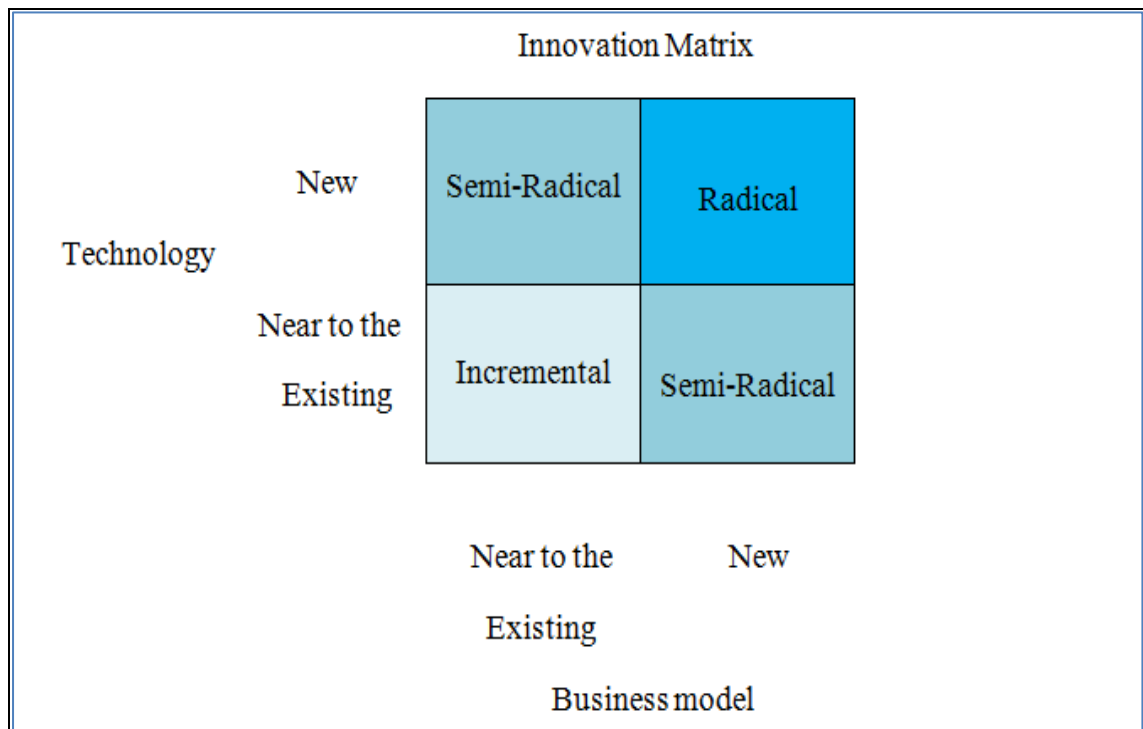
1. Product innovation: change in offering products/ services like new car design.
2. Process innovation: change in the way that products or services are delivered or created such as change in manufacturing methods.
3. Position innovation: change in introduced products or services such as shift to low-cost airlines or introduced a product as a healthy product (change the target market of product).
4. Paradigm innovation: change in mental models, for example transfer from product-based to service-based manufacturing.

Based on this different types of innovation occurs, if there are small improvements to the existing business process or products it's called incremental innovation. If you deliver new products or services the innovation is called radical innovation. Another type of innovation happens if substantial change of one innovation drivers, either business model or technology occurred not both, which is called semi-radical innovation (Davila et al., 2006). In this context, Tidd and Bessant (2009) identified incremental innovation as “do better” and radical innovation as “do different”.

Davila et al. (2006), illustrated the innovation framework which presents the innovation matrix that clarifies the different types of innovation as follows in Figure 1.

**Figure 1**

*The Innovation Matrix*



Note: Refer to Davila et al. (2006) p. 39.

From another viewpoint, it is important to differentiate between creativity and innovation. Robbins and Coulter (2009) defined creativity as "the ability to combine ideas in a unique way or to make unusual associations between ideas" (p. 287). While innovation is how to use the creative idea in useful products or work methods, which means that creativity is not enough alone. By moving to the concept of green innovation, Schiederig et al. (2012) reviewed the literature about the concept of innovation, the study identified six aspects derived from several definitions of green innovation, eco/ecological innovation, environmental innovation, and sustainable innovation. These aspects are related to: (1) Innovation objects such as Product and process. (2) Market orientation: competitive market needs. (3) Environmental aspects by minimizing the negative effects. (4) Phase, for instance taking the full life cycle into consideration. (5) Impulse, the purpose of reduction (economical or ecological). (6) Level: such as green standard in the firm. The results revealed that green innovation, eco/ecological innovation and environmental innovation are used synonymously. Only sustainable innovation differs from other notation by taking social dimension in addition to environmental dimension which broadens the concept.

Abu Seman et al. (2019) addressed by reviewing several studies in the green innovation arena that limited studies take the holistic concept of green innovation represented by

green product innovation, green process innovation, green managerial innovation, and green marketing innovation. In particular green marketing innovation did not receive adequate exploration and attention.

Although Weng et al. (2015) proved that green innovation (i.e. green product & process innovation) contributes to financial and social performance not only environmental performance through cost and waste reduction, they performed a study in 202 Taiwanese service and manufacturing companies. Schiederig et al. (2012) stated that innovation may be technological or non-technological such as marketing, organizational, or institutional.

In the same way, García-Machado and Martínez-Ávila (2019) stated that green innovation aims to save energy in the design of products, processes, and technologies. Therefore, it contributes to competitiveness and sustainability of companies.

Kraus et al. (2020) indicated that green innovation is related to innovation in technology which aims to be more environmentally friendly by decreasing: air pollution, wastage, and water usage, and conserving energy. In addition, they concluded that green innovation and environmental strategy improved environmental performance and mediated the relation between CSR and environmental performance in 297 large manufacturing firms in Malaysia.

According to Weng et al. (2015), green innovation is considered a weapon for managers to enable them in enhancing and sustaining their performance and capabilities of companies. Based on literature, there are some definitions of green innovation as follows:

- “The new or modified products and processes, including technology, managerial, and organizational innovations, which help sustain the surrounding environment” (Weng et al., 2015).
- “Hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy saving, pollution prevention, waste recycling, green product designs, or corporate environmental management” (Chen et al., 2006).

As found in the literature review, green innovation can be expressed as green product innovation, green process innovation, green managerial innovation and green marketing innovation. Green product innovation refers to any significant improvement in product or service in order to minimize the overall impact on the environment (Reid & Miedzinski, 2008). Similarly, Rakin et al. (2020) addressed that green product innovation includes the innovation through product design and manufacturing, aimed to energy saving, recycling, and pollution prevention.

According to Rakin et al. (2020) the green process innovation refers to innovation in production and manufacturing processes. Furthermore, Bernauer et al. (2006) introduced green process innovation as "improvements in the production process resulting in reduced environmental impacts, e.g., closed loops for solvents, material recycling, or filters". While Reid and Miedzinski (2008) discussed that green managerial innovation include EMS, or specific environmental management tools like process control tools, chain management, or environmental audit.

Green marketing innovation has high importance as one aspect of green innovation (Reid & Miedzinski, 2008), which involve product eco-labeling in promotion, pricing, licensing, and franchising, taking into consideration the environmental sides in these practices (Reid & Miedzinski, 2008; Abu Seman et al., 2019). Although marketing green innovation is important, the attention it received in literature was less than other types of green innovation (García-Granero et al., 2018).

## **1.8 GHRM and Sustainable Performance**

Jabbour and Santos (2008) presented the importance of HRM in developing sustainable organizations related to environmental, economic, and social performance. Moreover, in the service sector Rawashdeh (2018) found that GHRM implementation at hospitals was moderated and there was a positive effect of HRM practices on environmental performance in health service organizations in Jordan.

Al-Tit (2015) showed that HRM practices influence organizational performance. Also, Pham et al. (2020) suggested that green employee training and green involvement activate hotels environmental performance. Sittisom and Mekhum (2020) explained that green human resource practices moderate the relationship between environmental

cooperation and social performance, which means that green HR practices affect one of three important dimensions of sustainable performance (i.e., social performance). As a conclusion, it was clear that GHRM plays an important role in affecting the dimensions of sustainable performance.

Although many studies present the importance of HRM and GHRM practices in improving the performance. However, Mukherjee et al. (2020) concluded that the implementation of GHRM in NIT Silchar as one educational institute in India is low and it's important to improve HR practices to be as environment friendly practices. In this regard, Yong et al. (2020) confirmed that GHRM practices have a role in line up the strategies of business with the environment, and there is a positive impact of green recruitment and training on sustainability. But the study cannot prove the significant effect of other GHRM practices such as selection, and performance in manufacturing firms. The study suggested refining and adjusting the framework used in the research by adding other variables that were believed to make a contribution to the framework. Hence, investigating the relationship between GHRM practices, and organizational sustainability in other contexts, will help in generalizing the findings, and strengthen the base of knowledge about this link.

Hence, the studies investigating the holistic view of the impact of GHRM practices on the three dimensions of sustainable performance (i.e. environmental, economic, and social performance) is still little and need to be investigated in other services and manufacturing sectors. According to the above discussion the following hypothesis is proposed:

*H<sub>1</sub>: GHRM practices positively affect the sustainable performance in manufacturing firms in Palestine.*

### **1.9 GHRM Practices and Green Innovation**

Singh et al. (2020) affirmed that firms should invest in GHRM and green innovation and consider it as strategic assets in order to gain environmental management goals. Referring to GHRM concept, Singh et al. (2020) addressed according to Gerhart (2005) that GHRM practices can improve green performance of firms through continuous

product, process, and services innovation in a study conducted on the manufacturing sector in the United Arab Emirates (UAE).

In the same manner, Abdullah et al. (2020) found in the study conducted in Abu Dhabi at UAE that HRM practices such as compensation, planning and empowerment and employment positively affect innovation in the education and knowledge department. Furthermore, Wang et al. (2018) concluded that human capital, relational capital and structural capital as intellectual capital components influence innovation speed and quality positively which also have a positive contribution to firm performance. In Palestine especially in manufacturing sector there is no studies investigate the relationship between GHRM practices and green innovation, so the following hypothesis was developed:

*H<sub>2</sub>: GHRM practices positively affect the green innovation in manufacturing firms in Palestine.*

### **1.10 Green Innovation and Sustainable Performance**

Wheelen et al. (2018) stated that strategic management deals with many managerial decisions that emphasize on long-term performance of organizations. Moreover, sustainability and innovation are considered as strategic management challenges and main elements for successful strategic management to gain competitive advantage. About the efforts to investigate the importance of innovation in enhancing the performance, Asadi et al. (2020) focused on the importance of the role of green innovation and its effect in achieving sustainable performance through the study targeted at the hotel industry in Malaysia. By the same token, Abu Seman et al. (2019) affirmed that green innovation affects environmental performance positively. In this study, green product innovation, green process innovation, green managerial innovation and green marketing innovation as a measure of green innovation. In addition, some studies confirmed that the green process innovation, green product innovation and green managerial innovation contribute to green innovation (Zhang et al., 2020; Kraus et al., 2020; Weng et al., 2015). Furthermore, green innovation had a positive effect on environmental and firm performance. Based on this, the following hypothesis was proposed to investigate if there is a positive effect of green innovation on sustainable performance in Palestinian manufacturing sector:

*H3: Green innovation positively affects the sustainable performance in manufacturing firms in Palestine.*

### **1.11 Green Innovation as a Mediator**

Song et al. (2020) revealed that GHRM has a positive effect on green innovation. In more details, Sobaih et al. (2020) discussed the direct effect of GHRM practices on environmental performance and green innovation, and the role of green innovation on the relation between GHRM practices and environmental performance was examined, the results exhibit that there is a positive influence of GHRM practices on environmental performance and green innovation, as well the positive effect of GHRM practices on environmental performance in the presence of green innovation was doubled, the study was conducted in small lodging enterprises in Egypt. Moreover, Rakin et al. (2020) stated in the study conducted in the banking industry of Bangladesh that there is a mediating role of green innovation on the relation between socially responsible human resource management practices and environmental performance. Also, there is a positive effect from green innovation upon environmental performance. Over this, Shahzad et al. (2020) explored that corporate social responsibility affects green innovation and environmentally sustainable development. Although, Rehman et al. (2021) provided evidence that GHRM has a positive impact on green innovation, and green innovation has a positive impact on environmental performance, and the link between GHRM and environmental performance was fully mediated by green innovation in a study conducted in 244 large manufacturing firms. But the study does not investigate the mediating effect of green innovation between GHRM practices and overall sustainable performance.

Based on that, the green innovation has an impact not only on environmental performance, but also on social and economic performance, the existing studies and researches rarely investigate the relation between green innovation and sustainable performance (i.e. environmental, economic, and social performance). Hence, drawing on the above discussion there were many indicators supporting the presence of mediating role of green innovation on the link between GHRM practices and sustainable performance need to offer affirmation by new studies. Therefore, the authors proposed the following hypothesis:

*H<sub>4</sub>: Green innovation mediates the relationship between GHRM practices and sustainable performance in manufacturing firms in Palestine.*

### **1.12 GHRM and Manufacturing in Palestine**

According to Palestinian business forum (PBF), the industrial sector is defined as the sector that introduces modifications to materials before selling, aiming for increasing these purchasing value or increasing the demand for them before manufacturing (Palestinian business forum [PBF], 2014).

The industrial sector in Palestine is divided into three main sections: mining and quarrying, manufacturing industries, electricity, gas, steam and air conditioning supply (Nasralla & Awwad, 2004). While the Palestine statistical yearbook mentioned water collection, and waste collection, treatment and disposal activities as fourth part of economic activities (PCBS, 2020).

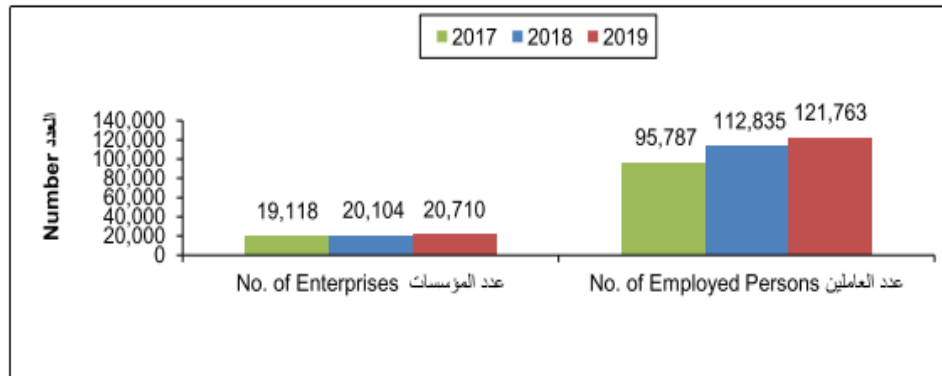
The number of industrial establishments operating in Palestine reached 20,710 during 2019, making the increase rate 3% over the previous year. 15,899 out of these enterprises are in the West Bank, the manufacturing industries consist 97.1% of these operating enterprises, the number of employees in these enterprises is 121,763 and the production volume is 5,144,933.5 \$ (PCBS, 2020). Figure 2 exhibits the numbers of enterprises and workers in the period between 2017 and 2019. Moreover, the main economic indicators for industrial activities growth includes numbers of enterprises and workers and other financial indicators over the 3 years from 2017 to 2019 according to PCBS statistics illustrated in Table 1 in Appendix C.

Despite the growth rates in the number of industrial enterprises, there are some problems that the industry suffers from in Palestine, which are represented in external problems resulting from the political situation of Israel's control over land and resources, imposing taxes, preventing exports, and dumping the market with Israeli products. And internal problems related to raw materials, and Palestine's lack of materials needed for industry, with 85% of the necessary materials. In addition to other problems related to machinery and equipment, low production efficiency, high production cost, and lack of financing or marketing due to the small size of the local market (PBF, 2014).



**Figure 2**

*The Number Of Industrial Enterprises And Workers In Palestine 2017-2019*



Source: (Palestinian Central Bureau of Statistics [PCBS], 2020).

The manufacturing industries include food, pharmaceutical, and chemical industries, which are considered the most polluting industries (Zaid et al., 2018; Masri & Jaaron, 2017). Furthermore, according to Palestinian Federation of Industries PFI the engineering and metal industry represents the largest industrial sector in Palestine constitutes a 37% of the value of Palestinian industries.

In contrast to the importance of manufacturing for the economic growth of nations, for instance, Szirmai and Verspagen (2011) found that manufacturing had a moderate positive impact on economic growth in developing countries in the period 1950-2005. Also in Palestine, According to the Environmental Quality Authority [EQA] (2016), the industrial sector formed 14.5% of the Gross Domestic Product (GDP) during 2014 (1078.3 million USD). The manufacturing process leads to creation of wastes, energy consumption, and utilization of natural resources. For example the industrial waste in Palestine was 131,344 ton/year in 2011(EQA, 2016). Hence, the uses of environmental initiatives in manufacturing become a need (Abdul-Rashid et al., (2017).

Referring to industrial pollution in the West Bank, (ARIJ, 2015) presented the results of a case study survey targeted 600 industrial establishments in the West Bank including 25 industrial sectors to assess the pollution resulting from these industries. The study classified the pollutants into three areas: gaseous and fine particulate emissions, liquid emissions and solid emissions. The results revealed that air emissions are not considered a problem in most cases and the emission volumes are relatively small.

The results of liquid emissions demonstrated that untreated wastewater is considered a problem and there is a potential to cause groundwater and surface water contamination. The study presented the results of different measures of liquid emissions in many industrial sectors such as Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). Table 2 in Appendix C shows the results in detail (ARIJ, 2015).

Referring to solid waste results, Hebron governorate produces the highest average annual waste per facility. (PBF, 2014) addressed that the industrial sector lacks specialized studies and how to build competitiveness for some industries. These reasons constitute an incentive for researchers to study solutions to enhance competitiveness and use sustainable practices to improve sustainability performance.

In GHRM field, Zaid et al. (2018) underlined by the study model that GHRM bundle practices include green hiring, green training and involvement, and green compensation have a positive and direct influence on sustainability performance contain environmental, social and economic performance in the Palestinian manufacturing sector.

Similarly Masri and Jaaron (2017) discovered that there was a moderate level in implementation of six GHRM practices in manufacturing sectors, specifically in chemical, pharmaceutical, and food sectors, with overall mean of 2.72 on a scale of 5, and these practices were in relation with environmental performance.

Moreover, Mousa and Othman (2020) gave evidence that GHRM practices including green hiring, green training and involvement, and green performance management and compensation affect sustainable performance positively in the health sector.

Although these studies search the relation between GHRM and sustainable performance, but there is no study investigated the green innovation degree of implementation in Palestinian manufacturing sector neither the relation between GHRM, green innovation, and sustainable performance. So this study is believed to be the first one addressed these relationships in this manner.

