

Green HRM Practices and Green Innovation: An Empirical Evidence from Pharmaceutical Industry in Pakistan

Areej Ali

PhD Scholar, Lyallpur Business School,
Government College University
Faisalabad

Hazoor Muhammad Sabir

Professor, Lyallpur Business School,
Government College University
Faisalabad

Dr. MuhmmadWaseem Bari

Assistant Professor, Lyallpur Business School,
Government College University
Faisalabad

Dr. Mohsin Bashir

Assistant Professor, Lyallpur Business School,
Government College University
Faisalabad

Abstract

Nowadays every business is focusing on development of environment as environmental problems like global warming, shortage of water, pollutions etc is increasing day by day. These problems are not only increasing outside the organization but also inside the organization. To solve these problems organizations are putting all their efforts to bring green innovation. To bring green innovation, Green human resource management practices (GHRM) are playing an important role as it is related to employees of organization. Through environmental related training and development of employees, evaluations of employees environmental task related performance and motivating employees to adopt green innovation through green reward system. The current research is about the impact of three (GHRM) practices that are Green training and development, Green Performance assessment and Green Rewards on green product and green process innovation with mediating effects of Green knowledge sharing and transfer and Green absorptive capacity. This study is descriptive explanatory and quantitative research i.e, theories are grounded and hypotheses are prepared before commencement of study. Data was gathered and analyzed in order to prove and disprove these hypotheses. The unit of analysis were employees from pharmaceutical industry of Pakistan. According to PPMA (Pakistan Pharmaceutical Manufacturing Association) , this sector has successfully contributed on development of sustainability in Pakistan so it is important to investigate the relationship of GHRM practices and green innovation in pharmaceutical industry . Structural Equation Modeling has been used for results computation.

Keywords : Green Training and Development , Green Performance assessment , Green Reward System , Green Absorptive Capacity , Green Knowledge transfer and sharing , Green Process innovation , Green Product innovation .

Introduction

The concept of environment development has become one of the major issues of various fields of the world example politics, public, or business in twenty first century. (Ahmad, 2015). Due to environmental issues like industrial pollutions , waste materials including toxic chemicals and wastage of water in various industries , Government and NGO's (Non Government Organization) have put their efforts to

reverse these issues by making and implementing Environmental based rules and regulations in different fields all around the globe. (Christmann & Taylor, 2011)

In Pakistan, main environmental issues like carbon dioxide emission, water wastage, usage and excretion of harmful chemicals which causing health issues in both outside and inside the different organization has been main focus (Alam, Fatima, & Butt, 2007.; Khan & others, 2017; Mehwish & Mustafa, 2016). Milestones which include "The Environmental and Urban Affairs Division (EUAD) later upgraded as the Federal Ministry of Environmental, Pakistan Environmental Protection Ordinance (PEPO; 1983) was revised as Environmental Protection Act (1997) and other Environmental protection agencies are working effectively for setting up environmental laboratories and National environmental based quality standards. Environmental protection agencies are putting their efforts for creating awareness through seminars and trainings in both academic and industrial level and to bring green process and product innovation in different industrial sectors of Pakistan which helps to solve all environmental issues of Pakistan and makes it an Environmental Friendly Country. (Protection, 1997)

To solve such issues different departments of an organization like Human Resource management, Marketing, Informational Technology, Finance, and so on, work together to make firm green and among them, major contribution is of the HR Department (Arulrajah, Opatha, & Nawaratne, 2015). GHRM is becoming more essential tool for the successful implementation of green strategies and Environment management (EM) practices. (D. Renwick, Redman, & Maguire, 2008; D. W. Renwick, Redman, & Maguire, 2013). Cherian & Jacob (2012) identified the importance of Green Human Resource (GHR) practices in organization in their research "A Study of Green HR Practices and its effective Implementation in the organization". In their review study it is stated that organization gains more profits and creates positive image in society through effective implementation of Green HR practices. Green training and development (GT&D): educating employees about environmental based knowledge and techniques to apply green knowledge in organization (Ren et al., 2018; Tang, Chen, Jiang, Paillé, & Jia, 2018) Green Performance assessment (GPA): evaluating employees's green performance. (Ahmad, 2015; Arulrajah et al., 2015; Gholami et al., 2016; Ren et al., 2018; D. W. Renwick et al., 2013; Tang et al., 2018) Green reward system: rewarding employees for their effective performance on environment related tasks, responsibilities. (Ren et al., 2018; Tang et al., 2018).

Innovation is a process that creates, modifies or

implements the new ideas, practices or technology. Innovation is of various types but most important type which has been under investigation of previous studies is Process and Product innovation. (K.-L. Wong, Tan, Ng, & Fong, 2013). So Green innovation is an innovation that involves creation, implementation and adoption of sustainable technology, green ideas and practices. (Hashim, Bock, & Cooper, 2015) Green innovations have played key role in sustainable development of the industries (Chen, Lai, & Wen, 2006).

This research is focusing on the impact of Green T&D, GPA and Green RS on green process and product innovation with parallel mediation of two mediators green absorptive capacity and green knowledge sharing and transfer in pharmaceutical industry of Pakistan. Different evidences from previous research works it is proven that green process and product innovation play a vital role in environmental development in globe and to bring green innovation, the department which are responsible for persuading and engaging employees and managers to implement green innovation in organization that is HRM department. GHRM practices should be in practice by organization's decision makers in order to adopt green innovation.

This study aims at providing framework that are useful for both researchers and industries who want to follow the green human resource management practices which leads to provision of green process and green product innovation. First we review the literature and support the proposed hypothesis in second section then third section consists of methodology and fourth section is about results extracted from the collected data. Last section shows the conclusion and discussion about analysis.

Literature review

Conceptual Framework and Hypothesis Development:

Green HRM Practices:

Ren et al. (2018) Defined Green human resource management as a fact that comprehends the association of firms sustainability related activities with new HR practices. It is considered as combination of EM and basic HR policies that leads to sustainability development of organization (Ren, Tang, & E. Jackson, 2018). "Green Human Resource Management (GHRM)" has opened doors in the field of research (Gholami et al., 2016) and creating framework for engaging HR practices with sustainability goals. (Jabbour & Jabbour, 2015).

Green Training and Development : Ahmad (2015) defined that Green T&D is a practice that focuses on development of employee's environmental management

related skills ,knowledge and attitude. Furthermore Ahmad (2015) describes that Green T&D activities make employees aware of different aspects and value of environment management. (Ren et al., 2018) .

Chen, Lai, & Wen (2006; 2018) had stated on their study that continues training triggers implementation of innovation as training has direct relationship with innovation .

Green Performance Assessment :Green performance assessment is a green human recourse practice in which employees are evaluated on the bases of environmental performance standards set by organization(Arulrajah et al., 2015).Through assessment of employee's performance who are following all the standards of environment friendly policies and such practices which allow them to share new ideas regarding new environment friendly trends in organization, have successfully implement the green product innovation and green process innovation in manufacturing industries (Condong, Zubir, Hashim, Lanang, &Habidin, 2013)We proposed that through environment related performance assessment of employees helps to bring

Green Rewards system : Researches like Ren, Tang, & E. Jackson (2018) had stated the there is positive relation between green reward system and green innovation . the motivation of employees gained from both monetary and non monetary like (special bonuses for new green ideas and green employee etc .) helps to persuade employees to bring new ideas for adopting both green process and green product innovations . With proper green reward management motivates workforce to adopt green innovation in organizations.

Green knowledge sharing and transfer;

It is a need for an Environmental Management System (EMS) that organizations should make their workforces to implement the transformational process of both internal and external eco knowledge so that they can acquire eco innovative capabilities.(Wu, Cheng, & Huang, 2010). Green manufacturing firms can help their partners in developing EM capabilities by provision of Eco training programs and spreading green knowledge . these kind of knowledge sharing involves all the activities of transferring or circulating of Environmental knowledge in order to gain green innovation.(Cheng, Yeh, &Tu, 2008)

Green absorptive capacity

Green Absorptive capacity is a capacity of an organization of recognizing, understanding, linking and applying the green knowledge that are gain from various resources . Absorptive Capacity theory states that organization can

successfully implement the change or modifies the system if it has maximum absorptive capacity .(Chen et al., 2015)

Different studies shows that absorptive capacity plays key role in enhancing the green innovative activities .through the ability to identify and understand the obtained knowledge which gathered from different resources like trainings , communication between employees , sharing experiences etc. firms can easily install new technology and make new products(Chen et al., 2015). So researcher purposed that green absorptive capacity creates a bridge between Green HRM practices and green innovation.

Green innovation

Chiou, Chan, Lettice, & Chung (2011) defined GI as an innovation that is relevant to creation or modification of environmental products and process through new innovative technology like energy saving, waste materials recycling , eliminating toxins and EM.Green technologies are beneficial for organizations in two ways :first it creates positive image in society and industry through sustainable products, and second it maximize the profits and saves money which results in achieving competitive advantage .(Albort-Morant, Leal-Millán, &Cepeda-Carrión, 2016).