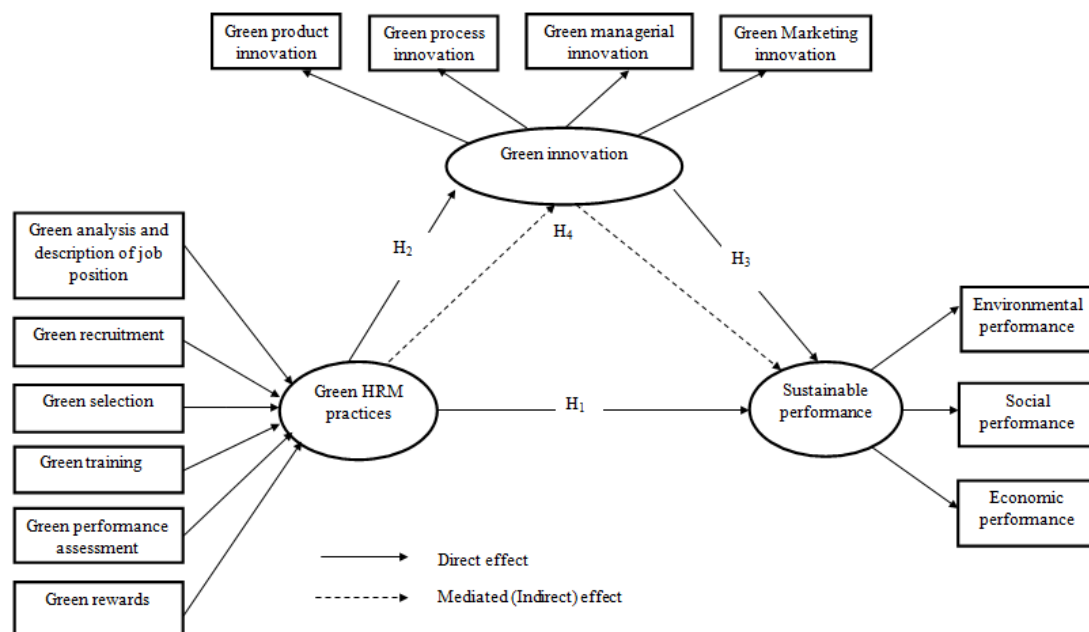
### **1.13 Conceptualization of the Proposed Model**

Based on the problem statement, and the previous discussion, and in order to achieve and answer the research questions a proposed model is developed. As shown in Figure 3

the model consists of three main constructs: GHRM practices, green innovation, and sustainable performance. Each construct is supposed to have some indicators. These indicators were developed based on previous studies founded in literature. In addition, the model includes the above mentioned hypotheses in order to test the effect of these constructs on each other as follow:

**Figure 3**

*The Research Conceptual Model*



## **Chapter Two**

### **Methodology**

#### **2.1 Chapter Overview**

This chapter demonstrated the methodology used in the thesis starting with identifying the different research types and approaches, then the methodology flow chart was addressed. Further, the data collection strategy, instrument development, and sampling techniques are explained. Finally, the data analysis techniques are presented in order to test the relationships between the model constructs.

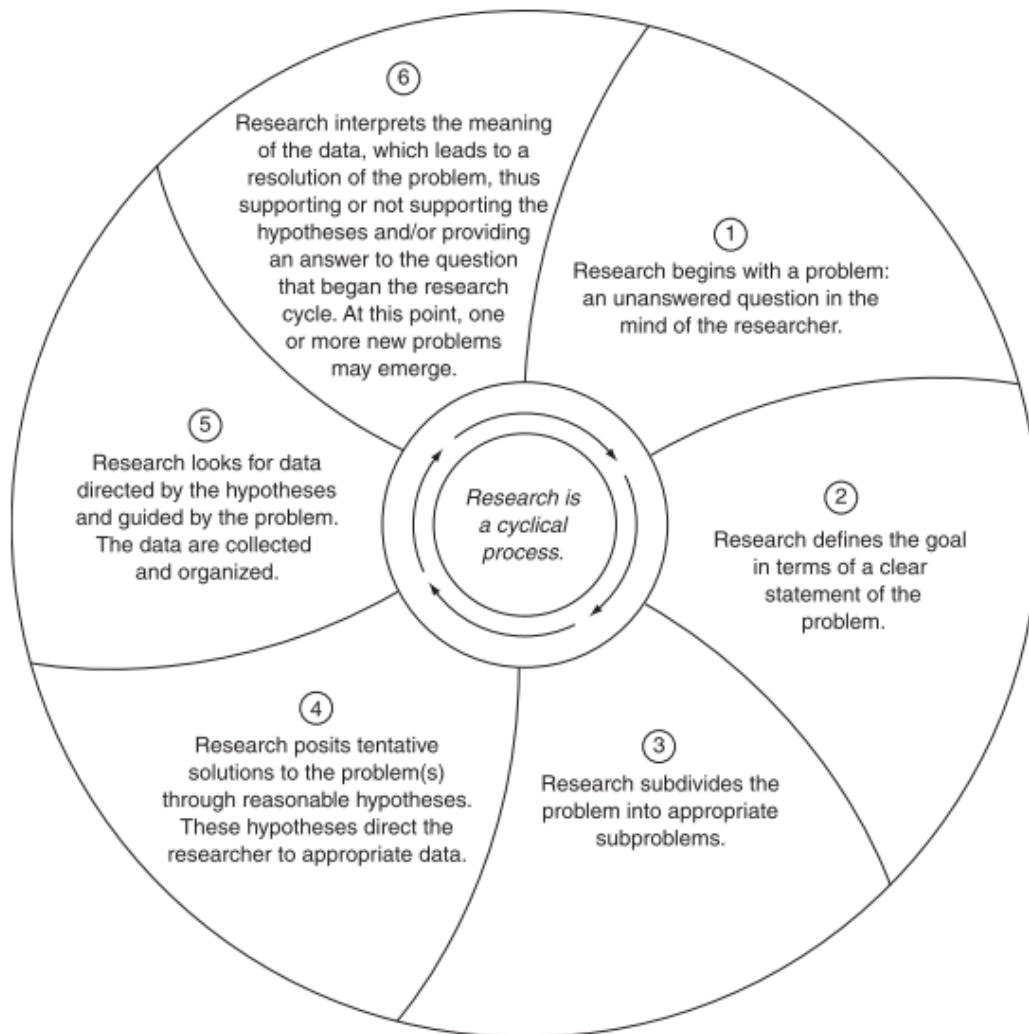
#### **2.2 Research Types**

According to Hair et al. (2011), the research is a “discerning pursuit of the truth” (p. 3). In addition, Leedy and Ormrod (2010) defined the research as “a systematic process of collecting, analyzing, and interpreting information (data) in order to increase our understanding of a phenomenon about which we are interested or concerned”. According to Leedy and Ormrod (2010), the research is a cyclical process that starts with a problem or unanswered question and finishes with interpreting this problem but the supported and unsupported hypotheses may lead to emerging new problems. Figure 4 below illustrated the whole concept of cyclical process as mentioned in page 7 referring to (Leedy & Ormrod, 2010).

The research type or research design is referring to the “conceptual blueprint within which research is conducted” (Akhtar, 2016). Moreover, Akhtar study discussed that the good research design should be theory grounded, situational, feasible, redundant, and efficient. Basically the research types are classified into three categories, exploratory, descriptive, and causal design. Exploratory research or formulative research is used when the existing information about an issue is little or outdated. So it’s appropriate for researchers who want to know and discover new relationships, ideas, patterns, etc. The literature review is considered the first step in understanding an issue in exploratory research. Although this research type depends on qualitative techniques, there is a possibility to use quantitative approaches (Hair et al., 2011; Akhtar, 2016).

**Figure 4**

*The Research Cycle*



Note: Refer to (Leedy & Ormrod, 2010) p. 7

Descriptive research or statistical research is usually performed when there is a need to describe a topic of interest like community, social events, by using some type of structured data collection process such as data observation or structured questions interviews or questionnaires. In this research type hypotheses testing are often used, which make it a confirmatory type (Hair et al., 2011; Akhtar, 2016). Descriptive studies are divided into two categories. If the descriptive studies are used to give snapshots or descriptions of a business issue at a particular time, these studies are called cross-sectional. Whilst, the longitudinal studies are used in descriptive studies to describe events over time by collecting data about the sample units at multiple times which enable pursuing the business element (Hair et al., 2011). Causal research or explanatory research interprets the relationship between two events, in other words a causal

relationship means that change in one event (the cause) brings a change in the second event (the effect) (Hair et al., 2011; Akhtar, 2016).

Akhtar (2016) addressed another type of research design called **experimental research** design which used to test the research design of causal relationship under controlled situation, this means that the studied variables are manipulated and the conditions are not allowed to change while the experiment is going on. Table 3 in Appendix C summarized the common application of research design according to (Akhtar, 2016).

Based on Hair et al. (2011) the researchers often use more than one research type in one project. For instance, the exploratory research conducted by qualitative approaches first then moving to descriptive designs using quantitative research. In conclusion, according to the research questions and objectives we select the right research type. If the research question emphasizes on clarification of an issue the exploratory research is used. If the research question focuses on description of event, quantity, or variable the descriptive design is the best. Finally, causal research is more suitable in clarifying the effect of one variable on another one. However, in descriptive research the exploratory research may be used to help in formulating a research instrument for a project.

In the case of studies performed in the manufacturing sector in Palestine, there is a lack of information regarding the implementation of such green practices in HRM, innovation practices, or sustainable performance in this sector. Hence, according to Hair et al. (2011), the most appropriate research design for this study is exploratory research when there is little information about an issue or a problem, and this type of research design provides better understanding of business problems and can be conducted as qualitative or quantitative research approaches. Moreover, the literature review is helped in developing the questionnaire used in data collection and investigating the relationships.

In conclusion, in such studies the suitable research type is exploratory research type, so it was used in this study.

### **2.3 Research Approach**

Usually the research question affects the researchers decision of what the appropriate research approach to use according to what the data needed for the research, either

numeric or texture data. Creswell (2014) defined the research approach as the procedures, plans that include all the steps from assumptions to the methods of collecting, analysis and interpretation of data. Commonly there are three research approaches that have been used: quantitative, qualitative, and mixed methods. Now, if the research question requires numerical data, a quantitative approach is selected. If the research question requires textural data the qualitative approach takes place. The mixed methods are conducted to respond to the research question requiring both numerical and textural data (Williams, 2007).

### **2.3.1 Quantitative Approach**

The quantitative approach typically concerns of collecting numerical data and the researchers use mathematical models in data analysis (Williams, 2007). Creswell (2014) defined the quantitative approach as “an approach for testing objective theories by examining the relationship among variables”. In this approach the deductive style is used by the researchers starting with testing theory through numbered data with statistical analyzing procedures to the ability of replicating and generalizing the findings. The research report usually consists of introduction, theory and literature, methodology, results, and discussion (Creswell, 2014).

Based on Leedy and Ormrod (2001), Williams (2007) mentioned that the quantitative approach classified into three broad classifications:

- 1- Descriptive research: which can be conducted through several methods include correlational research method, development design method, observational study method, and survey research method. In correlational research methods, two characteristics or more are investigated in order to reveal if these variables are related by using statistical analysis techniques. The development design includes exploration of how the characteristics of the study group may change over time through cross-sectional or longitudinal studies. During the observational study method, the researcher tends to record data related to such phenomena by observation and sampling data from respondents by open-ended items or closed-ended instruments. In the social sciences a survey research is used to gather information.
- 2- Experimental research: in these researches the outcome of the treatments in the study are evaluated.

- 3- Causal comparative research that includes the cause and effect analysis between independent and dependent variables.

Creswell (2014) focused on two designs of quantitative researches, experimental research which studies the influence of treatment on outcome, and the survey researches that provide numerical description of trends, opinions, and attitudes of population by studying a sample through longitudinal or cross-sectional studies using a questionnaires or structured interviews in data collection.

### **2.3.2 Qualitative Approach**

According to (Creswell, 2014), qualitative research relies on text and image data. Further, the qualitative approach was defined as “an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem”. The inductive style is usually used in this approach such that the data is collected in the participant’s setting, then the general theme is obtained from the particular setting, and the interpretation of the data is provided (Creswell, 2014).

Similarly, Williams (2007) addressed that in a qualitative approach the social phenomenon is investigated from the viewpoint of participants, this considered one identifier of this research approach. For conducting the qualitative research there are several methods as following:

- 1- Case study or idiographic research (Leedy & Ormrod, 2015), which enables the researcher to develop an “in depth analysis of a case, often a program, event, activity, process, or one or more individuals” (Creswell, 2014).
- 2- Ethnography study is related to the study of the culture of a group such as behaviors and languages over a long period of time (Creswell, 2014) not as in case study that looks at particular events or persons (Leedy & Ormrod, 2015).
- 3- Grounded theory study is defined by (Creswell, 2014) as “ the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of participants”.
- 4- Phenomenological study which is “a study that attempts to understand people’s perceptions and perspectives relative to a particular situation” (Leedy & Ormrod, 2015).



- 5- Content analysis study is defined as “a detailed and systematic examination of the contents of a particular body of material for the purpose of identifying patterns, themes, or biases (Leedy & Ormrod, 2015).

### **2.3.3 Mixed Method Approach**

The mixed method approach enables the researchers to use quantitative and qualitative approaches in one single study, subsequently collecting numerical and narrative data. For example, the numerical data can be collected by closed-ended questions, and open-ended questions can be used to collect narrative data through interviews for the same study which called the mixed research approach in order to answer the research question (Williams, 2007). The main assumption of using this type is to provide more understanding of a research problem than using a single approach alone (Creswell, 2014).

In Palestine there are some studies addressing the mixed method approach. In the manufacturing sector Masri and Jaaron (2017), applied this approach in assessing and selecting the best GHRM practices. Similarly, Zaid et al. (2018) used the same approach in the study of investigating the effect of GHRM and green supply chain management practices on sustainable performance. Furthermore, Mousa and Othman (2020), adopted the mixed method approach in the study performed in healthcare organizations that explored the impact of GHRM practices on sustainable performance. For the purpose of this study and based on these studies performed in Palestinian context which related to the study topic, the deductive style with quantitative approach is adopted.

## **2.4 Research Methodology**

The research methodology is the general approach that the researcher used in order to conduct the research project by selecting a specific research strategy or mechanism in collecting data which is called the research tool (Leedy & Ormrod, 2010). According to Hair et al. (2011), the process of conducting research includes three main phases: formulation, execution, and analytical. In the formulation phase the problem of the study is defined, followed by in depth review of related literature, then developing the research question and setting the objectives, specifying the hypotheses and formulating the research design. The execution phase contains selecting the sampling method, designing the collecting data tool, data collection begins, and the obtained data is stored.

The analytical phase involves data analysis and interpreting, hypotheses testing and drawing the results and recommendations.

In this study the research flow chart is presented in Figure 5. The methodology adopted the general three phases mentioned above which starts with identifying the problem of the study represented by the need of investigating the role of GHRM practices on sustainable performance in manufacturing firms in Palestine and the role of green innovation in this relationship. After that the literature review about the main three concepts is begun and the research gap is noticed. Based on literature the hypotheses are developed and the quantitative research approach is adopted.

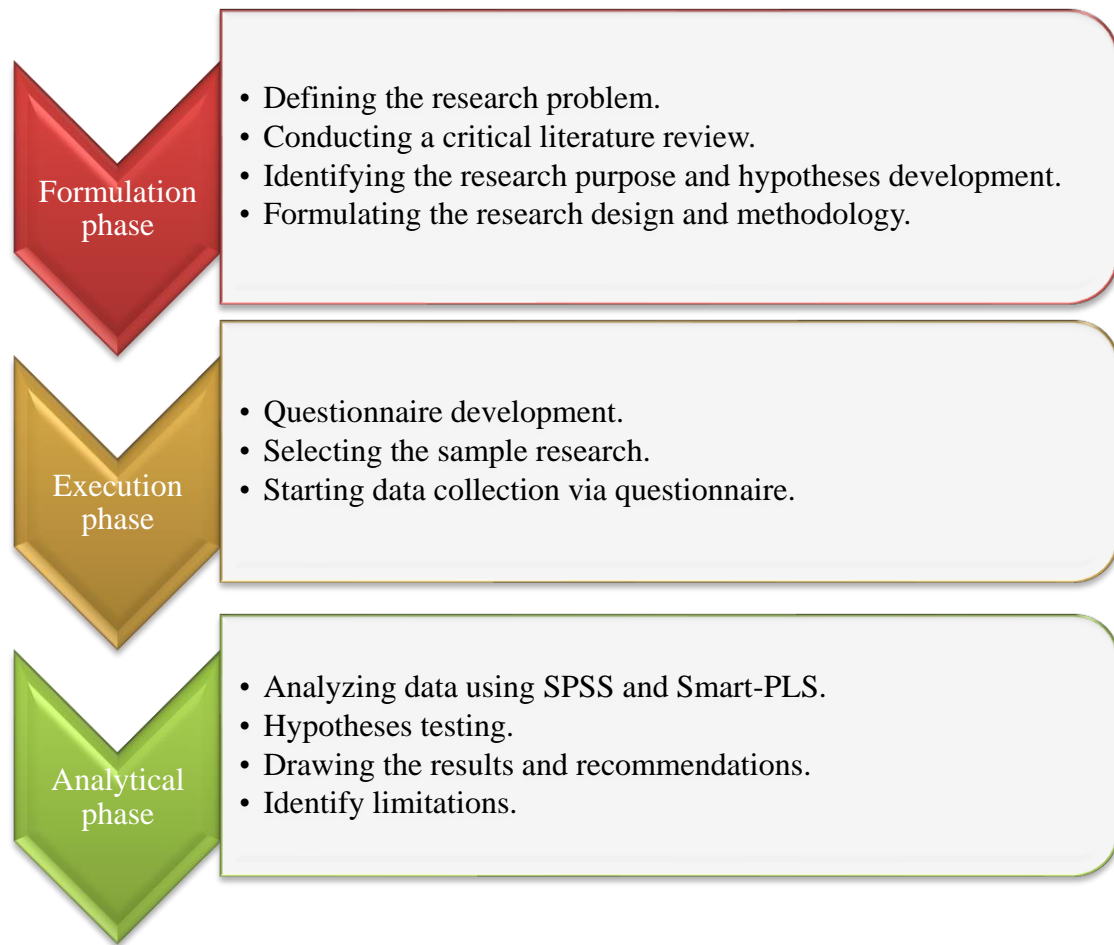
The following phase starts with designing the questionnaire and evaluating it by academic experts, this phase also includes selecting the sample of manufacturing firms (i.e. chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry) that represents the study population. The questionnaire is distributed electronically via email followed by phone calls. After the data were collected the smart-PLS software is used in data analysis and hypotheses testing then results, discussion, and recommendations are provided.

## **2.5 Sampling Techniques**

Based on Hair et al. (2011), the sample is “a relatively small subset of the population” (p. 171). In drawing the sample, it must be representative of the population to reflect the characteristics of the targeted population in order to minimize the error associated with sampling (Hair et al., 2011). The sampling process includes: defining the study population, choosing the sampling frame, sampling method selection, calculating the sample size, and sampling plan implementation.

**Figure 5**

*Research Methodology Flow Chart*



This study is conducted to evaluate the effect of GHRM on sustainable performance with green innovation as a mediator on this relationship in manufacturing firms in Palestine (i.e. chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry). The Palestinian Federation of Industries (PFI) is considered as a national institution that represents the industrial sector in Palestine, and it is also the umbrella that includes sixteen specialized federations. Among these specialized federations are the Palestinian federation of chemical industries, the union of Palestinian pharmaceutical manufacturers, the Palestinian food industries union, and the metal and engineering industries union.

In order to obtain the database of companies legally registered as members of each union, the PFI and specialized unions were contacted. Table 2 summarizes the number

of manufacturing firms working in Palestine according to each union which represent the target population relevant to the study.

**Table 2**

*The Number Of Manufacturing Firms*

Industries union	Members
Palestinian federation of chemical industries	60
Union of Palestinian pharmaceutical manufacturers	5
Palestinian food industries union	149
Metal and engineering industries union	46
Total	260

The sampling frame is the list from the target population from which the sample is selected. In this study, it was determined that the company should be legally registered, have green practices, and its economic activity is manufacturing not trade, as a condition for its entry into the sampling frame. So that a representative sample is obtained and the results can be generalized correctly.

From 260 of all members, 113 firms can be contacted and they met the predetermined conditions. To ensure obtaining a representative sample with the possibility of generalization of the results, as such a study in quantitative research the probability sampling procedure is typically used and it's adopted in this study.

The sample size obtained from the data collection period (about two and half months) is 58 responses. According to Hair et al. (2011), Cohen 1992 provided recommendations of sample size in PLS-SEM for a statistical power of 80% as shown in Table 4 in Appendix C. With maximum number of arrows pointing at a construct equal to six in this study, the sample size achieve 1% significance level with minimum  $R^2$  is 0.75 which is acceptable.

## **2.6 Measurement Development and Questionnaire Design**

After determining the main study constructs and based on literature review a scale items for each construct have been developed. A total of 47 items were generated as presented

in Table 5 in Appendix C. The questionnaire in English language and in Arabic language used in the study is presented in appendix A and B respectively.