Today, firms have lots of specific knowledge that is available at any time when it is need. This knowledge can be applied to aid firms to involve in innovative activities such as green innovation. Moreover, green innovation needs environmental knowledge to be spreaded and converted within the company (Albort-Morant et al., 2016; Hashim et al., 2015) . According to pervious literature the role of Human resource management with environmental policies is crucial for implementation and adoption of green innovation . Green innovation is divided into parts Green process innovation and Green product/service innovation :

Green Process innovation:

Alreshidi (2016) defined green process innovation as an improvement and modification of existing production processes to decrease environmental pollutions . Green Process innovation (GPSI) can help manufacturing industries by not only improving their environmental compliance but also providing different advantages and even improving their financial performance (Xie, Huo, Qi, & Zhu, 2016). Pharmaceutical Industry has successfully adopt green process innovation of sustainable drug manufacturing for the benefit of society and business (de Marco et al., 2018; Mountford, 2010; Roschangar et al., 2017)

Green Product Innovation :

Dangelico (2016) defined Green products are the products designed from less resources, avoiding waste, recycling, and anti-toxin raw materials that reduces the risk of the environmental damage in a society. Green products that are made to solve environmental issues have successfully gain more customers who considered high quality and reasonable price environmental friendly products. (Chen et al., 2015) Manufacturing green products is becoming a main focus of various business organizations (Dangelico, Pujari, & Pontrandolfo, 2017)

Direct relationship of Green Human Resource Management Practices and Green innovation:

One of the Key roles of GHRM is to achieving environmental goals through creation and development of sustainability management skills in employees, motivate them by green rewards, formulate a value system and initiate the environment that creates trust among people that helps to reduces resistance towards change. In result this will provide sustainable organizational practices that will be beneficial for organization and its employees. (Pandey, Viswanathan, & Kamboj, 2016)

So Green human resource management practices are main reason behind adopting and creating green innovative products/services and processes. Practices like green training and development, green performance assessment and green rewards have some effect on green innovation. Through sustainability related knowledge gain from proper sustainability training and development continues assessment of performance of green employees and motivation gain from special environmental reward system which enables green employees to use their creativity and ability can enhance green innovation in organizations like pharmaceuticals and all other manufacturing industries.

H1; Green Human resource management practices have some effect on Green Process innovation

H2; Green Human resource management practices have some effect on Green Product innovation

Role of Green knowledge sharing and transfer as mediator:

Green knowledge sharing and transfer is an asset of green firm manufacturing and green supply management. Circulation of environmental knowledge within organizations helped them to develop new EM capabilities (Albort-Morant et al., 2016; Cheng et al., 2008). Knowledge sharing drives organization towards high innovation performance (Hurmelinna-Laukkanen, 2011). Previous researches showed that sharing knowledge with

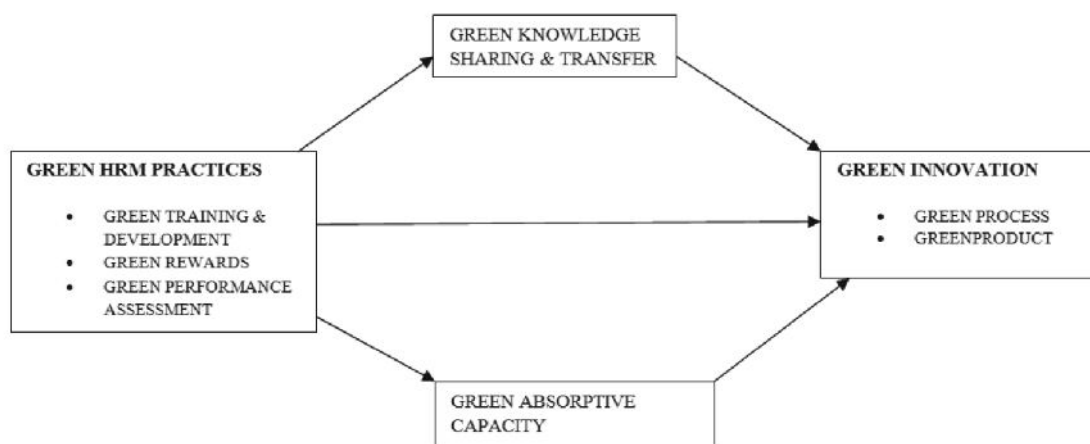
others creates a light environment which helps to adopt innovations. (Solér, Bergström, & Shanahan, 2010; Wolf, 2013). A firm which have maximum ability in knowledge spreading has a maximum capacity in modifying and sustaining both product and process innovation performances (Kama\csak & Bulutlar, 2010). From previous studies it is revealed the importance of knowledge sharing in an organization which converting from conventional to green organization. According to hypothesis there is a mediating effect of green knowledge sharing and transfer on green human resource management practices and green innovation.

H3; Green knowledge sharing and transfer have mediating effect between Green Human Resource management practices and Green Product innovation.

Role of Green absorptive capacity as a mediator of Green human resource management practices and green innovation:

Absorptive capacity plays key role in driving the organization's intention towards adoption of green innovation. (Hashim et al., 2015) According to researchers organizations with maximum environmental absorptive capacity have successfully enhanced their innovative performances which has resulted in achievement of sustainability goals (Albort-Morant, Leal-Rodríguez, & De Marchi, 2018). So according to proposed hypothesis, it is expected that Green absorptive capacity mediates the relationship of Green Human resource management practices and Green innovation.

H4: Green Absorptive Capacity mediates the effect of green human resource management practices and green process innovation.



Conceptual model

Methodology:

Before conducting the survey, we did pilot test by conducting Semi-structural Interviews from executives for example plant managers etc, quality assurance managers, human resource managers, training and development department for assurance of green human resource management practices and green innovation then Interviews were conducted on employees and labor to make sure that how much absorptive capacity they have and to what extent green human resource management practice have been implemented on them to adopt green innovation on them. In interviews questionnaires were asked from employees and managers which helped us to set direction for survey and feasibility of our research work.

Data for this study was collected from pharmaceutical industry of different cities of Pakistan especially in Lahore and Karachi because Lahore and Karachi have large number of pharmaceutical companies and labs. Questions were asked from all employees and managers from production department, Quality assurance department, administrative departments and HR departments which result in decrease of biasness of sampling. Total 600 Questionnaires was distributed in different departments like Production department, Quality assurance department, training and development and human resource department etc and 546 were collected and 64 were not responded. The questionnaire of 50 items has divided into four sections. First section shows the role of green human resource management practices: 1. GT&D 2. GPA and 3. GRS that are 27 items (Tang et al., 2018; Zibarras&Coan, 2015). Second section of 5 items (Wu et al., 2010) contained questions of GKS&T and Third section of 5 items (Chen et al., 2015) have questions of GAC. Last

section of 13 items (Chen et al., 2015) & (Chen & Chang, 2013) contained questions of GPTI and GPSI. Arulrajah, Opatha, & Nawaratne's and Tang, Chen, Jiang, Paillé, & Jia's GT&D dimension consists of 11 items was measured using a five point scale and its Cronbach's alpha was 0.924

Zibarras&Coan's and Tang, Chen, Jiang, Paillé, & Jia's dimension "Green Reward system" consists of 8 items will be measured by using 5 point likert scale which Cronbach's alpha was 0.890 and 5 items by using 5 point likert scale was used for measurement of green performance assessment (D. Renwick et al., 2008; Tang et al., 2018) & (Ren, Tang, & Jackson, 2018) and Green Performance Assessment's Cronbach's alpha was 0.839. As mediating variable 5 items were used to measure green knowledge sharing & transfer (Wu et al., 2010) and Cronbach's alpha of Green Knowledge sharing and Transfer was 0.808. To measure green absorptive capacity, likert scale of 7 items was used (Chen et al., 2015) and Cronbach's alpha of Green Absorptive Capacity was 0.819.

9 items were used to measure Green product innovation (Chen et al., 2015) on other hand 4 items were used for the measurement of Green Process innovation (Chen & Chang, 2013) in which Cronbach's alpha of Green Product innovation is 0.898 and Green Process innovation is 0.844

Results :

Smart PLS 3.0 was used to analyze the collected data. we used pls path modeling, a variance-based structural equation modeling (SEM) method to test the research model and hypothesis. we used structural equation modeling because it helps us to specify different relationships between variables in the model. (Albort-

Morant, Henseler, Cepeda-Carrión, & Leal-Rodríguez, 2018; Joseph F Hair ,2017)in which have interpreted the model fit and outer loadings with construct reliability which includes Composite Reliability, rho_A and validity comprises Cronbach's Alpha (CA) and Average Variance Extracted (AVE)

Table 3 describes discriminant validity which shows that all constructs are different from each other. this validity has

taken under two criterions: Fornell-Larcker Criterion in which the constructs are discriminately valid if off diagonal values are less then diagonal values in the corresponding rows and columns (Albert-Morant, Henseler, et al., 2018) and if constructs values are below 0.85, it means it have satisfied the Heterotrait–Monotrait (HTMT) ratio criterion, (Joseph F Hair ,2017) .Table 4 and 5 demonstrates the verification of hypothesis of direct and indirect relationships .