The validity of a research instrument means the ability of the instrument to measure what is intended to measure. While reliability refers to the consistency in results when using the same instrument without changing the inputs (Leedy & Ormrod, 2010). Hence, the scale was presented to a number of university professors who are specialized in the same field see Table 6 in Appendix C. Notes were taken and the scale was modified to ensure more accurate results

To measure GHRM practices 18 items (Green analysis and description of job position, Green recruitment, Green selection, Green training, Green performance assessment, and Green rewards, 3 items for each one) were selected according to previous studies adopted and tested these items such as (Renwick et al., 2013; Jabbour, 2011; Siyambalapitiya et al., 2018).

In order to evaluate the green innovation 14 measurement items (Green product innovation: 4 items, Green process innovation: 3 items, Green managerial innovation: 3 items, and Green marketing innovation: 4 items) also adopted from literature (Singh et al., 2020; Chen et al., 2006; Zhang et al., 2020; García-Granero et al., 2018).

Likewise sustainable performance scale items were developed from previous studies 15 measurement items (Environmental performance: 5 items, Economic performance: 6 items, and Social performance: 4 items) were designed (Singh et al., 2020; Kim et al., 2019; Melnyk et al., 2002; García-Machado & Martínez-Ávila, 2019; Zhu et al., 2008; Zaid et al., 2018; de Giovanni, 2012; Hourneaux Jr et al., 2018; Abdul-Rashid et al., 2017; Mousa & Othman, 2020).

All items are evaluated using a five point Likert scale; where the respondent asked to score to what extent that the organization uses the mentioned practice. The answers ranged as (1: Not at all), (2: To slight degree), (3: To a moderate degree), (4: To a great degree), (5: To a very great degree).

## **2.7 Data Analysis Techniques**

In this study, the data collected from manufacturing firms were analyzed using Statistical Package for the Social Sciences (SPSS) 22 software, which used to analyze

the descriptive data of the respondents, as well as to examine the mean, standard deviation for each construct and the degree of implementation for GHRM practices and green innovation in Palestinian industrial companies.

Moreover, partial least squares structural equation modeling (PLS-SEM) was used to test the study model relationships and investigate the results of proposed hypotheses. Smart PLS (v.3.2.8) software was used as one of the leading software tools for PLS-SEM. By using this software drawing the research model and the relationships between variables and data entry for each variable were done. In drawing the model and assigning indicators for each construct, a repeated indicator approach was used where first order and second order constructs were used in the model.

After that, PLS algorithm calculations were done to check the validity and reliability of the different indicators and the model as a whole by using the tests and threshold values to judge each test. Then bootstrapping was performed in order to check the significance of all relationships in order to be able to judge hypotheses.

In more detail, Smart PLS has two methodological elements in model assessment. First, the assessment of the measurement model where the reflective model is evaluated by reliability tests. Where the convergent validity is assessed by determining the internal consistency reliability: composite reliability (CR), indicator reliability (item loading), and average variance extracted (AVE).

In addition the validity test includes discriminant validity test, which includes the cross loadings and Fornell-Larcker criterion. As well, evaluating the formative measurement models by determining the collinearity Variance Inflation Factor (VIF) of indicators. and ensuring the significance for each indicator by examining the outer weight and outer loading.

Second, the assessment of the structural model by evaluating the coefficient of determination ( $R^2$ ), effect Size ( $F^2$ ), predictive relevance ( $Q^2$ ), goodness of fit Index (GoF), and path coefficients (hypotheses test). Moreover, the mediation analysis was investigated in the research.

## **Chapter Three**

### **Data Analysis and Results**

#### **3.1 Chapter Overview**

The chapter presents the analysis results of the data collected from manufacturing firms. SPSS software was used in providing the descriptive statistics of response rates and to obtain the level of implementation of GHRM practices, green innovation and sustainable performance in chemical, pharmaceuticals, metal and engineering and food industries in Palestine. While smart PLS software was used in analyzing the questionnaire responses, model validity and reliability and hypotheses testing.

#### **3.2 Analysis of Survey Response**

##### **3.2.1 Response Rates**

After screening the data collected via questionnaire, 58 respondents obtained from 113 contacted firms with a response rate of 51.33%. Table 7 in Appendix C summarizes the findings of frequency analysis by SPSS software. A descriptive statistical analysis for the respondent's variables was established to study the different characteristics of our statistical sample. With a percentage of 72.4% for males and 27.6% for females. In terms of educational level 67.2% of respondents holding a bachelor degree, 17.2% having higher education and the rest 15.5% having a diploma or less. The results also reveal that about 57% of respondents had more than 11 years of job experience, 27.6% were with 6-10 years of job experience, 15.5% of respondent's job experience ranging from 0-5 years. As displayed in Table 7 in Appendix C 36.2% of the respondents were general managers, and 25.9% of them were HR managers, whereas 15.5% and 12.1% were quality managers and production managers respectively, while around 10% of respondents' positions were classified as others such as administrative manager, sales manager, R&D manager, and financial manager. Referring to the organizational sector 55.2% of respondents were classified as food industries, 22.4% were metal and engineering industries, whereas 17.2% and 5.2% were chemical and pharmaceutical industries respectively.

It is also obvious from the respondents' locations analysis that Tulkarm, Nablus and Hebron represent 62.1% of respondents' locations with 20.7% each, and 17.2%, 8.6% for Ramallah and Jenin respectively, while 1.7% of respondents' locations from Jerusalem Qalqilya, Jericho and Tubas for each one. Out of 58 respondents 30 firms have 20-49 and 50-99 of employees with an equal present of 25.9% each, 17.2% of firms employees number was 1-9, 13.8% for 100-249 answers, and the lowest percentage is 5.2% for 250 and more employees. Most respondents answered that there was an environmental management practices engagement in work activities, 43.1% answered that these practices currently exist and 31.0% choose that there are some practices through activities without a clear plan. Only 22.4% of respondents have formal environmental certificates such as ISO14001, and 43.1% answered that currently there are no plans to implement. The majority of respondents have agreed on the role of the production process in green programs with 67.2% and also with 69% on the HR role in green programs.

### **3.2.2 Descriptive Analysis**

The descriptive analysis was performed in order to describe the general situation of the implementation level of GHRM practices, green innovation, and sustainable performance in Palestinian manufacturing context. As illustrated in Table 3 the mean and standard deviation of each construct were reported. In the current study Likert scale of five point equal sized categories was used, in order to interpreting the results, scores between 1-2.33 scores were considered low, scores from 2.34-3.66 were considered moderate, and scores from 3.67-5 were considered high. These categories were derived according to the equation  $\text{Interval length} = (\text{highest weight} - \text{lowest weight}) / (\text{three levels}) = (5-1) / (3) = 1.33$ .

The results show that the total implementation level of GHRM practices was moderate level while green performance assessment and green rewards levels of implementation were considered low. In terms of green innovation the total implementation level was also moderate while the green marketing innovation was considered as low level of implementation. Likewise, the total sustainable performance implementation level was moderate as its three pillars environmental performance, economic performance and social performance. Table 8 in Appendix C presents the results of descriptive analysis for all items used in the study.



**Table 3***GHRM Practices, Green Innovation, And Sustainable Performance Level Of Implementation*

Item	Mean	Standard deviation	Implementation level
Green analysis and description of job position (GA)	2.5574	1.0553	moderate
Green recruitment (GR)	2.5172	1.2508	moderate
Green selection (GS)	2.3448	1.0467	moderate
Green training (GT)	2.4713	1.1481	moderate
Green performance assessment (GPA)	2.2414	0.9940	low
Green rewards (GRE)	2.3104	1.1758	low
Green product innovation (GPDI)	3.4440	1.0921	moderate
Green process innovation (GPCI)	3.1264	1.1842	moderate
Green managerial innovation (GMGI)	2.6264	1.3224	moderate
Green marketing innovation (GMAI)	2.2888	1.2821	low
Environmental performance (EP)	3.0138	1.2864	moderate
Economic performance (ECP)	2.6034	1.1725	moderate
Social performance (SOP)	3.0819	1.1103	moderate
Total for GHRM	2.4071	1.1118	moderate
Total for Green innovation	2.8714	1.2202	moderate
Total Sustainable performance	2.8997	1.1897	moderate

### 3.3 Questionnaires Analysis

In analyzing the quantitative data obtained from the questionnaire responses Partial Least Squares (PLS) approach was used by using Smart-PLS v 3.2.8 software which is known of handling un-normalized data, and can handle also the small sample .Smart-PLS is one of the prominent software applications for Partial Least Squares Structural Equation Modeling (PLS-SEM). The analysis by Smart-PLS includes two main

elements. The first element is the outer model or the measurement model in order to assess the relationship between each latent variable and its associated indicators. The second element is the inner model or the structural model which describes the relationship between latent variables (path). Furthermore, we should distinguish between two types of variables; exogenous variables and endogenous variables. Endogenous variables are those variables working as dependent variables in the structural model. While exogenous variables refer to the variables acting as independent variables in a structural model (Hair et al., 2011).

On the other hand, we should also distinguish between reflective and formative measurement models. The reflective measurement model or (Model A in measurement in PLS-SEM) means that the measures (indicators) represent the effects of an underlying construct, in model the headed arrows are pointing from construct to its indicators. Commonly a set of reflective measures is called a scale. Hence, any indicator can be left without changing the meaning of the construct (Hair et al., 2011). The formative measurement model or (Model B in measurement in PLS-SEM) assumes that the indicators cause the construct, or the headed arrows are pointing from indicators to its construct which mean that each indicator represents a specific aspect of construct meaning so deleting one indicator changes the nature of the construct. The PLS-SEM can handle both formative and reflective measurement models (Hair et al., 2011).

In this study, GHRM practices (GA, GR, GS, GT, GPA, and GRE) and green innovation practices (GPDI, GPCI, GMGI, and GMAI) and sustainable performance dimensions (EP, SP, and ECP) used reflective indicators. GHRM practices as a contrast is treated as formative construct while sustainable performance is treated as reflective construct as adopted in previous studies (Zaid et al. 2018 ; Mousa & Othman, 2020) . Meanwhile, green innovation is treated as a reflective construct (Abu Seman et al., 2019). The study model includes 47 reflective items for 13 latent variables. We also have first order constructs and second order constructs. The model was built to investigate the relationship between GHRM practices as independent variable and sustainable performance as dependent variable, with green innovation as mediating variable. A mediating effect is used when a third variable or construct is expected to intervene between two other related constructs. The effect between two variables as a single arrow is called direct effect and the effect including two or more direct effects

(compound path) is called a mediating or indirect effect (Hair et al., 2011). In this study, green innovation is analyzed as a mediating variable and four hypotheses were investigated in this research.

### **3.4 Assessment of Measurement Models (Outer Model)**

The assessment of reflective measurement models includes evaluating the construct validity and reliability of constructs. The process of determination convergent validity includes evaluating the indicator reliability, composite reliability, and average variance extracted (AVE). Moreover, cross loadings, the Fornell - Larcker criterion, and the Heterotrait - Monotrait ratio (HTMT) are used to assess the discriminant validity.

#### **3.4.1 Convergent Validity**

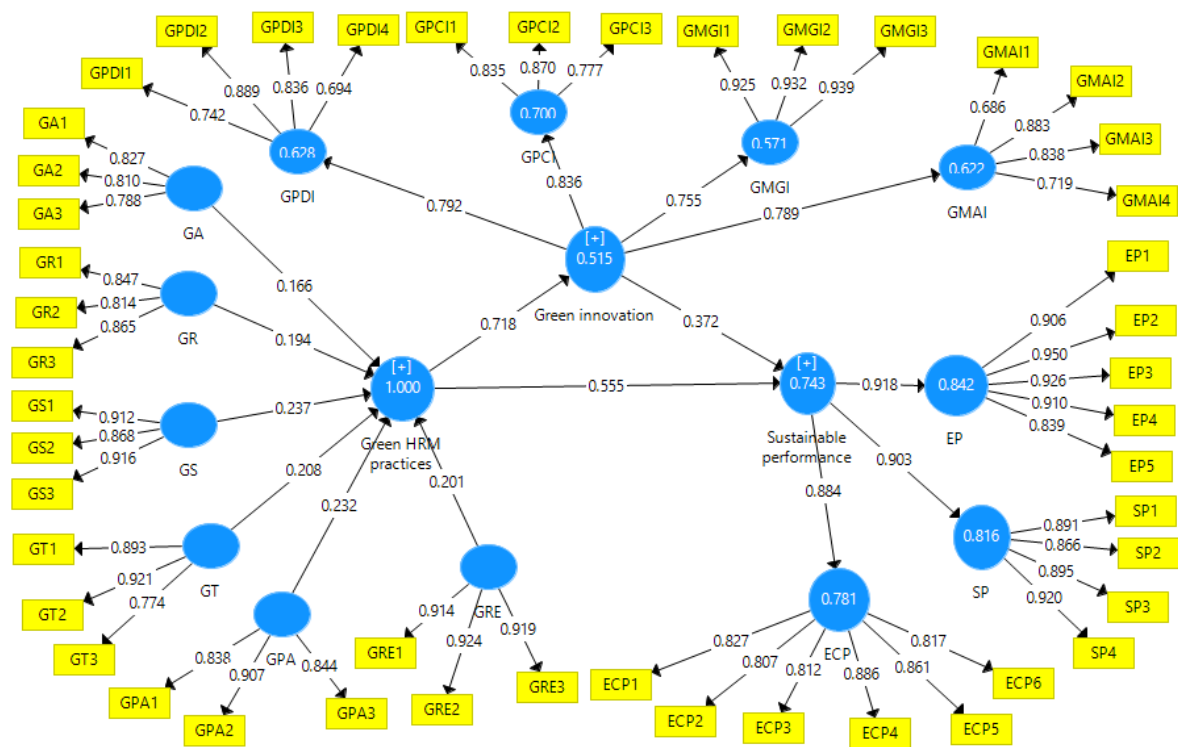
Convergent validity is the degree to which a measure correlates positively with other measures of the same construct. In reflective measurement models, the assessment of convergent validity includes determining three tests:

- Factor loadings: the higher outer loading means that the indicators have much in common on a construct, a common rule of thumb is that the outer loadings should be 0.708 or higher. However, in exploratory studies it is allowed to be above 0.60 (Hair et al., 2011). As shown in Figure 6 below all of the items loading achieve the criteria and agree with the recommended values.
- Composite reliability (CR): in order to ensure the internal consistency, composite reliability is evaluated for all indicators. The composite reliability values are between 0 and 1, the higher values of CR indicating higher levels of reliability. According to Hair et al. (2011), the value higher than 0.70 is considered acceptable. As illustrated in Table 4 below all the values of CR were greater than threshold 0.7. Hence, the reliability of the constructs was confirmed.
- Average variance extracted (AVE): the average variance extracted (AVE) is calculated as the summation of value of the squared loadings of the indicators on the construct divided by the number of indicators. The AVE should be higher than 0.50 which means that the construct explains more than half of the variance of its indicators (Hair et al., 2011). The values of AVE in this study range from 0.617 to 0.869 which indicates good convergent validity.

Table 9 in Appendix C illustrated the reflective constructs measurement properties for all constructs.

**Figure 6**

*The Measurement Model*



Cronbach's alpha and CR of all constructs were listed for all constructs of the study model. Cronbach's alpha is considered the traditional criterion in evaluating the internal consistency. A value higher than 0.7 is recommended, all constructs Cronbach's alpha agree with the threshold see Table 4.

### 3.4.2 Discriminant validity

The discriminant validity test is used to determine to what degree that a construct is different from other constructs, to ensure that the construct is unique and interpret the event not represented by other constructs in the model (Hair et al., 2011). To investigate the discriminant validity the cross loadings (correlation) of the construct indicators should be greater than all of its loadings on other constructs in the model. Table 10 in Appendix C presented all cross loadings of model indicators and it's obvious that the cross loadings discriminant validity method is confirmed.

**Table 4***Cronbach's Alpha , Composite Reliabilities And AVE values Of Constructs*

<b>Construct</b>	<b>Number of items</b>	<b>Cronbach's Alpha</b>	<b>Composite Reliability</b>	<b>AVE</b>
GA	3	0.739	0.850	0.654
GR	3	0.796	0.880	0.710
GS	3	0.881	0.927	0.808
GT	3	0.830	0.899	0.748
GPA	3	0.829	0.898	0.746
GRE	3	0.909	0.942	0.845
GPDI	4	0.801	0.871	0.630
GPCI	3	0.770	0.867	0.686
GMGI	3	0.925	0.952	0.869
GMAI	4	0.789	0.865	0.617
EP	5	0.945	0.958	0.822
SP	4	0.916	0.940	0.798
ECP	6	0.913	0.933	0.698

A second test in investigating the discriminant validity is Fornell-Larcker criterion, this method based on comparing the square root of the (AVE) with latent variable correlations. Also the square root of each construct's (AVE) should be more than the highest correlation with other constructs. Table 5 exhibits the results of this test and it can be said that Fornell-Larcker discriminant validity criterion was established.

Another method used to verify the discriminant validity is Heterotrait-Monotrait ratio of correlations (HTMT) criteria. According to Henseler et al. (2015), HTMT ratio less than 1 is acceptable and indicates good reliability. All HTMT values were listed in Table 6 and it's clear that all values are less than 1 which means that the discriminant validity through this test is demonstrated.

**Table 5***Fornell-Larcker Criterion.*

	GA	GR	GS	GT	GPA	GRE	GPDI	GPCI	GMGI	GMAI	EP	SP	ECP
GA	<b>0.808</b>												
GR	0.627	<b>0.842</b>											
GS	0.554	0.758	<b>0.899</b>										
GT	0.426	0.534	0.581	<b>0.865</b>									
GPA	0.645	0.642	0.622	0.706	<b>0.864</b>								
GRE	0.333	0.537	0.611	0.488	0.535	<b>0.919</b>							
GPDI	0.455	0.449	0.498	0.432	0.54	0.412	<b>0.794</b>						
GPCI	0.383	0.411	0.404	0.489	0.521	0.232	0.756	<b>0.828</b>					
GMGI	0.529	0.334	0.246	0.517	0.621	0.299	0.382	0.418	<b>0.932</b>				
GMAI	0.482	0.437	0.489	0.615	0.655	0.388	0.372	0.516	0.595	<b>0.786</b>			
EP	0.532	0.539	0.645	0.606	0.688	0.589	0.595	0.54	0.526	0.611	<b>0.907</b>		
SP	0.537	0.68	0.678	0.612	0.672	0.574	0.662	0.515	0.512	0.562	0.786	<b>0.893</b>	
ECP	0.504	0.594	0.713	0.447	0.587	0.498	0.583	0.492	0.39	0.573	0.682	0.693	<b>0.836</b>

### 3.4.3 Discriminant Validity Assessment of Formative Construct

In order to verify the formative model discriminant validity (i.e. GHRM practices construct), it should be assessed the significance of the construct indicator using bootstrapping to obtain the weight and loading. In a two-tailed test the critical t-values are 2.58 for 1% significance level, 1.96 for 5% significance level, and 1.65 for 10% significance level. Table 7 shows the t-values for each first order construct and the significance is occurred. In addition, Hair et al. (2011) mentioned that the collinearity of indicators (i.e. Variance Inflation Factor VIF) value should be lower than 5 which was established in this study, see Table 7.

**Table 6***Heterotrait-Monotrait Ratio (HTMT).*

	GA	GR	GS	GT	GPA	GRE	GPDI	GPCI	GMGI	GMAI	EP	SP	ECP
GA	-												
GR	0.812	-											
GS	0.664	0.893	-										
GT	0.537	0.640	0.666	-									
GPA	0.814	0.785	0.723	0.843	-								
GRE	0.368	0.610	0.672	0.551	0.612	-							
GPDI	0.599	0.561	0.599	0.526	0.666	0.472	-						
GPCI	0.531	0.507	0.484	0.602	0.644	0.268	0.956	-					
GMGI	0.633	0.392	0.266	0.583	0.704	0.316	0.434	0.479	-				
GMAI	0.650	0.558	0.586	0.763	0.813	0.447	0.464	0.640	0.708	-			
EP	0.620	0.615	0.704	0.677	0.776	0.626	0.682	0.626	0.559	0.703	-		
SP	0.628	0.783	0.753	0.709	0.764	0.621	0.767	0.604	0.548	0.652	0.839	-	
ECP	0.594	0.686	0.791	0.514	0.668	0.535	0.685	0.578	0.419	0.671	0.731	0.745	-

**Table 7***Weight, T- Values And Variance Inflation Factor (VIF) Values*

Second order construct	First order construct	Outer Weight	T-Value	VIF
GHRM practices	GA	0.411	7.032	1.487
	GR	0.395	14.122	1.697
	GS	0.371	10.966	2.563
	GT	0.383	9.610	2.234
	GPA	0.385	15.608	1.994
	GRE	0.363	8.103	3.074

### 3.5 Assessment of the Structural Model (Inner Model)

After confirmation of the measurement reliability and validity, the next step is to assess the structural model and examine the relationships between constructs. The main criteria used in PLS- SEM in assessment of the structural model is evaluating the following:

- The coefficient of determination ( $R^2$ )
- The effect size ( $F^2$ )
- Blindfolding and predictive relevance  $Q^2$
- Goodness of fit index (GoF)
- The significance of the path coefficients - hypotheses test

#### 3.5.1 The Coefficient of Determination ( $R^2$ )

The coefficient of determination is the most common measure used to evaluate the structural model. It represents the model's predictive accuracy. The value of  $R^2$  is ranging from 0 to 1 where the higher value indicates the higher level of predictive accuracy. According to Hair et al. (2011) the rule of thumb of the value of  $R^2$  for endogenous latent variables are 0.75, 0.50, or 0.25 can be described as high, moderate, or weak as a rough rule of thumb because the value of  $R^2$  depend on the complexity of the research model. The results show that  $R^2$  for endogenous latent variables in the study model achieve a high estimate more than 0.75 see Table 8.

#### 3.5.2 The Effect Size ( $F^2$ )

The effect size express the effect of excluding a specified exogenous construct on the endogenous constructs, and can be calculated as follow in equation 1:

$$F^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}} \quad (1)$$

Based on Cohen 1988 the values of  $F^2$  equal to 0.02, 0.15, and 0.35, respectively, represent small, medium, and large effects of the exogenous latent variable. Table 8 illustrated the effect size of GHRM practices and Green innovation constructs.



**Table 8***R<sup>2</sup> and F<sup>2</sup> Values*

Construct	R Square	R Square Adjusted	Result	F <sup>2</sup>	
				GHRM practices	Green innovation
Sustainable performance	0.743	0.733	high	0.581 large effect	0.261 Medium effect
EP	0.842	0.840	high	-	-
SP	0.816	0.812	high	-	-
ECP	0.781	0.777	high	-	-
Green innovation	0.515	0.506	moderate		

### 3.5.3 Blindfolding and Predictive Relevance Q<sup>2</sup>

Q<sup>2</sup> or (Stone-Geisse's Q<sup>2</sup>) value is an indicator of the model's predictive relevance in the structural model. A value of Q<sup>2</sup> more than 0 for a specified reflective endogenous latent variable, points to path model predictive relevance for this construct. The blindfolding procedure was used to obtain the value of Q<sup>2</sup>. The values of Q<sup>2</sup> for all constructs were larger than zero so the model has sufficient predictive quality see Table 11 in Appendix C.

### 3.5.4 Goodness of Fit Index GoF

The goodness of fit for the model (GoF) defined as the geometric mean of both average variances extracted (AVE) and the average of R<sup>2</sup> of the endogenous variables, it measures the ability to rely on the study model. The calculation formula of GoF is as follow in equation 2:

$$\text{GoF} = \sqrt{\text{avg. R}^2 \times \text{avg. AVE}} \quad (2)$$

In this study the value of  $\text{GoF} = \sqrt{0.7396 \times 0.741} = 0.741$

According to Wetzels et al. (2009) if the

- GoF value is less than 0.1 there is no fit.
- GoF between 0.1 and 0.25 there is a small fit.
- GoF values between 0.25 and 0.36 the fit is medium.

d) GoF values larger than 0.36 there is a large fit.

The calculated value of GOF is 0.741 in this model which is considered sufficient global PLS model validity.

### 3.5.5 The Significance of the Path Coefficients - Hypotheses Test

After running the PLS-SEM algorithm the structural model was estimated to test the relationships among the study model. Path coefficient test was used for this purpose. The values of path coefficients are between -1 and + 1.

The values close to + 1 represent strong positive relationships and the values close to - 1 represent strong negative relationships. In PLS-SEM bootstrapping procedures are used to test the significance of path coefficients, this analysis techniques depend on nonparametric bootstrap procedure because PLS-SEM does not assume normality distribution of data. Moreover, the bootstrapping means bootstrap samples which a large number of subsamples used (Hair et al., 2011). As recommended by Hair et al. (2011), 5000 subsamples are used in bootstrapping procedures. Figure 9 illustrates the results of PLS bootstrapping procedures the. In addition, Table 9 listed the results where the  $\beta$  values, standard deviation values, T-values, and P-values for direct relations were tabulated.

**Table 9**

*The Results Of Direct Relations*

Path	HYP.	Original Sample ( $\beta$ )	Standard Deviation (STDEV)	T-value	P-value	Result
Green HRM practices -> Sustainable performance	H <sub>1</sub>	0.555	0.094	5.900	0.000	Supported
Green HRM practices -> Green innovation	H <sub>2</sub>	0.718	0.062	11.662	0.000	Supported
Green innovation -> Sustainable performance	H <sub>3</sub>	0.372	0.094	3.945	0.000	Supported

As presented in Table 9 it's clear that there is a significant positive relationship between Green HRM practices and sustainable performance, and a positive relationship between

green innovation and sustainable performance. In addition to the positive and significant relationship between Green HRM practices and green innovation.

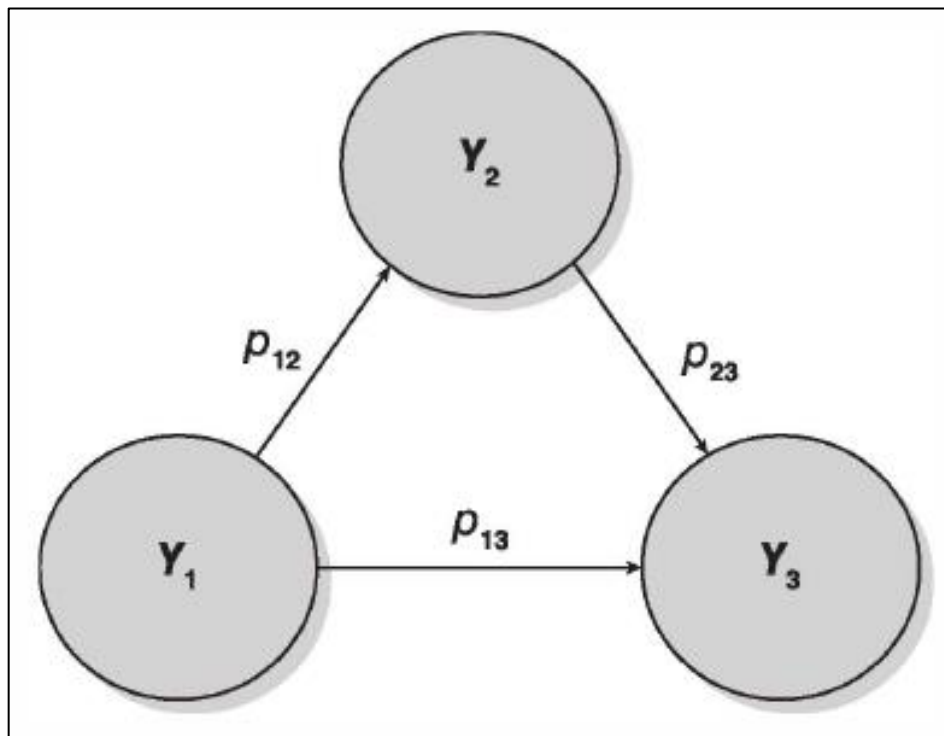
It can be concluded that the proposed hypothesis H<sub>1</sub> analysis results is ( $\beta = 0.555$ ,  $t = 5.900$ ,  $P\text{-value} = 0.000$ ) hence the hypothesis was supported, the analysis results for H<sub>2</sub> is ( $\beta = 0.718$ ,  $t = 11.662$ ,  $P\text{-value} = 0.000$ ) hence the hypothesis was supported, and the analysis results for H<sub>3</sub> is ( $\beta = 0.372$ ,  $t = 3.945$ ,  $P\text{-value} = 0.000$ ) hence the hypothesis was supported.

### 3.6 Mediation Analysis

According to Hair et al. (2011), the general mediator model presented in Figure 7 and the mediator analysis procedure in PLS-SEM presented in Figure 8.

**Figure 7**

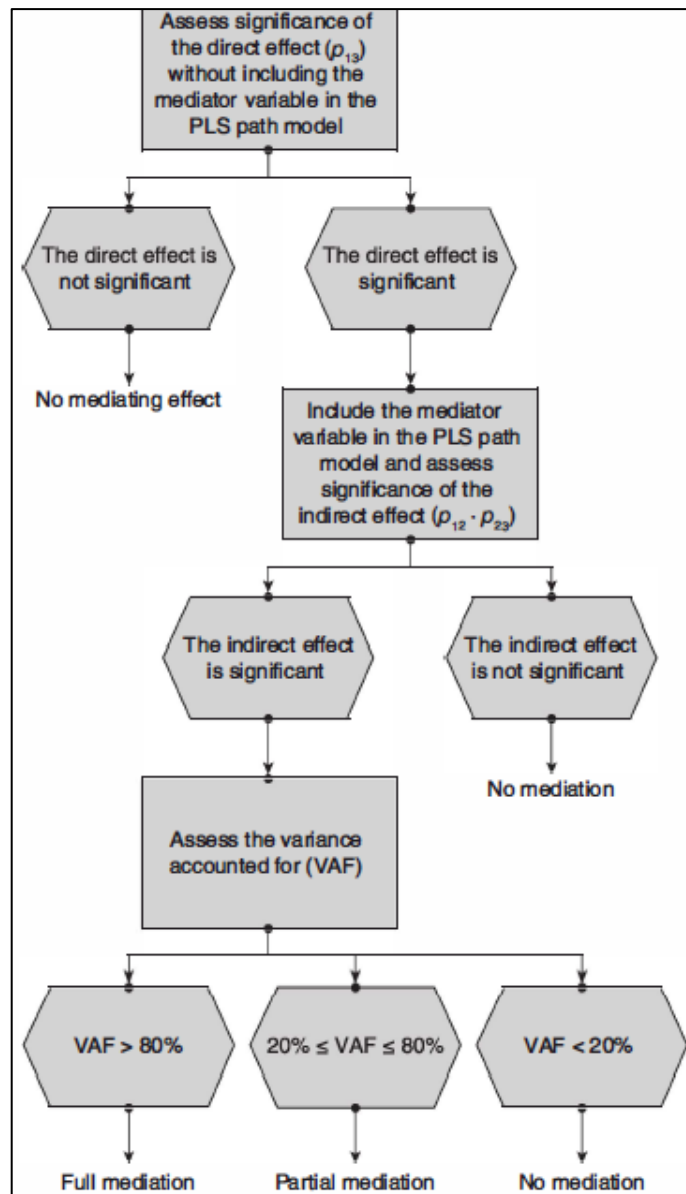
*The General Mediator Model*



Source: Hair et al. (2011), p.220.

**Figure 8**

*The Mediator Analysis Procedure*



Source: Hair et al. (2011), p. 224.

By using the Smart-PLS v 3.2.8 software the mediation relationship was examined where the investigation of mediating relationship is one of this study's contributions.

Table 10 listed the indirect relation result where ( $\beta = 0.267$ ,  $t = 3.835$ ,  $P\text{-value} = 0.000$ ) so the indirect effect is significant. Hence, the results exposed that green innovation mediates the relationship between GHRM practices and sustainable performance, so  $H_4$  was supported.

According to Preacher and Hayes (2008), there are two steps in mediating analysis:

1. Bootstrap the indirect effect (total effect). For this step the relationship between the independent variable and the dependent variable via the mediator must be significant. In this study the relationship between GHRM practices and sustainable performance via green innovation was significant, referring to Table 10.
2. Bootstrapped the confidence interval, lower and upper level.

Table 10 listed the total effects relation result where ( $\beta = 0.718$ ,  $t = 11.662$ , P-value =0.000) for path P<sub>12</sub> which is significant and ( $\beta = 0.372$ ,  $t = 3.945$ , P-value =0.000) for path P<sub>23</sub> which is significant. Zaid et al. (2018) used the specific indirect effects from Smart-PLS report to investigate the mediating effect. The results approved the significant mediating effect of green innovation in the relationship between GHRM practices and sustainable performance. Table 10 presented the results of indirect relation as follow:

**Table 10**

*Indirect Relation (Mediation) Result*

Indirect Effects						
Path	Path No	Original Sample ( $\beta$ )	Standard Deviation (STDEV)	T-value	P-value	Result
Green HRM practices -> Sustainable performance	Path P <sub>13</sub>	0.267	0.070	3.835	0.000	Significant
Bootstrap The Indirect Effects (Total Effects)						
Green HRM practices -> Green innovation	Path P <sub>12</sub>	0.718	0.062	11.662	0.000	Significant
Green innovation -> Sustainable performance	Path P <sub>23</sub>	0.372	0.094	3.945	0.000	Significant
Specific indirect Effects						
Green HRM practices -> Green innovation -> Sustainable performance	-	0.267	0.068	3.911	0.000	Significant

The bootstrapped confidence interval is from 0.130 to 0.404, the value of zero doesn't fall in the confidence interval. Hence, it's another confirmation that the indirect effect is significant based on Preacher and hayes (2008) criterion, see Table 12 in Appendix C. In order to determine the strength of mediating effect the variance accounted for (AVF)



## **Chapter Four**

### **Discussion, Conclusion and Recommendations**

#### **4.1 Chapter Overview**

This chapter illustrates the discussion of the obtained results related to GHRM practices, green innovation, and sustainable performance status in Palestinian manufacturing organizations. The chapter also provides a discussion of proposed hypotheses testing results, and offers theoretical and practical implications related to the study. Moreover, the chapter summarizes and concludes the findings of the study, and highlights some recommendations for managers working at manufacturing firms. The limitations of the study and suggestions for future research directions are presented at the end of the chapter.

#### **4.2 Discussion of Results**

The study aims to investigate the effect of GHRM practices on sustainable performance and green innovation. In addition to, explore the influence of green innovation as a mediator on the relation between GHRM practices and sustainable performance in Palestinian manufacturing organizations. The proposed model includes six GHRM practices (green analysis and job description, green recruitment, green selection, green training, green performance assessment, and green rewards). Furthermore, green innovation practices include (green product innovation, green process innovation, green managerial innovation, green marketing innovation). Also the environmental, financial and social performance as sustainable performance pillars are included.

##### **4.2.1 Discussion of GHRM Status in Palestine**

In assessment process of the data collected, the results indicate that the total GHRM practices level of implementation in Palestinian manufacturing organizations is moderate level of 2.4071 in the scale of 5 which is similar to the findings from other studies performed in Palestine in manufacturing organizations (e.g. Masri & Jaaron 2017; Zaid et al., 2018) and in healthcare organizations (Mousa & Othman, 2020) also as in other developing countries such Rawashdeh (2018). In more details all GHRM practices implementation level in the targeted manufacturing sectors ranging from

2.2414 for green performance assessment which is considered the lowest score to 2.5574 for green analysis and description of job position which is the most influential green practice followed by green recruitment.

All of GHRM practices implementation level is considered moderate except green performance assessment and green rewards which is considered low. These results comply with the results from (Mousa & Othman, 2020) study implemented in healthcare organizations which provide a results that the most influential green practice was green hiring and the lowest one was green performance management and compensation considering that this study treat GHRM practices as bundle. This give an indicator that the organizations still did not take green practices as priority in the work activities. Therefore, this suggests that if the manufacturing firms in Palestine invest more in implementation GHRM practices, then they will be able to move the level of implementation from moderate to high level. For example, although the overall level of implementation of environmental training is moderate there are some aspects need to be developed such as making environmental training continuous and priority in manufacturing organizations which is difficult to achieve high level in environmental performance without improve it (Masri & Jaaron, 2017).

It's also found that there is a positive and significant association between GHRM practices and sustainable performance. Moreover, there is evidence that the GHRM practices have a positive and significant effect on green innovation. This results along with the results obtained by (Singh et al. 2020) in the study performed in 309 manufacturing sector small and medium-sized enterprises (SMEs), also the study of (Sobaih et al. 2020) which collected 525 valid forms from Egyptian small lodging enterprises.

However, the overall results can be interpreted in the context of the industrial firms in Palestine, as one of the developing countries, that the culture of green human resources needs greater ingredients in order to become sufficiently mature. Most of the companies are not large companies, so the financial needs and awareness are very necessary to reach the greatest benefit from the environmental programs that are implemented. For example, as stated from one of the responses to the questionnaire by one of the managers in the last question that is open for comments about the questionnaire for the



research, that he/she is convinced that chemicals can often be replaced with less harmful or green materials, but the harmful chemicals cannot be dispensed because there are no other alternatives at the present time. Another one stated that it is necessary to educate companies, institutions and individuals so that they can implement green innovation.

#### **4.2.2 Discussion of Green Innovation Status in Palestine**

One of the most important contributions for which this study was implemented is to measure the extent to which green innovation practices are applied in the Palestinian context as an indicator of the context in developing countries, as well as an attempt to discover the relationship between GHRM practices and green innovation on the one hand, and the relationship between green innovation and sustainable performance on the other hand, and to examine the relationship of the expected mediation effect of green innovation between GHRM practices and sustainable performance, which expected that no such study has been addressed before in Palestinian manufacturing firms.

In terms of green innovation practices the results demonstrated that the total implementation level of green innovation is moderate with a mean is 2.8714. Specifically, green product innovation, green process innovation, and green managerial innovation implementation level is considered moderate with the mean of 3.444, 3.1264, and 2.6264 respectively. Meanwhile, the green marketing innovation level of implementation is low with a mean of 2.2888. It's clear that green product innovation is the most influential part of green innovation which indicates that companies are getting a green product through the use of materials that reduce pollution, which also significantly reduces energy use. It is also clear that industrial companies need to develop management and marketing processes in the field of green innovation. The results showed that the companies need more incentives to adopt more environmental standards in order to audit and control managerial programs and green supply chains. It is striking that companies turnout for environmental labeling of green products is the weakest among the four variables that were chosen to measure green marketing innovation which requires more attention to the issue of green marketing .

As mentioned, the results showed that there is a significant relationship between GHRM practices and green innovation. In addition, there is an important positive relationship between green innovation and sustainable performance, therefore this study proved the

existence of a mediation relationship of green innovation between GHRM practices and sustainable performance nexus. The results of this study complement the study of (Singh et al. 2020) which proved that GHRM ( employee's green ability, employee's green motivation, and employee's green opportunities) indirectly affect firm environmental performance through the mediating role of green process and product innovation. The mediating analysis results also in the line of (Rehman et al. 2021) study that confirmed the mediating role of green innovation between GHRM and environmental performance. Moreover, the results proved that green innovation positively and significantly influences sustainable performance. It can be concluded from the results of the study that green innovation plays a vital role on GHRM practices and sustainable performance relationship. Hence, manufacturing organizations should pay attention to the practices of green innovation in order to maximize the positive effects toward environment, social, and economic performance. In addition, regarding this study results, green innovation can be defined as greening the traditional products/services, process, managerial, and marketing innovation practices to reinforce the sustainable performance practices.

#### **4.2.3 Discussion of Sustainable Performance Status in Palestine**

The results of data analysis showed that there is an important positive relationship between GHRM practices and sustainable performance on its three dimensions: environmental, economic and social, as well as the same relationship between the impact of green innovation on sustainable performance. Moreover, the results showed that the overall sustainable performance level of implementation was 2.8997, which is a moderate level. In details the sustainable performance pillars (i.e. environmental, social and economic dimensions) level of implementation was 3.0138, 3.0819, and 2.6034 respectively, which is considered moderate. Through these results, it can be said that the management of green human resources, which enhances the selection of more efficient employees from the environmental point of view, as well as supports in increasing environmental awareness and commitment, has a major role in influencing the performance of individuals towards the environment and motivates the presence of sustainable performance. In terms of environmental performance, the results showed that the average response to the question "Our company respects environmental policies in order to counteract harmful emissions from processes" was 3.4655 which is the

highest among the other questions followed by the question which states that environmental activities reduce waste in the supply chain by an average of 3.051. While the average response rate for managers who believe that environmental activities improve the company's reputation and improved product / process quality was 2.9655 and 2.9310 respectively. Standing at these results calls for managers and decision-makers in companies to pay more attention to enhancing the role of GHRM practices in supporting the environmental performance of institutions, which is consistent with many previous studies that demonstrated the role of GHRM practices and its impact on environmental management such as (Kim et al., 2019; Yong et al., 2020; Pham et al., 2020 ;Masri & Jaaron 2017; Zaid et al., 2018; Mousa & Othman, 2020).