Table 1: Model_Fit

Fit Summary

| | Saturated Model | Estimated Model |
|-------------------|-----------------|-----------------|
| SRMR | 0.068 | 0.074 |
| d_ ULS | 5.164 | 6.177 |
| d_ G | 2.339 | 2.468 |
| Chi-Square | 5,595.196 | 5,726.004 |
| NFI | 0.657 | 0.649 |

SRMR (Standardized Root Mean Square) of saturated model is 0.068 and estimated model 0.074, d_ ULS of saturated model is 5.164 and estimated model is 6.177 and d_ G is 2.339 of saturated model and 2.468 . table also

shows chi –square of both saturated and estimated model which is 5,595.196 and 5,726.004 and NFI is 0.657 and 0.649 . rms theta of a model is 0.125 .

Table 2: Outer loadings, construct reliability and convergent validity

Measurement model: loadings, construct reliability and convergent validity

| Constructs /indicators | Outer loadings : | rho_A | Cronbach's Alpha | Composite Reliability | Average Variance Extracted (AVE) |
|------------------------|------------------|-------|------------------|-----------------------|----------------------------------|
| GAC: | | 0.819 | 0.819 | 0.875 | 0.584 |
| GAC1 | 0.748 | | | | |
| GAC2 | 0.844 | | | | |
| GAC3 | 0.651 | | | | |
| GAC4 | 0.760 | | | | |
| GAC5 | 0.804 | | | | |
| GKS&T: | | 0.825 | 0.808 | 0.865 | 0.563 |
| GKS&T1 | 0.742 | | | | |
| GKS&T2 | 0.826 | | | | |
| GKS&T3 | 0.803 | | | | |
| GKS&T4 | 0.673 | | | | |
| GKS&T5 | 0.696 | | | | |
| GPA: | | 0.853 | 0.839 | 0.882 | 0.558 |
| GPA1 | 0.652 | | | | |
| GPA2 | 0.786 | | | | |
| GPA3 | 0.843 | | | | |
| GPA4 | 0.785 | | | | |
| GPA5 | 0.709 | | | | |
| GPA6 | 0.688 | | | | |
| GPSI: | | 0.845 | 0.844 | 0.895 | 0.682 |
| GPSI1 | 0.797 | | | | |
| GPSI2 | 0.826 | | | | |
| GPSI3 | 0.857 | | | | |
| GPSI4 | 0.822 | | | | |

| | | | | | |
|-------------------|-------|-------|-------|-------|-------|
| GPTI: | | 0.902 | 0.898 | 0.917 | 0.552 |
| GPTI1 | 0.764 | | | | |
| GPTI2 | 0.784 | | | | |
| GPTI3 | 0.765 | | | | |
| GPTI4 | 0.701 | | | | |
| GPTI5 | 0.714 | | | | |
| GPTI6 | 0.831 | | | | |
| GPTI7 | 0.756 | | | | |
| GPTI8 | 0.714 | | | | |
| GPTI9 | 0.650 | | | | |
| GRS: | | 0.891 | 0.890 | 0.913 | 0.567 |
| GRS1 | 0.747 | | | | |
| GRS2 | 0.766 | | | | |
| GRS3 | 0.746 | | | | |
| GRS4 | 0.805 | | | | |
| GRS5 | 0.811 | | | | |
| GRS6 | 0.725 | | | | |
| GRS7 | 0.731 | | | | |
| GRS8 | 0.686 | | | | |
| GT&D: | | 0.925 | 0.924 | 0.936 | 0.594 |
| GT&D1 | 0.782 | | | | |
| GT&D2 | 0.783 | | | | |
| GT&D3 | 0.779 | | | | |
| GT&D4 | 0.794 | | | | |
| GT&D5 | 0.740 | | | | |
| GT&D6 | 0.782 | | | | |
| GT&D7 | 0.733 | | | | |
| GT&D8 | 0.816 | | | | |
| GT&D9 | 0.774 | | | | |
| GT&D10 | 0.720 | | | | |

The results in Table 2 shows that GT&D is the most reliable construct in the model as it's all outer loading are more than 0.708 and Cronbach's bach alpha is 0.924 ,rho_A is 0.925 and Composite reliability is 0.936 and AVE is 0.594.