Referring to the results of economic performance, the decrease of cost for energy consumption indicator has a mean of 2.8793 which is the highest score of the economic performance indicators. All other indicators ranging from 2.4310 and 2.7069 which are considered moderate. However, it requires those institutions that integrate environmental management programs into their work to focus more and give their attention to improving the results of economic performance, which constitutes one of the pillars of sustainable performance.

According to the findings of the research on social performance, the average response rate to its indicators was between 2.8621 and 3.3103 .This suggests that organizations are making considerable progress in the context of social performance, as evidenced by the findings of an examination of the responses of managers from diverse manufacturing firms. The aspects that were examined represented the social performance of improving the health and safety of workers and the community, as well as the relationship between society and stockholders in addition to the ability to provide job opportunities in the community.

#### **4.2.4 Hypothesis Testing Discussion**

Based on the hypotheses, those have been studied (H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, and H<sub>4</sub>) as proposed in section 1.13. The results demonstrated that there is a significant and positive relationship between GHRM practices and sustainable performance which is matched with the results from other studies (Masri & Jaaron 2017; Zaid et al., 2018; Mousa & Othman, 2020) which prove the H<sub>1</sub>.

Furthermore, the findings showed a positive and significant relationship between GHRM practices and green innovation which is in the line of previous studies results such as Rehman et al. (2021) study which confirmed that GHRM has a positive impact on green innovation in study conducted in 244 large manufacturing firms. Hence, H<sub>2</sub> is supported.

The results of the relation between green innovation and sustainable performance showed that there is a positive and significant correlation between them, which is consistent with other studies such as (Asadi et al., 2020; Abu Seman et al., 2019) then H<sub>3</sub> is approved.

Finally, the mediating effect proposed of green innovation on the relation between GHRM practices and sustainable performance confirmed in this study so H<sub>4</sub> is supported. This study deals with the mediation of green innovation on the relationship between GHRM practices and sustainable performance with its three dimensions (i.e. environmental, economic, and social performance) which complement the whole picture of the mediating role of green innovation between GHRM practices and sustainable performance, where other studies that have demonstrated the existence of a mediation of green innovation on the relationship between GHRM practices and environmental performance only like (Rehman et al., 2021; Rakin et al., 2020 ; Sobaih et al., 2020).

#### **4.3 Theoretical Implications**

The study contributed in deepening the understanding of the subject of GHRM practices, green innovation practices, and their relationship to sustainable performance. It provided a comprehensive presentation of the most important practices in the Palestinian context, especially in the field of manufacturing, which expanded the literature in this field. This study added to previous studies that examined the relationship between GHRM practices and sustainable performance in the presence of a third variable, which is green innovation, and how to benefit from the integration between them in improving the level of sustainable performance in manufacturing companies. It provided empirical evidence of the level of implementation for GHRM practices and green innovation, as well as sustainable performance. In addition, the study examined the mediation relationship of green innovation between management

and sustainable performance, which is considered the first to address this topic in such a comprehensive manner, especially in Palestine as one of the developing countries.

#### **4.4 Practical Implications**

This study also has some practical implications for managers and owners of the manufacturing firms. The interest of the top management in environmental management would reduce the side effects of the various manufacturing processes on the environment, so the investment in GHRM practices regarding to their influence in green innovation practices and sustainable performance improve the competitive advantage of the company. For instance, selecting the right staff having environmental values encourages them to improve the environmental skills which developed the environmental management, so rewarding the employees for their environmental initiatives is important for ensuring the continuity of green behavior. In addition, the results showed that companies should work in integrating the organization's environmental goals with GHRM practices to support and sustain green product, process, managerial, and marketing innovation.

The study showed that the impact on sustainable performance is not only limited to GHRM practices, but there is a role for green innovation too. Therefore, paying attention to making products/services more environmentally friendly would not only make the companies' reputation better, but actually help preserve the environment, along with developing green processes and activating managerial systems and environmental marketing innovation.

#### **4.5 Conclusions**

The concern of green issues is growing across the world, which led the organizations to adopt green technologies and green tools to keep improving the green abilities toward the protection of the surrounding environment, waste minimization and energy consuming reduction. This research aims to explore the effect of GHRM practices on the firm's sustainable performance in addition to investigate the mediating effect of green innovation on the relationship between GHRM practices and sustainable performance in the context of Palestinian manufacturing companies (i.e. chemical industry, Pharmaceutical industry, food industry, and metal & engineering industry). In addition, the study also dealt with measuring the level of implementation of GHRM

practices, green innovation and sustainable performance. According to the results obtained from this study, green innovation explained 50% of the total effect of GHRM practices on the sustainable performance as the mediator of partial mediation. Moreover, as the results indicate there is a statistically positive and significant association between the GHRM practices and sustainable performance and the GHRM practices are implemented at a moderate level with a scale of 2.4071 demonstrating that if firms are involved in GHRM practices, they will experience more acceptable sustainable performance.

In the same way, it is found that GHRM practices affect green innovation positively and the total green innovation implementation level is considered moderate with a scale of 2.8714, so improving the green capabilities of employees enable the organizations to be more green in offering products and services through enhancing the manufacturing process toward reducing waste and pollution and by fostering green managerial innovation and green marketing innovation, and at the same time enhancing their competitive potential.

The manufacturing industry has to recognize the value of green innovation on the aspects of sustainable performance. Where the results of this study confirmed the significant and positive effects of green innovation on manufacturing firms sustainable performance. Accordingly, customers who are concerned about the environment and its value will be attracted to these firms. Further, much more savings of money through the use of various green innovation aspects. The social aspect of performance will also be maximized and recognized by customers who pay attention to society. The results of sustainable performance were recorded which reflect the overall sustainable performance level of implementation was considered moderate with a scale 2.8997.

As far as the authors know, this is one of the first empirical studies performed to examine the impact that green innovation may have on the GHRM practices and sustainable performance relationship on Palestinian manufacturing firms. Hence, the findings obtained here play a significant role in understanding this study area on how green innovation can work in the manufacturing industry.

#### **4.6 Recommendations**

Although the concepts of environmental management are still developing in most manufacturing companies in developing countries such as Palestine, and this can be attributed to many reasons, including economic and political ones, as mentioned, but it is possible to take steps that would increase the benefit of adopting environmental management programs in organizations such as:

- Increasing the focus by the top management on the application of environmental concepts in the institution and not keeping them confined to written regulations and laws only. For example, in job advertisements the companies should pay attention to include the environmental values of the organization, which enhance the attraction and recruiting of green capabilities.
- In the selection process the environmental knowledge of applicants should be considered and investigated through environmental questions in selection steps.
- Working on unifying environmental concepts and refining the personalities of employees working in institutions to become more committed to environmental aspects. In this point, companies are recommended to focus on environmental training continuously which develops the qualifications of employees.
- In the field of green performance assessment, organizations should record the contributions of employees toward the environment and motivate the employees by activating the green reward system.
- The organizations should work more in decreasing the usage of (e.g. Coal and oil) and move toward renewable energy alternatives.
- Activating the role of the various departments in the organization and enhancing integration between them, such as the department of Human Resources, quality and production in the field of environmental management, which helps in improving the sustainable performance of the institution. A green managerial innovation is a good example for this recommendation. The companies should work on adopting environmental standards, environmental audit systems and green supply chain management.
- In green marketing, companies should pay attention to products eco labeling and the use of reusable packaging.

#### **4.7 Research Limitations**

This study, like others, contains a number of limitations. First, the absence of a unified concept or standard regarding to environmental management among manufacturing firms, and the little studies have examined this issue before in developing countries such as Palestine. Secondly, data were collected from manufacturing companies in Palestine, which is considered a small market. Therefore, the numbers of companies that make up the study population and meet the conditions of the study are few. Therefore, the sample size was small, which makes generalizing the results cautiously. Third, the limitations imposed by the political situation and the restriction of movement of access to some companies. Fourth, the lack of an updated record for the manufacturing companies that contains the correct contact information for all companies.

#### **4.8 Future Research Directions**

This study formed a strong basis for launching other studies towards enhancing the results by. First, working on taking a larger sample size of industrial companies. In addition, the same study can be applied in other fields to other sectors. Secondly, re-implementation of this study in other developing countries confirms the results of the study. Third, the impact of environmental beliefs and values can be studied as a controlling variable for the relationship between the various variables: GHRM practices and sustainable performance, GHRM practices and innovation, green innovation and sustainable performance. Fourth, it can study the effect of other variables as mediators between the relationship between GHRM practices and sustainable performance, such as the environmental organizational culture, to show their impact on the relationship.



## List of Abbreviations

Abbreviation	Meaning
TBL	Triple Bottom Line
GHRM	Green Human Resource Management
HRM	Human Resource Management
PCBS	Palestinian Central Bureau of Statistics
RQ	Research Questions
RBV	Resource Based View
SHRM	Strategic Human Resource Management
AMO	Ability, Motivation, and Opportunity
EMS	Environmental Management System
IMS	Integrated Management System
ISO	International Organization of Standards
EM	Environmental Management
CSR	Corporate social responsibility
OCBE	Organizational Citizenship Behavior towards the Environment
UAE	The United Arab Emirates
PBF	Palestinian Business Forum
GDP	Gross Domestic Product
ARIJ	Applied Research Institute-Jerusalem
PFI	The Palestinian Federation of Industries
EQA	Environmental Quality Authority
SPSS	Statistical Package for the Social Sciences
PLS-SEM	Partial Least Squares Structural Equation Modeling
GA	Green Analysis and Description Of Job Position
GR	Green Recruitment
GS	Green Selection

---

GT	Green Training
GPA	Green Performance Assessment
GRE	Green Rewards
GPDI	Green Product Innovation
GPCI	Green Process Innovation
GMGI	Green Managerial Innovation
GMAI	Green Marketing Innovation
EP	Environmental Performance
ECP	Economic Performance
SP	Social Performance

---

## References

- [1] Abdul-Rashid, S. H., Sakundarini, N., Ghazilla, R. A. R., & Thurasamy, R. (2017). The impact of sustainable manufacturing practices on sustainability performance: empirical evidence from Malaysia. *International Journal of Operations & Production Management*, 37(2). Retrieved from <https://doi.org/10.1108/IJOPM-04-2015-0223>
- [2] Abdullah, A., Alharthy, H., & Marni, N. Bin. (2020). *Training impact on the human resource performance*. 55(3).
- [3] Abu Seman, N. A., Govindan, K., Mardani, A., Zakuan, N., Mat Saman, M. Z., Hooker, R. E., & Ozkul, S. (2019). The mediating effect of green innovation on the relationship between green supply chain management and environmental performance. *Journal of Cleaner Production*, 229, 115–127. <https://doi.org/10.1016/j.jclepro.2019.03.211>
- [4] Acosta-Prado, J. C., López-Montoya, O. H., Sanchís-Pedregosa, C., & Zárate-Torres, R. A. (2020). Human Resource Management and Innovative Performance in Non-profit Hospitals: The Mediating Effect of Organizational Culture. *Frontiers in Psychology*, 11(June), 1–12. <https://doi.org/10.3389/fpsyg.2020.01422>
- [5] Akhtar, M. I. (2016). Research design Research design. *Research in Social Science: Interdisciplinary Perspectives*, (September), 68–84.
- [6] Al-Tit, A. A. (2015). The Mediating Role of Knowledge Management and the Moderating Part of Organizational Culture between HRM Practices and Organizational Performance. *International Business Research*, 9(1), 43. <https://doi.org/10.5539/ibr.v9n1p43>
- [7] Amrutha, V. N., & Geetha, S. N. (2020). A systematic review on green human resource management: Implications for social sustainability. *Journal of Cleaner Production*, 247, 119131. <https://doi.org/10.1016/j.jclepro.2019.119131>
- [8] Anwar, N., Nik Mahmood, N. H., Yusliza, M. Y., Ramayah, T., Noor Faezah, J., & Khalid, W. (2020). Green Human Resource Management for organisational

- citizenship behaviour towards the environment and environmental performance on a university campus. *Journal of Cleaner Production*, 256, 120401. <https://doi.org/10.1016/j.jclepro.2020.120401>
- [9] Appelbaum, E., Bailey, T., Berg, P., Kalleberg, A. L., & Bailey, T. A. (2000). *Manufacturing advantage: Why high-performance work systems pay off*. Cornell University Press.
- [10] ARIJ. (2015). Status of the Environment. In *Applied Research Institute-Jerusalem (ARIJ)*.
- [11] Asadi, S., OmSalameh Pourhashemi, S., 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*, 258, 120860. <https://doi.org/10.1016/j.jclepro.2020.120860>
- [12] Ben Eli, M. . (2006). Sustainability: Definition and Five Core Principles - A New Framework. *The Sustainability Laboratory*, 1–12. Retrieved from <http://www.sustainabilitylabs.org/assets/img/SL5CorePrinciples.pdf>
- [13] Bernauer, T., Engels, S., Kammerer, D., & Seijas, J. (2006). Explaining Green Innovation - Ten Years after Porter's Win-Win Proposition: How to Study the Effects of Regulation on Corporate Environmental Innovation? Thomas. *Center for Comparative and International Studies (CIS) Working Paper*, (17).
- [14] Brundtland, G. H. (1987). Our Common Future ('The Brundtland Report'): World Commission on Environment and Development. *The Top 50 Sustainability Books*, 52–55. [https://doi.org/10.9774/gleaf.978-1-907643-44-6\\_12](https://doi.org/10.9774/gleaf.978-1-907643-44-6_12)
- [15] Chaudhary, R. (2020). Green Human Resource Management and Employee Green Behavior: An Empirical Analysis. *Corporate Social Responsibility and Environmental Management*, 27(2), 630–641. <https://doi.org/10.1002/csr.1827>
- [16] 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. <https://doi.org/10.1007/s10551-006-9025-5>

- [17] Creswell, J. W. (2014). *Research design: Qualitative, quantitative. and mixed methods approaches* (4ed ed.). SAGE Publications, Inc.
- [18] Davila, T., Epstein, M. J., & Shelton, R. (2006). *Making innovation work: how to manage it, measure it, and profit from it* (1 ed.). Wharton School Publishing.
- [19] de Giovanni, P. (2012). Do internal and external environmental management contribute to the triple bottom line? *International Journal of Operations and Production Management*, 32(3), 265–290.  
<https://doi.org/10.1108/01443571211212574>
- [20] Dessler, G. (2013). Human Resource Management (HRM). In *The SAGE Glossary of the Social and Behavioral Sciences* (13 ed).  
<https://doi.org/10.4135/9781412972024.n1221>
- [21] Drucker, P. (1998). The Discipline of Innovation : Harvard Business Review. *The Journal of Science Policy and Research Management*, 2(4), 484–485.  
[https://doi.org/10.20801/jsrpim.2.4\\_484\\_2](https://doi.org/10.20801/jsrpim.2.4_484_2)
- [22] Dunford, B. B., Snell, S. A., & Wright, P. M. (2001). WORKING PAPER SERIES Human Resources and the Resource Based View of the Firm and the Resource Based View of the Firm. *Journal of Management*, 1–35.
- [23] Environment Quality Authority of Palestine. (2016). *Assessment Report on Sustainable Consumption and Production Policies in Palestine 2015*. Retrieved from <http://www.switchmed.eu/en/documents/assessment-report-on-sustainability-palestine.pdf>
- [24] García-Granero, E. M., Piedra-Muñoz, L., & Galdeano-Gómez, E. (2018). Eco-innovation measurement: A review of firm performance indicators. *Journal of Cleaner Production*, 191, 304–317. <https://doi.org/10.1016/j.jclepro.2018.04.215>
- [25] García-Machado, J. J., & Martínez-Ávila, M. (2019). Environmental performance and green culture: The mediating effect of green innovation. An application to the automotive industry. *Sustainability (Switzerland)*, 11(18).  
<https://doi.org/10.3390/su11184874>
- [26] Glavič, P., & Lukman, R. (2007). Review of sustainability terms and their

- definitions. *Journal of Cleaner Production*, 15(18), 1875–1885. <https://doi.org/10.1016/j.jclepro.2006.12.006>
- [27] Habibie, M., & Mustika, I. (2020). The Effect of Training on Work Motivation and Its Impact on Employee Performance (Case Study at BPJS Ketenagakerjaan Headquarters). *International Journal of Innovative Science and Research Technology*, 5(7), 51–57. <https://doi.org/10.38124/ijisrt20jul039>
- [28] Hadjri, M. I., Perizade, B., Zunaidah, & Farla, W. (2019). *Green Human Resource Management, Green Organizational Culture, and Environmental Performance: An Empirical Study*. 100(Icoi), 138–143. <https://doi.org/10.2991/icoi-19.2019.25>
- [29] Hair, J. F., Jr, Wolfinbarger, M., Money, A. H., Samouel, P., & Page, M. J. (2011). *Essentials of Business Research Methods*. Retrieved from <https://books.google.com/books?hl=en&lr=&id=GfnqBgAAQBAJ&pgis=1>
- [30] Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- [31] Hourneaux Jr, F., Gabriel, M. L. da S., & Gallardo-Vázquez, D. A. (2018). Triple bottom line and sustainable performance measurement in industrial companies. *Revista de Gestão*, 25(4), 413–429. <https://doi.org/10.1108/rege-04-2018-0065>
- [32] Ikram, M., Zhou, P., Shah, S. A. A., & Liu, G. Q. (2019). Do environmental management systems help improve corporate sustainable development? Evidence from manufacturing companies in Pakistan. *Journal of Cleaner Production*, 226, 628–641. <https://doi.org/10.1016/j.jclepro.2019.03.265>
- [33] Ivancevich, J. M. (2010). *Human resource management* (11 ed.). McGRAW- Hill.
- [34] Jabbour. (2011). How green are HRM practices, organizational culture, learning and teamwork? A Brazilian study. *Industrial and Commercial Training*, 43(2), 98–105. <https://doi.org/10.1108/00197851111108926>
- [35] Jabbour, Charbel José Chiappetta, & Santos, F. C. A. (2008). The central role of human resource management in the search for sustainable organizations.

- International Journal of Human Resource Management*, 19(12), 2133–2154.  
<https://doi.org/10.1080/09585190802479389>
- [36] Jabbour, Charbel José Chiappetta, Santos, F. C. A., & Nagano, M. S. (2010). Contributions of HRM throughout the stages of environmental management: Methodological triangulation applied to companies in Brazil. *International Journal of Human Resource Management*, 21(7), 1049–1089.  
<https://doi.org/10.1080/09585191003783512>
- [37] Ji, L., Huang, J., Liu, Z., Zhu, H., & Cai, Z. (2012). The effects of employee training on the relationship between environmental attitude and firms' performance in sustainable development. *International Journal of Human Resource Management*, 23(14), 2995–3008.
- [38] Jing Yi, Y., & Mohd-Yusoff, Y. (2016). Studying the Influence of Strategic Human Resource Competencies on the Adoption of Green Human Resource Management Practices. *Industrial and Commercial Training*, 48(8), 1–40.  
<https://doi.org/10.1108/00197858199500005>
- [39] Kim, Y. J., Kim, W. G., Choi, H. M., & Phetvaroon, K. (2019). The effect of green human resource management on hotel employees' eco-friendly behavior and environmental performance. *International Journal of Hospitality Management*, 76(August 2017), 83–93.  
<https://doi.org/10.1016/j.ijhm.2018.04.007>
- [40] Kraus, S., Rehman, S. U., & García, F. J. S. (2020). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. *Technological Forecasting and Social Change*, 160(August), 120262.  
<https://doi.org/10.1016/j.techfore.2020.120262>
- [41] Leedy, P. D., & Ormrod, J. E. (2010). *Practical Research: Planning and Design* (9th ed.). Pearson.
- [42] Leedy, P. D., & Ormrod, J. E. (2015). *Practical Research: Planning and Design*. In *Journal of Crohn's and Colitis* (11ed ed., Vol. 12). <https://doi.org/10.1093/ecco-jcc/jjy097>

- [43] Maiti, & Bidinger. (1981). Sustainable Development Exploring the Contradictions. In *Journal of Chemical Information and Modeling* (Vol. 53).
- [44] Masri, H. A., & Jaaron, A. A. M. (2017). Assessing green human resources management practices in Palestinian manufacturing context: An empirical study. *Journal of Cleaner Production*, 143, 474–489. <https://doi.org/10.1016/j.jclepro.2016.12.087>
- [45] Melnyk, S. A., Sroufe, R. P., & Calantone, R. (2002). Assessing the impact of environmental management systems on corporate and environmental performance. *Journal of Operations Management*, 21, 329–351. Retrieved from <http://www.telegraph.co.uk/news/12067812/RSPCA-warns-rise-of-fad-pets-inspired-by-popular-films-is-leading-to-widespread-neglect-of-exotic-animals.html>
- [46] Mousa, S. K., & Othman, M. (2020). The impact of green human resource management practices on sustainable performance in healthcare organisations: A conceptual framework. *Journal of Cleaner Production*, 243. <https://doi.org/10.1016/j.jclepro.2019.118595>
- [47] Mukherjee, S., Bhattacharjee, S., Paul, N., & Banerjee, U. (2020). Assessing Green Human Resource Management Practices in Higher Educational Institute. *Test Engineering & Management*, 82(221), 221–240.
- [48] Mutsuddi, I. (2011). *Managing Human Resources Text and Cases*(As per the new syllabus for MBA, U.P. Technical University) (1 ed.). New Age Internaional (P) Ltd., Publishers.
- [49] Nasralla, A., & Awwad, T. (2004). *The reality of the industrial sector in Palestine*.
- [50] Pane Haden, S. S., Oyler, J. D., & Humphreys, J. H. (2009). Historical, practical, and theoretical perspectives on green management: An exploratory analysis. *Management Decision*, 47(7), 1041–1055. <https://doi.org/10.1108/00251740910978287>
- [51] PBF. (2014). *The reality of the industrial sector in Palestine*. Retrieved from



- [52] PCBS. (2020). *Palestine Statistical Yearbook*. Retrieved from <http://www.pcbs.gov.ps>
- [53] PCBS. (2021). Industrial Production Index. In *Palestinian Central Bureau of Statistics*. Retrieved from [http://www.pcbs.gov.ps/portals/\\_pcbs/PressRelease/Press\\_Ar\\_4-4-2021-IPI-ar.pdf](http://www.pcbs.gov.ps/portals/_pcbs/PressRelease/Press_Ar_4-4-2021-IPI-ar.pdf)
- [54] Pham, N. T., Vo Thanh, T., Tučková, Z., & Thuy, V. T. N. (2020). The role of green human resource management in driving hotel's environmental performance: Interaction and mediation analysis. *International Journal of Hospitality Management*, 88(September). <https://doi.org/10.1016/j.ijhm.2019.102392>
- [55] Rakin, S. R., Yousuf, M. B., & Rubel, M. R. B. (2020). Socially responsible HRM and Environmental Performance of Banking Organization in Bangladesh: Mediating Effect of Green Innovation. *International Journal of Human Resource Studies*, 10(4), 268. <https://doi.org/10.5296/ijhrs.v10i4.17768>
- [56] Rawashdeh, A. M. (2018). The impact of green human resource management on organizational environmental performance in Jordanian health service organizations. *Management Science Letters*, 8(10), 1049–1058. <https://doi.org/10.5267/j.msl.2018.7.006>
- [57] 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(xxxx), 120481. <https://doi.org/10.1016/j.techfore.2020.120481>
- [58] Reid, A., & Miedzinski, M. (2008). “Eco-innovation: Final report for sectoral Innovation Watch”, *Technopolis group*. (May). <https://doi.org/10.13140/RG.2.1.1748.0089>
- [59] Renwick, D. W. S., Redman, T., & Maguire, S. (2013). Green Human Resource Management: A Review and Research Agenda. *International Journal of Management Reviews*, 15(1), 1–14. <https://doi.org/10.1111/j.1468-2370.2011.00328.x>

- [60] Robbins, S. P., & Coulter, M. (2009). *Management* (10 ed). Pearson Education, Inc.
- [61] Schiederig, T., Tietze, F., & Herstatt, C. (2012). Green innovation in technology and innovation management - an exploratory literature review. *R and D Management*, 42(2), 180–192. <https://doi.org/10.1111/j.1467-9310.2011.00672.x>
- [62] Shahzad, M., Qu, Y., Javed, S. A., Zafar, A. U., & Rehman, S. U. (2020). Relation of environment sustainability to CSR and green innovation: A case of Pakistani manufacturing industry. *Journal of Cleaner Production*, 253, 119938. <https://doi.org/10.1016/j.jclepro.2019.119938>
- [63] Singh, S. K., Chen, J., Del Giudice, M., & El-Kassar, A. N. (2019). Environmental ethics, environmental performance, and competitive advantage: Role of environmental training. *Technological Forecasting and Social Change*, 146(May), 203–211. <https://doi.org/10.1016/j.techfore.2019.05.032>
- [64] Singh, S. K., Giudice, M. Del, Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change*, 150(September 2019), 119762. <https://doi.org/10.1016/j.techfore.2019.119762>
- [65] Sittisom, W., & Mekhum, W. (2020). External supply chain management factors and social performance in Thai manufacturing industry: Moderating role of green human resource practices. *International Journal of Supply Chain Management*, 9(1), 190–198.
- [66] Siyambalapitiya, J., Zhang, X., & Liu, X. (2018). Green Human Resource Management: A Proposed Model in the Context of Sri Lanka's Tourism Industry. *Journal of Cleaner Production*. <https://doi.org/10.1016/j.jclepro.2018.07.305>
- [67] Sobaih, A. E. E., Hasanein, A., & Elshaer, I. (2020). Influences of green human resources management on environmental performance in small lodging enterprises: The role of green innovation. *Sustainability (Switzerland)*, 12(24), 1–19. <https://doi.org/10.3390/su122410371>

- [68] 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*. <https://doi.org/10.1108/EJIM-11-2019-0315>
- [69] Szirmai, B. A., & Verspagen, B. (2011). *Manufacturing and Economic Growth in Developing Countries*. (31).
- [70] Tang, G., Chen, Y., Jiang, Y., Paillé, P., & Jia, J. (2018). Green human resource management practices: scale development and validity. *Asia Pacific Journal of Human Resources*, 56(1), 31–55. <https://doi.org/10.1111/1744-7941.12147>
- [71] TheEconomist. (2009). Triple bottom line. Retrieved June 6, 2021, from <https://www.economist.com/news/2009/11/17/triple-bottom-line>
- [72] Tidd, J., & Bessant, J. (2009). *Managing innovation : integrating technological, market, and organizational change* (4 ed.). John Wiley & Sons Ltd.
- [73] Torrington, D., Hall, L., Taylor, S., & Atkinson, C. (2017). *Human Resource Management* (10 ed.). Pearson Education Limited UK.
- [74] Wang, Z., Cai, S., Liang, H., Wang, N., & Xiang, E. (2018). Intellectual capital and firm performance: the mediating role of innovation speed and quality. *International Journal of Human Resource Management*, 0(0), 1–29. <https://doi.org/10.1080/09585192.2018.1511611>
- [75] Weng, H. H. R., Chen, J. S., & Chen, P. C. (2015). Effects of green innovation on environmental and corporate performance: A stakeholder perspective. *Sustainability (Switzerland)*, 7(5), 4997–5026. <https://doi.org/10.3390/su7054997>
- [76] Wernerfelt, B. (1984). Harmonised implementation of Application-Specific Messages (ASMs). *Strategic Management Journal*, CINCO(2), 1–12. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/smj.4250050207/abstract>
- [77] Wetzels, M., Odekerken, G., & Oppen Van, C. (2009). *Using PLS Path Modeling for Assessing Hierarchical Construct Models: Guidelines and Empirical Illustration Service Design for Innovation View project*. (March 2009). Retrieved from <https://www.researchgate.net/publication/228754673>
- [78] Wheelen, T. L., Hunger, J. D., Hoffman, A. N., & Bamford, C. E. (2018).

*Strategic Management and Business Policy Globalization, Innovation and Sustainability* (15 ed.). Pearson Education Limited.

- [79] Williams, C. (2007). Research methods. *Journal of Business & Economic Research*, 1(3), 23–37. <https://doi.org/10.1017/9781108656184.003>
- [80] 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. <https://doi.org/10.1002/bse.2359>
- [81] Zaid, A. A., Jaaron, A. A. M., & Talib Bon, A. (2018). The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study. *Journal of Cleaner Production*, 204, 965–979. <https://doi.org/10.1016/j.jclepro.2018.09.062>
- [82] Zhang, D., Sial, M. S., Ahmad, N., Filipe, J. A., Thu, P. A., Zia-Ud-din, M., & Caleiro, A. B. (2021). Water scarcity and sustainability in an emerging economy: A management perspective for future. *Sustainability (Switzerland)*, 13(1), 1–10. <https://doi.org/10.3390/su13010144>
- [83] Zhang, Y., Sun, J., Yang, Z., & Wang, Y. (2020). Critical success factors of green innovation: Technology, organization and environment readiness. *Journal of Cleaner Production*, 264, 121701. <https://doi.org/10.1016/j.jclepro.2020.121701>
- [84] Zhu, Q., Sarkis, J., & Lai, K. hung. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111(2), 261–273. <https://doi.org/10.1016/j.ijpe.2006.11.029>

## **Appendices**

### **Appendix A**

#### **Research Questionnaire in English**



**An-Najah National University**

**Faculty of Graduate Studies**

**Engineering Management Program**

**Questionnaire about evaluation the effect of green human resource management practices on sustainable performance with green innovation as mediating variable:  
an empirical study**

Dear respondent,

Thank you for your time in filling out this questionnaire. This study will target the manufacturing sector in Palestine, which aims to assess the green human resource management practices (GHRM), sustainable performance, green innovation practices, and the relation between them in this vital sector of industry. The questionnaire is a means of collecting information for scientific research in order to complete the requirements for obtaining a master's degree in engineering management at An-Najah National University.

The questionnaire includes two parts. The first one aims to gather general information about the respondent, company, and the current status of environmental management in the company.

The second part consists of three sections. The first section aims to assess the degree that GHRM practices are applied in industrial companies in Palestine.

The second section aims to know the impact of these practices on green innovation and the impact of these aspects on sustainable performance. The third section also aims to measure the impact of these practices on environmental sustainability.

It will take 10 minutes to answer the questionnaire. Please read all parts carefully and choose the appropriate answer accurately and impartially, with full appreciation for your participation.

Regards,

Baha' Ahmed Alja'ar.

Researcher, Master of Engineering Management

Email: Baha-ahmad@outlook.com

Mob +970-597-553703

Part one: General information

Please kindly answer the following questions by putting an (X) in the answer that suits you.

1. Gender  
☐ Male      ☐ Female
2. Your education degree  
☐ Diploma or less      ☐ Bachelor degree      ☐ Higher education
3. Your job experience  
☐ 0-5 Years    ☐ 6-10 Years    ☐ 11-15 Years    ☐ More than 15 years
4. Your current position in the company  
☐ General manager/CEO    ☐ HR manager    ☐ Production manager    ☐ Quality manager    ☐ other
5. Your organization sector  
☐ Chemical industry      ☐ Pharmaceutical industry    ☐ Food industry  
☐ Metal and Engineering industry      ☐ other
6. Your location  
☐ Jenin      ☐ Tulkarm      ☐ Nablus      ☐ Ramallah      ☐ Jerusalem    ☐ Hebron      ☐ Bethlehem    ☐ Salfit  
☐ Qalqilya    ☐ Jericho      ☐ Tubas

7. Number of employees in the company  
☐ 1-9                      ☐ 10-19                      ☐ 20-49                      ☐ 50-99                      ☐  
100-249                      ☐ 250 and more
8. Does your organization engage environmental management practices in business operations  
☐ Currently exists                      ☐ currently there are no plans to implement                      ☐  
Plan to implement within 12 months                      ☐ Plan to implement within a period  
more than 12 months                      ☐ There are some practices through activities without  
clear plan                      ☐ Not sure
9. Does your organization has formal certificate related to environmental issues or environmental management system such as ISO14001  
☐ Currently exists                      ☐ currently there are no plans to implement                      ☐  
Plan to implement within 12 months                      ☐ Plan to implement within a period  
more than 12 months                      ☐ Not sure
10. Do you think that production process which include product, process, managerial, or marketing has direct involvement in green programs  
☐ Yes                      ☐ No                      ☐ Not sure
11. Do you think that human resource management has direct involvement in green programs  
☐ Yes                      ☐ No                      ☐ Not sure

Part two: (Section 1: Green human resource management GHRM practices assessment):

GHRM includes a set of policies and practices to protect the environment such as green recruitment and selection, green training, green performance management, and green wages and rewards.

This section aims to reveal to what degree that the manufacturing industries apply green human resource management practices. For each item please choose to what extent that your organization uses it by marking the appropriate column with (x) sign.

No.	Green analysis and description of job position	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
1	Job positions enable involvement in managing environmental activities.					
2	Job positions enable acquisition of knowledge about environmental management.					
3	Job positions demand knowledge about environmental management.					
No.	Green recruitment	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
4	The recruitment message includes organizations environmental values in job advertisement					
5	The environmental performance of a company attracts employees.					
6	The company prefers to hire employees who have environmental knowledge.					
No.	Green selection	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
7	Consider environmental knowledge and organization's green requirements in the selection process.					
8	Consider candidates' environmental awareness and commitments in the selection process.					
9	All selection steps consider environmental questions.					
No.	Green training	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	statement					
10	Environmental training is continuous.					
11	Environmental training is a priority.					



12	Environmental training is an important investment.					
No.	Green performance assessment	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	statement					
13	Every employee has specific environmental goals to achieve.					
14	Contributions to environmental management are assessed.					
15	Individual performance assessment results are recorded.					
No.	Green rewards	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
16	Employees are rewarded for their suggestions in the field of environmental management.					
17	Cash rewards are provided to recognize environmental performance.					
18	Environmental performance is recognized publicly.					

## Section 2: Green innovation assessment

Green innovation refers to innovation that can reduce environmental impacts, while achieving the company's environmental goals and achieving environmental benefits through green product innovation, green process innovation, green management innovation, and green marketing innovation. This section aims to reveal to what degree that the manufacturing industries apply green innovation practices. For each item please choose to what extent that your organization uses it by marking the appropriate column with (x) sign.

No.	Green product innovation	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
1	My company uses materials that produce the least pollution.					
2	My company uses materials that consume less energy and resources management.					
3	My company uses materials to design environmentally friendly products.					
4	My company uses materials that are easy to recycle, reuse, and decompose.					
No.	Green process innovation	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
5	The manufacturing processes of my company effectively reduce hazardous substances or waste.					
6	The manufacturing processes of my company effectively reduce consumption of coal, oil, electricity or water.					
7	The manufacturing processes of my company effectively reduce use of raw materials.					
No.	Green managerial innovation	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
8	My company works on adopting environmental management standards (e.g. ISO14000).					
9	My company works on establishing green supply chain management.					
10	My company works on implementing environment audit/control					

	systems.					
No.	Green marketing innovation	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	statement					
11	My company marks green products with eco-labels.					
12	My company use returnable/reusable Packaging.					
13	My company has green design packaging which makes products for example easy to clean, and easy to empty to fulfill ecological requirements.					
14	My company indicates quality certifications to the market.					

### Section 3: Sustainable performance

Sustainable performance consists of three main pillars: environmental, financial and social performance. Environmental sustainability means that business takes its impact on the environment into account, while economic sustainability is concerned with the financial success of the organization, and social sustainability represents factors related to the human context of business.

This section aims to reveal to what degree that the manufacturing industries apply environmental sustainability pillars. For each pillar please choose to what extent that you agree that the item allows your organization to obtain the following results by marking the appropriate column with (x) sign.

No.	Environmental performance	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
1	Environmental activities significantly improved the reputation of my company.					
2	Environmental activities significantly reduced waste within the entire value chain process.					
3	Environmental activities significantly improved product / process quality.					
4	Environmental management within the company reduced purchases of non-renewable materials, chemicals, and components.					
5	Our company respects environmental policies in order to counteract harmful emissions from processes.					
No.	Economic performance	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
6	Decrease of cost for materials purchasing.					
7	Decrease of cost for energy consumption.					
8	Decrease of fee for waste treatment and discharge.					
9	Average profit and profit growth.					
10	Average growth in market share.					
11	Decrease in fines for environmental accidents.					

No.	Social performance	Not at all	To a slight degree	To a moderate degree	To a great degree	To a very great degree
	Statement					
12	Improved relationship with the community and stakeholders.					
13	Improved employee's health and work safety.					
14	Development of economic activities in the community and providing more job opportunities.					
15	Improvement of community health and safety.					

Notes:

.....

.....

.....

.....

.....

Thank you

## Appendix B

### Research Questionnaire in Arabic



جامعة النجاح الوطنية

كلية الدراسات العليا

برنامج ماجستير الإدارة الهندسية

استبيان حول تقييم تأثير ممارسات إدارة الموارد البشرية الخضراء على الأداء المستدام مع الابتكار الأخضر  
كمتغير وسيط: دراسة تجريبية

عزيزي القارئ/ عزيزتي القارئة ،

تحية طيبة،

شكراً لك على وقتك في الإجابة على هذا الاستبيان. تستهدف هذه الدراسة قطاع التصنيع في فلسطين، بهدف تقييم ممارسات إدارة الموارد البشرية الخضراء والأداء المستدام والابتكار الأخضر والعلاقة بينهما في هذا القطاع الحيوي من الصناعة. إن الاستبيان هو وسيلة لجمع المعلومات للبحث العلمي لاستكمال متطلبات الحصول على درجة الماجستير في الإدارة الهندسية من جامعة النجاح الوطنية.

يتكون الاستبيان من قسمين.

القسم الأول: يهدف إلى جمع معلومات عامة عن المجيب والمؤسسة والوضع الحالي للإدارة البيئية في المؤسسة.

القسم الثاني: يتكون من ثلاثة أجزاء، تهدف إلى تقييم مدى تطبيق ممارسات إدارة الموارد البشرية الخضراء في الشركات الصناعية المسجلة في اتحاد الصناعات في فلسطين ، ومدى تطبيق جوانب الابتكار الأخضر والأداء المستدام والعلاقات بينهما.

سوف تستغرق الإجابة على الاستبيان 10 دقائق. يرجى قراءة جميع الأجزاء بعناية واختيار الإجابة المناسبة بدقة وحيدة ، مع التقدير الكامل لمشاركتك.