Table 3 : Discriminant Validity

| Discriminant Validity | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|
| Fornell-Larcker Criterion | | | | | | | |
| | GAC | GKS&T | GPA | GPSI | GPTI | GRS | GT&D |
| GAC | 0.764 | | | | | | |
| GKS&T | 0.743 | 0.750 | | | | | |
| GPA | 0.556 | 0.565 | 0.747 | | | | |
| GPSI | 0.551 | 0.507 | 0.493 | 0.826 | | | |
| GPTI | 0.551 | 0.513 | 0.538 | 0.476 | 0.743 | | |
| GRS | 0.534 | 0.610 | 0.573 | 0.452 | 0.637 | 0.753 | |
| GT&D | 0.613 | 0.601 | 0.498 | 0.495 | 0.498 | 0.675 | 0.771 |
| Heterotrait-Monotrait Ratio (HTMT) | | | | | | | |
| | GAC | GKS&T | GPA | GPSI | GPTI | GRS | GT&D |
| GAC | | | | | | | |
| GKS&T | 0.850 | | | | | | |
| GPA | 0.661 | 0.664 | | | | | |
| GPSI | 0.660 | 0.604 | 0.579 | | | | |
| GPTI | 0.640 | 0.583 | 0.615 | 0.551 | | | |
| GRS | 0.622 | 0.709 | 0.658 | 0.522 | 0.708 | | |
| GT&D | 0.702 | 0.679 | 0.558 | 0.561 | 0.543 | 0.744 | |
| NOTE: GAC =Green Absorptive Capacity , GKS&T= Green Knowledge Sharing and Transfer, GPA= Green Performance Assessment , GPSI= Green Process Innovation , GPTI=Green Product Innovation , GRS= Green Reward System and GT&D=Green Training & Development | | | | | | | |

Tables show that all the diagonal values of variables are greater than off diagonal values in Fornell-Larcker Criterion and all are below 0.85 in Heterotrait-Monotrait

Ratio (HTMT) that means that our variables are discriminately valid.

TABLE 4: HYPOTHESES VERIFICATION (DIRECT RELATIONSHIP)

| Structural paths | Path coefficient (t-value) | Effect size (f2) | Confidence interval (95%) | (p-value) 0.05% | Results |
|------------------|----------------------------|------------------|---------------------------|-----------------|-----------------|
| GPA-> GPSI | 0.208 (3.486) | 0.041 | | 0.000 | Accepted(H1-a) |
| GPA-> GPTI | 0.214 (4.261) | 0.050 | (0.110-0.311) | 0.000 | Accepted (H2-a) |
| GRS-> GPSI | 0.060 (1.055) | 0.003 | (-0.058-0.165) | 0.291 | Rejected (H1-b) |
| GRS-> GPTI | 0.418 (6.539) | 0.143 | (0.292-0.543) | 0.000 | Accepted (H2-b) |
| GT&D-> GPSI | 0.166 (2.278) | 0.020 | (0.020-0.301) | 0.023 | Accepted (H1-c) |
| GT&D-> GPTI | 0.042 (0.629) | 0.002 | (-0.087-0.173) | 0.530 | Rejected (H2-c) |

Table 3 shows that there are direct relationship between GPA and GPSI, GPA and GPTI, GRS and GPTI and GT&D

and GPSI Because their structural paths p values are significant.

TABLE 4: HYPOTHESES VERIFICATION (INDIRECT RELATIONSHIP)

| Structural paths | Direct effect (t-value) | Indirect effect (t-value) | Total effect (t-value) | VAF (%) | Interpretation | Results |
|---------------------|-------------------------|---------------------------|------------------------|---------|-------------------|-----------------|
| GPA-> GAC-> GPSI | 0.208 (3.486) | 0.092 (3.037) | 0.300 (5.781) | 30.7% | Partial mediation | Accepted (H3-a) |
| GPA-> GKS&T-> GPTI | 0.214 (4.261) | 0.031 (1.810) | 0.244 (4.953) | 12.7% | No mediation | Rejected (H4-a) |
| GRS-> GAC-> GPSI | 0.060 (1.055) | 0.026 (1.381) | 0.086 (1.511) | 30.2% | Partial mediation | Accepted (H3-b) |
| GRS-> GKS&T-> GPTI | 0.418 (6.539) | 0.029 (1.861) | 0.447 (7.246) | 6.5% | No mediation | Rejected (H4-b) |
| GT&D-> GAC-> GPSI | 0.166 (2.278) | 0.121 (3.244) | 0.287 (4.920) | 42% | Partial mediation | Accepted (H3-c) |
| GT&D-> GKS&T-> GPTI | 0.042 (0.629) | 0.033 (2.053) | 0.075 (1.165) | 44% | Partial mediation | Accepted (H4-c) |

Table 4 illustrates the mediation (indirect relationship) of two mediators GAC and GKS&T with three Green HRM practices and GPTI And GPSI where GAC mediating all three practices (GPA, GRS and GT&D) with GPSI partially. on the other hand GKS&T is mediating only the relationship of GT&D and GPTI because their VAF values

are more than 30% which show the existence of mediating effect.