الباحث/ بهاء أحمد الجعار

ماجستير الإدارة الهندسية

Email: Baha-ahmad@outlook.com

Mob: +970-597-553703

القسم الأول: معلومات عامة

يرجى التكرم بالإجابة على الأسئلة التالية بوضع إشارة × في المكان المناسب:

1. الجنس:

( ) ذكر ( ) أنثى

2. الدرجة العلمية:

( ) دبلوم أو أقل ( ) بكالوريوس ( ) دراسات عليا

3. خبرتك في العمل:

( ) 0-5 سنوات ( ) 6-10 سنوات ( ) 11-15 سنة ( ) أكثر من 15 سنة

4. الموقع الوظيفي الحالي في الشركة:

( ) مدير عام / رئيس تنفيذي ( ) مدير موارد بشرية ( ) مدير إنتاج  
( ) مدير جودة ( ) غير ذلك

5. قطاع المؤسسة:

( ) الصناعات الكيماوية ( ) الصناعات الدوائية ( ) الصناعات الغذائية

( ) الصناعات الهندسية والمعدنية ( ) أخرى

6. الموقع:

( ) جنين ( ) طولكرم ( ) نابلس ( ) رام الله ( ) القدس ( ) الخليل ( )  
بيت لحم ( ) سلفيت ( ) قلقيلية ( ) أريحا ( ) طوباس والأغوار الشمالية

7. عدد العاملين في الشركة:

( ) 1-9 ( ) 10-19 ( ) 20-49 ( ) 50-99 ( ) 100-249 ( ) أكثر من 250

8. هل تدمج مؤسستك ممارسات الإدارة البيئية في العمليات التجارية؟

( ) نعم موجود حالياً ( ) حالياً لا توجد خطط للتنفيذ ( ) يوجد خطة للتنفيذ في غضون 12 شهراً  
( ) يوجد خطة للتنفيذ في غضون فترة تزيد عن 12 شهراً ( ) هناك بعض الممارسات في النشاطات بدون  
خطة واضحة ( ) لست متأكداً

9. هل تمتلك مؤسستك شهادة رسمية تتعلق بالقضايا البيئية أو نظام إدارة البيئة مثل الأيزو 14001؟

( ) نعم موجود حالياً ( ) حالياً لا توجد خطط للتنفيذ ( ) يوجد خطة للتنفيذ في غضون 12 شهراً  
( ) يوجد خطة للتنفيذ في غضون فترة تزيد عن 12 شهراً ( ) لست متأكداً

10. هل تعتقد أن عملية الإنتاج التي تشمل المنتج أو العملية أو الإدارة أو التسويق تؤثر بشكل مباشر في البرامج  
البيئية في المؤسسة؟

( ) نعم ( ) لا ( ) لست متأكداً

11. هل تعتقد أن إدارة الموارد البشرية تؤثر بشكل مباشر في البرامج البيئية في المؤسسة؟

( ) نعم ( ) لا ( ) لست متأكداً

القسم الثاني: ( الجزء الأول: تقييم ممارسات إدارة الموارد البشرية الخضراء)

( إدارة الموارد البشرية الخضراء تتضمن مجموعة من السياسات والممارسات لحماية البيئة مثل التوظيف  
والاختيار الأخضر ، والتدريب الأخضر ، وإدارة الأداء الأخضر ، والأجور والمكافآت الخضراء ).

يهدف هذا القسم إلى الكشف عن مستوى تطبيق الشركات الصناعية لممارسات إدارة الموارد البشرية الخضراء.

لكل عبارة يرجى اختيار درجة استخدامها في مؤسستك بوضع إشارة × في العمود المناسب.

الدرجة	التحليل الأخضر ووصف الوظيفة				
	الجملة	الجملة	الجملة	الجملة	الجملة
1	يتم تحديد القضايا البيئية في الوصف الوظيفي.				
2	تُتيح المناصب الوظيفية اكتساب المعرفة حول الإدارة البيئية.				
3	تتطلب المناصب الوظيفية معرفة حول الإدارة البيئية.				
الدرجة	التوظيف الأخضر				
	الجملة	الجملة	الجملة	الجملة	الجملة
4	يتضمن الإعلان عن الوظيفة القيم البيئية للمؤسسة.				
5	يجذب الأداء البيئي للشركة الموظفين.				



6	تفضل الشركة توظيف أشخاص لديهم معرفة بيئية.					
3	الإختيار الأخضر	درجة قليلة جداً	درجة قليلة	درجة متوسطة	درجة كبيرة	درجة كبيرة جداً
	الجملة					
7	يتم أخذ المعرفة البيئية والمتطلبات الخضراء للمؤسسة في عين الاعتبار في عملية اختيار الموظفين.					
8	يتم أخذ الوعي والالتزام البيئي للمرشحين في عين الاعتبار في عملية اختيار الموظفين.					
9	جميع خطوات اختيار الموظفين تأخذ في الاعتبار الأسئلة البيئية.					
3	التدريب الأخضر	درجة قليلة جداً	درجة قليلة	درجة متوسطة	درجة كبيرة	درجة كبيرة جداً
	الجملة					
10	تقدم الشركة برامج التدريب البيئي بشكل مستمر.					
11	التدريب البيئي هو أولوية.					
12	تتأثر مهم.					
3	تقييم الأداء الأخضر	درجة قليلة جداً	درجة قليلة	درجة متوسطة	درجة كبيرة	درجة كبيرة جداً
	الجملة					
13	كل موظف لديه أهداف بيئية محددة لتحقيقها.					
14	يتم تقييم المساهمات في الإدارة البيئية.					
15	يتم تسجيل نتائج تقييم الأداء الفردي.					
3	المكافآت الخضراء	درجة قليلة جداً	درجة قليلة	درجة متوسطة	درجة كبيرة	درجة كبيرة جداً
	الجملة					
16	يتم مكافأة الموظفين على اقتراحاتهم في مجال الإدارة البيئية.					
17	يتم تقديم المكافآت النقدية لتميز الأداء البيئي.					
18	يتم تمييز الأداء البيئي علناً.					

(الجزء الثاني: تقييم الابتكار الأخضر)

(\*) الابتكار الأخضر يشير إلى الابتكار الذي يمكن أن يقلل من الآثار البيئية ، مع تحقيق الأهداف البيئية للشركة وتحقيق فوائد بيئية من خلال ابتكار المنتجات الخضراء، ابتكار العملية الخضراء، الابتكار الإداري الأخضر، ابتكار التسويق الأخضر).

يهدف هذا القسم إلى الكشف عن مستوى تطبيق الشركات الصناعية لممارسات الابتكار الأخضر. لكل عبارة يرجى اختيار درجة استخدامها في مؤسستك بوضع إشارة × في العمود المناسب.

الدرجة	الدرجة	الدرجة	الدرجة	الدرجة	الابتكار المنتجات الخضراء	الدرجة
					الجملة	
بدرجة كبيرة جداً	بدرجة كبيرة	بدرجة متوسطة	بدرجة قليلة	بدرجة قليلة جداً	1 تستخدم الشركة مواد تنتج أقل تلوث.	
					2 تستخدم الشركة مواد تستهلك قدرًا أقل من الطاقة وتسمح بإدارة الموارد.	
					3 تستخدم الشركة مواد لتصميم منتجات صديقة للبيئة.	
					4 تستخدم الشركة مواد يسهل إعادة تدويرها وإعادة استخدامها وتحللها.	
بدرجة كبيرة جداً	بدرجة كبيرة	بدرجة متوسطة	بدرجة قليلة	بدرجة قليلة جداً	الابتكار العملية الخضراء	الدرجة
					الجملة	
					5 تقلل عمليات التصنيع في الشركة بشكل فعال من المواد أو النفايات الخطرة.	
					6 تقلل عمليات التصنيع في الشركة بشكل فعال من استهلاك الفحم أو النفط أو الكهرباء أو الماء.	
					7 تقلل عمليات التصنيع في الشركة بشكل فعال من استخدام المواد الخام.	
بدرجة كبيرة جداً	بدرجة كبيرة	بدرجة متوسطة	بدرجة قليلة	بدرجة قليلة جداً	الابتكار الإداري الأخضر	الدرجة
					الجملة	
					8 تعمل الشركة على اعتماد معايير للإدارة البيئية مثل الأيزو 14001.	
					9 تعمل الشركة على إنشاء إدارة سلسلة التوريد الخضراء.	
					10 تعمل الشركة على تنفيذ أنظمة تدقيق / رقابة بيئية.	
بدرجة كبيرة جداً	بدرجة كبيرة	بدرجة متوسطة	بدرجة قليلة	بدرجة قليلة جداً	الابتكار التسويق الأخضر	الدرجة
					الجملة	

11	تقوم الشركة بتمييز المنتجات الخضراء بملصقات بيئية.				
12	تستخدم الشركة عيوباً قابلة للإرجاع / قابلة لإعادة الاستخدام.				
13	تمتلك الشركة عيوباً ذات تصميم أخضر تجعل المنتج سهل التنظيف ، وسهل التفريغ لتلبية المتطلبات البيئية.				
14	تشير الشركة إلى شهادات الجودة للسوق.				

(الجزء الثالث: الأداء المستدام)

(\*) الأداء المستدام يتكون من ثلاث ركائز أساسية هي الأداء البيئي والمالي والاجتماعي، تعني الاستدامة البيئية أن الأعمال تضع تأثيرها على البيئة في الاعتبار، بينما تهتم الاستدامة الاقتصادية بشأن النجاح المالي للمنظمة وتمثل الاستدامة الاجتماعية العوامل المتعلقة بالسياق البشري للأعمال)

يهدف هذا القسم إلى الكشف عن مستوى تطبيق الشركات الصناعية لركائز الاستدامة البيئية (البيئية والإقتصادية والاجتماعية). لكل عبارة يرجى اختيار لأي مدى توافق على النتائج التالية من حيث صلتها بالتغيرات في أداء مؤسستك بوضع إشارة × في العمود المناسب .

رقم	الأداء البيئي					درجة كبيرة جداً
	الجملة					
1	أدت الأنشطة البيئية إلى تحسين سمعة الشركة بشكل كبير.					درجة كبيرة جداً
2	أدت الأنشطة البيئية إلى تقليل النفقات بشكل كبير في عملية الإنتاج بأكملها.					درجة كبيرة جداً
3	أدت الأنشطة البيئية إلى تحسين جودة المنتج / العملية بشكل كبير.					درجة كبيرة جداً
4	خفضت الإدارة البيئية داخل الشركة مشتريات المواد غير المتجددة والمواد الكيميائية.					درجة كبيرة جداً
5	تحتزم الشركة السياسات البيئية من أجل مواجهة الانبعاثات الضارة من عمليات التصنيع.					درجة كبيرة جداً
رقم	الأداء الإقتصادي					درجة كبيرة جداً
	الجملة					
6	انخفاض تكلفة شراء المواد.					درجة كبيرة جداً
7	انخفاض تكلفة استهلاك الطاقة.					درجة كبيرة جداً

					8	تخفيض رسوم معالجة النفائات وتصريفها.
					9	تحقيق نمو في متوسط الأرباح .
					10	تحقيق معدل نمو في حصة المؤسسة السوقية.
					11	تخفيض الغرامات على الحوادث البيئية.
درجة كبيرة جداً	درجة كبيرة	درجة متوسطة	درجة قليلة	درجة قليلة جداً	الأداء الاجتماعي	م
					12	تحسين العلاقة مع المجتمع وأصحاب المصلحة.
					13	تحسين صحة الموظف وسلامته في العمل.
					14	تنمية الأنشطة الاقتصادية في المجتمع وتوفير المزيد من فرص العمل.
					15	تحسين صحة المجتمع وسلامته.

ملاحظات:

.....

.....

.....

.....

شكراً لتعاونكم

## Appendix C

### Information and Data Analysis Tables

**Table 1**

*Main Economic Indicators For Industrial Activities 2017-2019*

Indicators	السنة			المؤشرات
	2019	2018	2017	
No. of Enterprises	20,710	20,104	19,118	عدد المؤسسات
No. of Employed Persons	121,763	112,835	95,787	عدد العاملين
Compensation of Employees	723,390.6	594,737.5	538,200.1	تعويضات العاملين
Output	5,144,933.5	4,956,010.4	4,784,691.1	الإنتاج
Intermediate Consumption	2,866,146.0	2,851,640.1	2,805,931.8	الاستهلاك الوسيط
Value Added	2,278,787.5	2,104,370.3	1,978,759.3	القيمة المضافة

Source: (Palestinian Central Bureau of Statistics [PCBS], 2020).

**Table 2**

*Estimated Ranges Of Loads Of Selected Contaminates For Different Sectors*

Sector	Total BOD (kg/month)	Total SS (kg/month)	Total O&G (kg/month)	Total COD (kg/month)	Total P (kg/month)
Food	2366-19358	1811-21406	683-11588	4153-32496	315-2004
Chemical	5409-14645	379-2089	65-629	40345-101013	19-347
Pharma	6-147	3-47	2-8	17-172	0.1-0.6
Metal	3756-7636	1955-3159	4249-4564	20710-21713	6133-6171
Mineral	7665-10654	15165-16093	3844-4121	9695-10467	8-82
Mining	395-432	788-799	198-201	495-504	0-0.2
Oil	104-237	44-86	998-1008	210-245	0.3-1
Paper	189-1907	90-623	45-178	494-938	7-16
Rubber	131-2234	99-753	59-249	276-997	5-36
Tannery	285-4728	478-5721	80-1104	1212-8845	1.6-7
Textile	37-1022	37-387	25-99	91-345	1.4-6.6
Water	0.1-1.9	0.1-0.6	0-0.2	0.2-0.6	0
Wood	76-2418	75-787	227-391	332-1821	3-15
Sewerage	34768-34858	34768-34796	9273-34774	34773-34796	2318-34765

Sources: Applied Research Institute-Jerusalem (ARIJ, 2015). BOD: Biological Oxygen Demand, SS: Suspended Solids, O&G: Oil and Grease, COD: Chemical Oxygen Demand, P: phosphorus.

**Table 3***The Common Application Of Research Design*

Design	Best for	Also used for
<b>Survey</b>		
1. Cross-Section 2. Longitudinal	Description Description Explanation	Explanation Exploration
Literature Reviews	Exploration	Description & Explanation
<b>Unobtrusive Method</b>		
1. Cross-Section  2. Longitudinal	Description  Description Explanation	Explanation Exploration  Exploration
Experiment	Experimentation	
Field Search	Exploration	Description Explanation

Source: (Akhtar, 2016). The unobtrusive method includes collecting data without intruding into the lives of the people being studied, such as, analysis of existing statistics, historical records, or examining written documents.

**Table 4***Sample Size Recommendations In PLS-SEM For A statistical Power of 80%*

Maximum Number of Arrows Pointing at a Construct	Significance Level											
	1%				5%				10%			
	Minimum R <sup>2</sup>				Minimum R <sup>2</sup>				Minimum R <sup>2</sup>			
	0.10	0.25	0.50	0.75	0.10	0.25	0.50	0.75	0.10	0.25	0.50	0.75
2	158	75	47	38	110	52	33	26	88	41	26	21
3	176	84	53	42	124	59	38	30	100	48	30	25
4	191	91	58	46	137	65	42	33	111	53	34	27
5	205	98	62	50	147	70	45	36	120	58	37	30
6	217	103	66	53	157	75	48	39	128	62	40	32
7	228	109	69	56	166	80	51	41	136	66	42	35
8	238	114	73	59	174	84	54	44	143	69	45	37
9	247	119	76	62	181	88	57	46	150	73	47	39
10	256	123	79	64	189	91	59	48	156	76	49	41

Source: Cohen, J. A power primer. *Psychological Bulletin*, 112, 155–159.

Note: Refer to Hair et al. (2011), (P. 21).

**Table 5***Operationalisation Of Model Constructs*

Reflective constructs	Construct items	Adopted from
Green analysis and description of job position (GA)	Environmental issues are specified in the job description.	(Renwick et al., 2013)
	Job positions enable acquisition of knowledge about environmental management.	(Jabbour, 2011)
	Job positions demand knowledge about environmental management.	
Green recruitment (GR)	The recruitment message includes organizations environmental values in job advertisements.	(Siyambalapitiya et al., 2018)
	The environmental performance of a company attracts employees.	
	The company prefers to hire employees who have environmental knowledge.	(Jabbour, 2011)
Green selection (GS)	Consider environmental knowledge and organization's green requirements in the selection process.	(Siyambalapitiya et al., 2018)
	Consider candidates' environmental awareness and commitments in the selection process.	
	All selection steps consider environmental questions.	(Jabbour, 2011)
Green training (GT)	Environmental training is continuous.	
	Environmental training is a priority.	(Jabbour, 2011)
	Environmental training is an important investment.	
Green performance assessment (GPA)	Every employee has specific environmental goals to achieve.	
	Contributions to environmental management are assessed.	(Jabbour, 2011)
	Individual performance assessment results are recorded.	

Green rewards (GRE)	<p>Employees are rewarded for their suggestions in the field of environmental management.</p> <p>Cash rewards are provided to recognize environmental performance.</p> <p>Environmental performance is recognized publicly.</p>	<p>(Renwick et al., 2013)</p> <p>(Jabbour, 2011)</p>
Green product innovation (GPDI)	<p>My company uses materials that produce the least pollution.</p> <p>My company uses materials that consume less energy and resources management.</p> <p>My company uses materials to design environmentally friendly products.</p> <p>My company uses materials that are easy to recycle, reuse, and decompose.</p>	(Singh et al., 2020), (Chen et al., 2006)
Green process innovation (GPCI)	<p>The manufacturing processes of my company effectively reduce hazardous substances or waste.</p> <p>The manufacturing processes of my company effectively reduce consumption of coal, oil, electricity or water.</p> <p>The manufacturing processes of my company effectively reduce use of raw materials</p>	(Singh et al., 2020), (Chen et al., 2006)
Green managerial innovation (GMGI)	<p>My company works on adopting environmental management standards (e.g. ISO14000).</p> <p>My company works on establishing green supply chain management.</p> <p>My company works on implementing environment audit/control systems.</p>	(Zhang et al., 2020), (Chen et al., 2006)
Green marketing innovation (GMAI)	<p>My company marks green products with eco-labels.</p> <p>My company use returnable/reusable packaging.</p>	<p>(Singh et al., 2020), (Chen et al., 2006)</p> <p>(García-Granero et al., 2018)</p>



	My company uses green design packaging which makes products for example easy to clean, and easy to empty to fulfill ecological requirements.	(García-Granero et al., 2018)
	My company indicates quality certifications to the market.	(García-Granero et al., 2018)
Environmental performance (EP)	Environmental activities significantly improved the reputation of my company.	(Singh et al., 2020), (Kim et al., 2019), (Melnik et al., 2002)
	Environmental activities significantly reduced waste within the entire value chain process.	(Singh et al., 2020), (Melnik et al., 2002)
	Environmental activities significantly improved product / process quality.	(Singh et al., 2020), (Melnik et al., 2002)
	Environmental management within the company reduced purchases of non-renewable materials, chemicals, and components.	(Kim et al., 2019)
	Our company respects environmental policies in order to counteract harmful emissions from processes.	(García-Machado & Martínez-Ávila, 2019)
Economic performance (ECP)	Decrease of cost for materials purchasing.	(Zhu et al., 2008)
	Decrease of cost for energy consumption.	
	Decrease of fee for waste treatment and discharge.	(Zhu et al., 2008) , (Zaid et al., 2018)
	Average profit and profit growth.	(Zaid et al., 2018)
	Average growth in market share.	(de Giovanni, 2012), (Zaid et al., 2018)
	Decrease in fines for environmental accidents.	(Zhu et al., 2008)
Social performance (SP)	Improved relationship with the community and stakeholders.	(Hourneaux Jr et al., 2018), (Abdul-Rashid et al., 2017)
	Improved employee's health and work safety.	(Zaid et al., 2018), (Hourneaux Jr et al., 2018), (Abdul-Rashid et al., 2017), (de Giovanni, 2012)

Development of economic activities in the community and providing more job opportunities.	(de Giovanni, 2012),(Mousa & Othman, 2020)
Improvement of community health and safety.	(de Giovanni, 2012)

**Table 6**

*Experts And Arbitrators Who Review The Questioners*

Number	position
4	Teaching staff at An-Najah university
1	Teaching staff at Palestine Technical University – Kadoorie

**Table 7**

*Respondents profile summary*

No.	items	Option	Frequency	Percentage
1.	Gender	Male	42	72.4%
		Female	16	27.6%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
2.	Educational level	Diploma or less	9	15.5%
		Bachelor degree	39	67.2%
		Higher education	10	17.2%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
3.	Job experience	0-5 Years	9	15.5%
		6-10 Years	16	27.6%
		11-15 Years	14	24.1%
		More than 15 years	19	32.8%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
4.	Position	General manager/CEO	21	36.2%
		HR manager	15	25.9%
		Production manager	7	12.1%

		Quality manager	9	15.5%
		Others	6	10.3%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
5.	Organization sector	Chemical industry	10	17.2%
		Pharmaceutical industry	3	5.2%
		Food industry	32	55.2%
		Metal and Engineering industry	13	22.4%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
6.	Location	Jenin	5	8.6%
		Tulkarm	12	20.7%
		Nablus	12	20.7%
		Ramallah	10	17.2%
		Jerusalem	1	1.7%
		Hebron	12	20.7%
		Bethlehem	3	5.2%
		Qalqilya	1	1.7%
		Jericho	1	1.7%
		Tubas	1	1.7%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
7.	Employees number	1-9	10	17.2%
		10-19	7	12.1%
		20-49	15	25.9%
		50-99	15	25.9%
		100-249	8	13.8%
		250 and more	3	5.2%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
8.	Environmental management practices engagement	Currently exists	25	43.1%
		currently there are no plans to implement	9	15.5%

		Plan to implement within 12 months	3	5.2%
		Plan to implement within a period more than 12 months	1	1.7%
		There are some practices through activities without clear plan	18	31.0%
		Not sure	2	3.4%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
9.	Having formal environmental certificate such as ISO14001	Currently exists	13	22.4%
		currently there are no plans to implement	25	43.1%
		Plan to implement within 12 months	6	10.3%
		Plan to implement within a period more than 12 months	7	12.1%
		Not sure	7	12.1%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
10.	Production process role in green programs	Yes	39	67.2%
		No	13	22.4%
		Not sure	6	10.3%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>
11.	HR role in green programs	Yes	40	69.0%
		No	12	20.7%
		Not sure	6	10.3%
		<b>Total</b>	<b>58</b>	<b>100.0%</b>

**Table 8**

*Descriptive Analysis Of All Aspects Of The Questionnaire*

indicator	items	Mean	Standard deviation
GA1	Job positions enable involvement in managing environmental activities.	2.2586	0.9654

GA2	Job positions enable acquisition of knowledge about environmental management.	2.8276	1.0453
GA3	Job positions demand knowledge about environmental management.	2.5862	1.1552
GR1	The recruitment message includes organizations environmental values in job advertisement	2.0517	1.0990
GR2	The environmental performance of a company attracts employees.	2.5862	1.3250
GR3	The company prefers to hire employees who have environmental knowledge.	2.9138	1.3283
GS1	Consider environmental knowledge and organization's green requirements in the selection process	2.3103	0.9771
GS2	Consider candidates' environmental awareness and commitments in the selection process.	2.5345	1.0796
GS3	All selection steps consider environmental questions.	2.1897	1.0835
GT1	Environmental training is continuous.	2.1724	1.1261
GT2	Environmental training is a priority.	2.2586	1.0689
GT3	Environmental training is an important investment.	2.9828	1.2494
GPA1	Every employee has specific environmental goals to achieve.	2.2414	0.9424
GPA2	Contributions to environmental management are assessed.	2.2759	0.9513
GPA3	Individual performance assessment results are recorded.	2.2069	1.0884
GRE1	Employees are rewarded for their suggestions in the field of environmental management.	2.2931	1.1395
GRE2	Cash rewards are provided to recognize environmental performance.	2.2414	1.1893
GRE3	Environmental performance is recognized publicly.	2.3966	1.1985
GPD11	My company uses materials that produce least pollution.	3.5862	1.2288
GPD12	My company uses materials that consume less energy and resources management.	3.5345	1.0297

GPDI3	My company uses materials to design environment friendly products.	3.3966	1.0250
GPDI4	My company uses materials that are easy to recycle, reuse, and decompose.	3.2586	1.0852
GPCI1	The manufacturing processes of my company effectively reduce hazardous substances or waste.	3.3793	1.0230
GPCI2	The manufacturing processes of my company effectively reduce consumption of coal, oil, electricity or water.	3.0172	1.3827
GPCI3	The manufacturing processes of my company effectively reduce use of raw materials.	2.9828	1.1470
GMGI1	My company works on adopting environmental management standards (e.g. ISO14000).	2.6552	1.4333
GMGI2	My company works on establishing green supply chain management.	2.4310	1.1864
GMGI3	My company works on implementing environment audit/control systems.	2.7931	1.3476
GMAI1	My company marks green products with eco-labels.	1.7069	1.0261
GMAI2	My company use returnable/reusable Packaging.	2.1552	1.3351
GMAI3	My company has green design packaging which makes products for example easy to clean, and easy to empty to fulfill ecological requirements.	2.3793	1.1969
GMAI4	My company indicates quality certifications to the market.	2.9138	1.5704
EP1	Environmental activities significantly improved the reputation of my company.	2.9655	1.2561
EP2	Environmental activities significantly reduced waste within the entire value chain process.	3.0517	1.3035
EP3	Environmental activities significantly improved product / process quality.	2.9310	1.2685
EP4	Environmental management within the company reduced purchases of non-renewable materials, chemicals, and components.	2.6552	1.2503
EP5	Our company respects environmental policies in order to counteract harmful emissions from processes.	3.4655	1.3536

ECP1	Decrease of cost for materials purchasing.	2.4310	1.2011
ECP2	Decrease of cost for energy consumption.	2.8793	1.2151
ECP3	Decrease of fee for waste treatment and discharge.	2.7069	1.2141
ECP4	Average profit and profit growth.	2.4655	1.1427
ECP5	Average growth in market share.	2.5862	1.0602
ECP6	Decrease in fines for environmental accidents.	2.5517	1.2019
SP1	Improved relationship with the community and stakeholders.	2.9138	1.1590
SP2	Improved employee's health and work safety.	3.3103	1.1115
SP3	Development of economic activities in the community and providing more job opportunities.	2.8621	0.9814
SP4	Improvement of community health and safety.	3.2414	1.1893

**Table 9**

*Reflective Constructs Measurement Properties.*

Reflective construct	Construct items	Items loading	Composite Reliability CR	AVE
Green analysis and description of job position (GA)	GA1	0.827	0.850	0.654
	GA2	0.810		
	GA3	0.788		
Green recruitment (GR)	GR1	0.847	0.880	0.710
	GR2	0.814		
	GR3	0.865		
Green selection (GS)	GS1	0.912	0.927	0.808
	GS2	0.868		
	GS3	0.916		
Green training (GT)	GT1	0.893	0.899	0.748
	GT2	0.921		
	GT3	0.774		

Green performance assessment (GPA)	GPA1	0.838	0.898	0.746
	GPA2	0.907		
	GPA3	0.844		
Green rewards (GRE)	GRE1	0.914	0.942	0.845
	GRE2	0.924		
	GRE3	0.919		
Green product innovation (GPDI)	GPDI1	0.742	0.871	0.630
	GPDI2	0.889		
	GPDI3	0.836		
	GPDI4	0.694		
Green process innovation (GPCI)	GPCI1	0.835	0.867	0.686
	GPCI2	0.870		
	GPCI3	0.777		
Green managerial innovation (GMGI)	GMGI1	0.925	0.952	0.869
	GMGI2	0.932		
	GMGI3	0.939		
Green marketing innovation (GMAI)	GMAI1	0.685	0.865	0.617
	GMAI2	0.883		
	GMAI3	0.838		
	GMAI4	0.719		
Environmental performance (EP)	EP1	0.906	0.958	0.822
	EP2	0.950		
	EP3	0.926		
	EP4	0.910		
	EP5	0.839		
Social performance (SP)	SP1	0.891	0.940	0.798
	SP2	0.866		
	SP3	0.895		
	SP4	0.920		



Economic performance (ECP)	ECP1	0.827	0.933	0.698
	ECP2	0.807		
	ECP3	0.812		
	ECP4	0.886		
	ECP5	0.861		
	ECP6	0.817		

**Table 10**

*Cross Loadings Discriminant Validity.*

Indicat or / variable	GA	GR	GS	GT	GPA	GRE	GPDI	GPCI	GMG I	GMA I	EP	SP	ECP
GA1	<b>0.827</b>	0.590	0.574	0.357	0.569	0.459	0.336	0.205	0.406	0.386	0.540	0.522	0.536
GA2	<b>0.810</b>	0.457	0.361	0.387	0.54	0.137	0.396	0.364	0.541	0.342	0.354	0.404	0.303
GA3	<b>0.788</b>	0.451	0.373	0.283	0.439	0.155	0.383	0.395	0.337	0.450	0.367	0.349	0.348
GR1	0.572	<b>0.847</b>	0.627	0.338	0.523	0.485	0.341	0.321	0.248	0.411	0.399	0.426	0.526
GR2	0.585	<b>0.814</b>	0.526	0.444	0.531	0.234	0.296	0.236	0.355	0.315	0.405	0.571	0.390
GR3	0.445	<b>0.865</b>	0.742	0.557	0.569	0.603	0.480	0.460	0.251	0.376	0.544	0.706	0.570
GS1	0.534	0.740	<b>0.912</b>	0.566	0.584	0.578	0.441	0.396	0.270	0.504	0.594	0.588	0.675
GS2	0.419	0.638	<b>0.868</b>	0.482	0.529	0.509	0.423	0.309	0.188	0.348	0.525	0.640	0.563
GS3	0.535	0.661	<b>0.916</b>	0.514	0.563	0.558	0.479	0.379	0.201	0.459	0.616	0.604	0.678
GT1	0.348	0.496	0.530	<b>0.893</b>	0.684	0.409	0.425	0.465	0.545	0.551	0.575	0.543	0.409
GT2	0.426	0.540	0.595	<b>0.921</b>	0.626	0.476	0.379	0.478	0.430	0.567	0.575	0.502	0.379
GT3	0.323	0.325	0.353	<b>0.774</b>	0.510	0.377	0.309	0.306	0.357	0.472	0.403	0.562	0.379
GPA1	0.606	0.520	0.497	0.625	<b>0.838</b>	0.369	0.454	0.358	0.553	0.583	0.541	0.568	0.469
GPA2	0.568	0.650	0.616	0.673	<b>0.907</b>	0.490	0.506	0.522	0.543	0.590	0.649	0.640	0.597
GPA3	0.496	0.483	0.490	0.523	<b>0.844</b>	0.526	0.435	0.463	0.516	0.524	0.589	0.527	0.443
GRE1	0.207	0.430	0.471	0.363	0.443	<b>0.914</b>	0.290	0.084	0.218	0.236	0.429	0.451	0.357
GRE2	0.301	0.517	0.526	0.415	0.481	<b>0.924</b>	0.350	0.252	0.255	0.340	0.524	0.454	0.461
GRE3	0.388	0.522	0.665	0.547	0.540	<b>0.919</b>	0.473	0.282	0.338	0.466	0.645	0.653	0.534
GPDI1	0.373	0.278	0.137	0.168	0.360	0.199	<b>0.742</b>	0.497	0.379	0.225	0.361	0.492	0.364
GPDI2	0.422	0.313	0.330	0.378	0.424	0.290	<b>0.889</b>	0.674	0.413	0.249	0.508	0.573	0.488
GPDI3	0.331	0.422	0.555	0.424	0.485	0.458	<b>0.836</b>	0.685	0.283	0.384	0.549	0.603	0.489
GPDI4	0.318	0.426	0.569	0.393	0.450	0.354	<b>0.694</b>	0.522	0.109	0.326	0.461	0.413	0.519
GPCI1	0.269	0.232	0.277	0.399	0.473	0.282	0.644	<b>0.835</b>	0.356	0.445	0.434	0.375	0.376
GPCI2	0.198	0.272	0.297	0.406	0.362	0.100	0.634	<b>0.87</b>	0.208	0.344	0.378	0.391	0.361
GPCI3	0.465	0.504	0.419	0.407	0.448	0.184	0.595	<b>0.777</b>	0.453	0.479	0.516	0.503	0.474
GMGI1	0.399	0.283	0.133	0.424	0.506	0.216	0.229	0.282	<b>0.925</b>	0.544	0.421	0.432	0.277
GMGI2	0.530	0.297	0.309	0.495	0.539	0.259	0.374	0.425	<b>0.932</b>	0.538	0.525	0.468	0.393
GMGI3	0.536	0.348	0.233	0.518	0.678	0.350	0.443	0.444	<b>0.939</b>	0.581	0.516	0.525	0.408

GMAI1	0.479	0.249	0.335	0.463	0.517	0.257	0.208	0.227	0.625	<b>0.685</b>	0.360	0.356	0.326
GMAI2	0.312	0.317	0.391	0.507	0.566	0.322	0.375	0.571	0.477	<b>0.883</b>	0.535	0.486	0.514
GMAI3	0.345	0.324	0.441	0.457	0.510	0.380	0.339	0.443	0.284	<b>0.838</b>	0.516	0.404	0.537
GMAI4	0.412	0.498	0.373	0.510	0.464	0.255	0.224	0.337	0.509	<b>0.719</b>	0.499	0.518	0.408
EP1	0.474	0.508	0.609	0.489	0.634	0.591	0.513	0.471	0.519	0.612	<b>0.906</b>	0.723	0.645
EP2	0.498	0.475	0.602	0.546	0.633	0.494	0.614	0.578	0.435	0.554	<b>0.950</b>	0.738	0.621
EP3	0.519	0.493	0.610	0.596	0.636	0.539	0.536	0.489	0.469	0.599	<b>0.926</b>	0.736	0.568
EP4	0.481	0.484	0.597	0.579	0.628	0.512	0.540	0.480	0.531	0.634	<b>0.910</b>	0.716	0.703
EP5	0.439	0.484	0.499	0.539	0.588	0.536	0.492	0.424	0.429	0.353	<b>0.839</b>	0.648	0.549
SP1	0.587	0.668	0.668	0.597	0.675	0.511	0.605	0.512	0.508	0.618	0.790	<b>0.891</b>	0.745
SP2	0.351	0.540	0.566	0.541	0.546	0.549	0.557	0.374	0.375	0.347	0.626	<b>0.866</b>	0.442
SP3	0.480	0.655	0.611	0.554	0.596	0.511	0.544	0.501	0.520	0.582	0.696	<b>0.895</b>	0.654
SP4	0.473	0.550	0.566	0.490	0.571	0.484	0.656	0.436	0.410	0.430	0.681	<b>0.920</b>	0.600
ECP1	0.448	0.444	0.512	0.354	0.521	0.210	0.491	0.390	0.408	0.458	0.541	0.529	<b>0.827</b>
ECP2	0.500	0.540	0.556	0.390	0.498	0.375	0.539	0.482	0.380	0.407	0.631	0.684	<b>0.807</b>
ECP3	0.449	0.470	0.652	0.296	0.388	0.374	0.405	0.265	0.169	0.403	0.557	0.524	<b>0.812</b>
ECP4	0.433	0.577	0.700	0.487	0.531	0.535	0.490	0.456	0.314	0.592	0.582	0.591	<b>0.886</b>
ECP5	0.330	0.542	0.631	0.430	0.554	0.574	0.548	0.475	0.317	0.551	0.590	0.575	<b>0.861</b>
ECP6	0.364	0.387	0.515	0.270	0.441	0.413	0.440	0.379	0.363	0.456	0.509	0.561	<b>0.817</b>

**Table 11**

*Q<sup>2</sup> Values*

Construct	SSO	SSE	Q <sup>2</sup> (=1-SSE/SSO)
Sustainable performance	870.000	501.579	0.423
EP	290.000	103.006	0.645
ECP	348.000	172.418	0.505
SP	232.000	92.073	0.603
Green HRM practices	1,044.000	585.382	0.439
Green innovation	812.000	655.323	0.193

*Note:* SSO is the sum of squares of observations; SSE is the sum of squares of prediction errors.

**Table 12**

*Bootstrapped Confidence Interval*

Path	Path	Indirect	SE for	T-	95%	95%	Decision
P <sub>12</sub>	P <sub>23</sub>	Effect	Indirect	value	LL	UL	
			P <sub>13</sub>				

0.718	0.372	0.267	0.070	3.816	0.130	0.404	Mediation
-------	-------	-------	-------	-------	-------	-------	-----------



جامعة النجاح الوطنية

كلية الدراسات العليا

## تأثير ممارسات إدارة الموارد البشرية الخضراء على الأداء المستدام مع الابتكار الأخضر كمتغير وسيط: دراسة تجريبية

إعداد

بهاء أحمد عبد الرحمن الجعار

إشراف

د. محمد السيد

د. يحيى صالح

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في الإدارة الهندسية، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس - فلسطين.

2022

# تأثير ممارسات إدارة الموارد البشرية الخضراء على الأداء المستدام مع الابتكار الأخضر كمتغير وسيط: دراسة تجريبية

إعداد  
بهاء أحمد عبد الرحمن الجعار  
إشراف  
د. محمد السيد  
د. يحيى صالح  
الملخص

تُعد إدارة الموارد البشرية الخضراء GHRM قضية بحثية مهمة تمت دراستها في العقود الأخيرة. لذلك تبحث هذه الدراسة في كيفية تأثير ممارسات إدارة الموارد البشرية الخضراء على الأداء المستدام في ظل وجود الابتكار الأخضر كمتغير وسيط في شركات التصنيع في فلسطين. بالإضافة إلى ذلك تسعى هذه الدراسة إلى تقييم مستوى تنفيذ ممارسات إدارة الموارد البشرية الخضراء والابتكار الأخضر والأداء المستدام.

من أجل هذه الأهداف تم تطوير نموذج بحثي للربط بين متغيرات الدراسة. وتم جمع البيانات من شركات التصنيع وعبر الاستبيان كأداة للطريقة الكمية. أما بالنسبة لتحليل وتقييم البيانات تم تقييم نموذج البحث من خلال نمذجة المعادلات الهيكلية للمربعات الصغرى الجزئية PLS-SEM باستخدام برنامج Smart PLS ، من خلال 58 إجابة صالحة تم جمعها من المديرين العاملين في هذه الشركات في فلسطين عبر الاستبيان.

كشفت النتائج أن ممارسات إدارة الموارد البشرية الخضراء والابتكار الأخضر والأداء المستدام يتم تنفيذها على مستوى متوسط في شركات التصنيع. وبشكل أكثر تفصيلاً، لقد وجد أن أكثر ممارسات إدارة الموارد البشرية الخضراء تأثيراً هو التحليل الأخضر ووصف الوظيفة بينما كان تقييم الأداء الأخضر هو الممارسة الأقل تأثيراً. أما فيما يتعلق بالابتكار الأخضر ، أكدت النتائج أن ابتكار المنتجات الخضراء يليه ابتكار العمليات الخضراء كانا الأكثر تأثيراً على ممارسات الابتكار الأخضر. علاوة على ذلك ، أكدت النتائج أن ممارسات إدارة الموارد البشرية الخضراء والابتكار الأخضر لها تأثير إيجابي هام على الأداء المستدام بالإضافة إلى التأثير الهام والإيجابي لممارسات إدارة الموارد البشرية الخضراء على الابتكار الأخضر. وأكدت النتائج أيضاً أن الابتكار الأخضر يتوسط جزئياً في العلاقة بين ممارسات إدارة الموارد البشرية الخضراء والأداء المستدام.

وفقًا لذلك، تم أيضًا تطوير إطار عمل مفاهيمي والذي شكل دليلًا إرشاديًا لوضعي السياسات في شركات التصنيع حول كيفية استخدام ممارسات إدارة الموارد البشرية الخضراء في زيادة التزام الموظف بالبيئة من أجل تحسين الأداء المستدام في هذه الشركات. علاوة على ذلك، تقدم هذه الدراسة معلومات مفيدة فيما يتعلق بالابتكار الأخضر في قطاع التصنيع في فلسطين والذي يعتبر قاعدة للباحثين والمديرين في اتجاهات البحث المستقبلية، حيث كشفت الأدبيات أنه لا يعتقد وجود عمل مماثل يستكشف التأثير الوسيط للابتكار الأخضر على العلاقة بين ممارسات إدارة الموارد البشرية الخضراء والأداء المستدام في الشركات الصناعية الفلسطينية.

تساهم الدراسة أيضًا في تعميق الفهم لكل من ممارسات إدارة الموارد البشرية الخضراء والابتكار الأخضر والأداء المستدام، وتقدم أدلة تجريبية حول العلاقة بين هذه المتغيرات كما وتوصي بدراسات أخرى لتكرار هذه الدراسة مع حجم عينة أكبر يؤكد النتائج أو البحث في تأثير متغيرات أخرى على الأداء المستدام.

الكلمات المفتاحية: إدارة الموارد البشرية الخضراء، الابتكار الأخضر، الأداء المستدام، نمذجة المعادلات الهيكلية للمربعات الصغرى الجزئية، القطاع الصناعي.