Discussions and Conclusion :

GPTI is now main consideration for decision makers of manufacturing companies(Dangelico, Pujari, &

Pontrandolfo, 2017) and have major contribution in environmental development in different countries . Today, pharmaceutical companies are putting their efforts in making green medical drugs to reduce toxins and waste (Roschangar et al., 2017). GPSI has a positive impact in our industry and society .throughGPSI, we can solve all the environmental issues like release of toxins chemicals, conserve energy and materials , noise pollution inside the organization (Xie, Huo, Qi, & Zhu, 2016).

Green Training and development(GT&D) enables organization to adopt green innovation (Antonioli, Mancinelli, & Mazzanti, 2013)because green trainings creates awareness to both employees and management create skills to adopt and create environmental based innovative ideas (Jabbar & Abid, 2014) . Green Performance assessment (GPA) helps employees to enhance their environment related performance and motivates employees to adopt green innovation (Gholami, Rezaei, Saman, Sharif, & Zakuan, 2016; Jabbour, 2011). Employees are highly motivated to working on promoting green innovation if they are rewarded on bases of effective environmental related performance especially on GI related projects (Jackson, 2017; Tang, Chen, Jiang, & Jia, 2018). Green knowledge sharing and transfer(GKS&T) process in organization mediates the relationship GHRM practices and GI because previous researches showed that GKS&T has a positive impact on GI (Hashim, Bock, & Cooper, 2015; Tang et al., 2018; Zibarras & Coan, 2015).Green absorptive capacity(GAC) of an organization reduces the resistance towards GI and enhance the implementation of sustainable innovation because GAC has a positive relationship with GI (Albort-Morant, Henseler, et al., 2018).

For data collection we had selected pharmaceutical companies of Pakistan because of their major contribution in sustainability development while maintaining green process innovation through their green technology which helps to reduce wastage and environmental pollution and providing green medicines and drugs (<https://www.ppma.org.pk/>) .for analysis , we used Smart PLS 3 version which accurately give us analysis on estimation of path models with latent variables , goodness of model fit , discriminate validity etc .

Results shows that our research model is fitted well as it has fulfilled the requirements of model fit . All the constructs are valid and reliable as their Cronbach's Alpha are around 0.9 especially Green Training and development because all it's outer loading are significant and more than 0.7. Some of the outer loadings of other constructs are below than 0.7 but Accepted because their Cronbach's alphas are significant (Joseph F Hair ,2017). Our research

model , results depicts that Green Absorptive Capacity has partial mediation effect on Green Training and Development , Green Performance Assessment and Green Reward System with Green Process Innovation which has proved our hypothesis that Green Absorptive Capacity mediates the relationship of Green Human Resource management practices with green process innovation while on the other side Green knowledge Sharing and transfer mediates only the relationship of Green Training and development with Green Product innovation but no mediating effect on relationship of two other Green Human Resource management practices with green product innovation but green knowledge Sharing and transfer has a stronger mediation then Green Absorptive Capacity because its VAF percentage is 44% while maximum VAF percentage of Green Absorptive Capacity is 42% . these results depicts that through existences of Green absorptive capacity in an organization enables employees to bring green process innovation through application of Green Training and Development , Green Reward system and Green Performance Assessment practices and Green Training and Development contributes in adoption of green product innovation through green knowledge sharing and transfer . Among three Green Human Resource Management Practice, Green Training and Development practices have major contribution in development of green innovation in pharmaceutical companies more over Green Training and development have positive relationship with our two mediators .

To encapsulate the study , researcher has suggested that all researcher who seeks to study the relationship of Green Human Resource management practice with green innovation , with green absorptive capacity and green knowledge sharing and transfer must generalize and enhance the study with the help this research . For decision makers of pharmaceutical companies , it is suggested that they should increase their efforts to implement all the Green Human Resource Management practices , if they want to bring sustainability in the organization and society more over they should work on maximizing the absorptive capacity of employees and managers and persuade them to share and transfer knowledge which they gain from the Green Human Resource management practices.

Reference

- Ahmad, S. (2015). Green human resource management: Policies and practices. *Cogent Business & Management*, 2(1), 1030817.
- Alam, S., Fatima, A. & Butt, M. S. (2007). Sustainable development in Pakistan in the context of energy consumption demand and environmental

- degradation. *Journal of Asian Economics*, 18(5), 825–837.
- Albort-Morant, G., Leal-Millán, A. & Cepeda-Carrión, G. (2016). The antecedents of green innovation performance: A model of learning and capabilities. *Journal of Business Research*, 69(11), 4912–4917.
- Albort-Morant, G., Leal-Rodríguez, A. L. & De Marchi, V. (2018). Absorptive capacity and relationship learning mechanisms as complementary drivers of green innovation performance. *Journal of Knowledge Management*, 22(2), 432–452.
- Alreshidi, B. A. (2016). Toward sustainability in manufacturing: linking green training and green supplier development for sustainable business advantages.
- Arulrajah, A. A., Opatha, H. & Nawaratne, N. (2015). Green human resource management practices: A review. *Sri Lankan Journal of Human Resource Management*, 5(1).
- Blum-Kusterer, M. & Hussain, S. S. (2001). Innovation and corporate sustainability: An investigation into the process of change in the pharmaceuticals industry. *Business Strategy and the Environment*, 10(5), 300–316.
- Chen, Y.-S. & Chang, K.-C. (2013). The nonlinear effect of green innovation on the corporate competitive advantage. *Quality & Quantity*, 47(1), 271–286.
- 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.
- Chen, Y.-S., Lin, Y.-H., Lin, C.-Y. & Chang, C.-W. (2015). Enhancing green absorptive capacity, green dynamic capacities and green service innovation to improve firm performance: An analysis of structural equation modeling (SEM). *Sustainability*, 7(11), 15674–15692.
- Cheng, J.-H., Yeh, C.-H. & Tu, C.-W. (2008). Trust and knowledge sharing in green supply chains. *Supply Chain Management: An International Journal*, 13(4), 283–295.
- Cherian, J. P. & Jacob, J. (2012). A study of green HR practices and its effective implementation in the organization: A review. *International Journal of Business and Management*, 7(21), 25.
- Chiou, T.-Y., Chan, H. K., Lettice, F. & Chung, S. H. (2011). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), 822–836.
- Christmann, P. & Taylor, G. (2002). Globalization and the environment: Strategies for international voluntary environmental initiatives. *Academy of Management Executive*, 16(3), 121–135.
- Dangelico, R. M., Pujari, D., & Pontrandolfo, P. (2017). Green Product Innovation in Manufacturing Firms: A Sustainability-Oriented Dynamic Capability Perspective. *Business Strategy and the Environment*, 26(4), 490–506. <https://doi.org/10.1002/bse.1932>
- Cohen, J., McCabe, L., Michelli, N. M. & Pickeral, T. (2009). School climate: Research, policy, practice, and teacher education. *Teachers College Record*, 111(1), 180–213.
- Dostie, B. (2018). The Impact of Training on Innovation. *ILR Review*, 71(1), 64–87.
- Fornell, C., & Larcker, D. F. (1981). Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics. *Journal of Marketing Research*, 18(3), 382–388. <https://doi.org/10.1177/002224378101800313>
- Henseler, J. (2017). Bridging Design and Behavioral Research With Variance-Based Structural Equation Modeling. *Journal of Advertising*, 46(1), 178–192. <https://doi.org/10.1080/00913367.2017.1281780>
- Hashim, R., Bock, A. & Cooper, S. (2015). The relationship between absorptive capacity and green innovation. *World Acad. Sci. Eng. Technol*, 9, 1040–1047.
- Hurmelinna-Laukkanen, P. (2011). Enabling collaborative innovation-knowledge protection for knowledge sharing. *European Journal of Innovation Management*, 14(3), 303–321.
- Jabbar, M. H. & Abid, M. (2014). GHRM: Motivating Employees towards Organizational Environmental Performance. *Magnt. Res. Rep.*, 2, 267–278.
- Jabbour, C. J. C. & de Sousa Jabbour, A. B. L. (2016). Green human resource management and green

- supply chain management: Linking two emerging agendas. *Journal of Cleaner Production*, 112, 1824–1833.
- Jackson, S. E. & Seo, J. (2010). The greening of strategic HRM scholarship. *Organization Management Journal*, 7(4), 278–290.
- Hair, Joe & Hult, Tomas & Ringle, Christian & Sarstedt, Marko. (2016). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd edition.
- Kama\csak, R. & Bulutlar, F. (2010). The influence of knowledge sharing on innovation. *European Business Review*, 22(3), 306–317.
- Khan, M. & others. (2017). The Health Burden of Dust Pollution in the Textile Industry of Faisalabad, Pakistan.
- Kostopoulos, K., Papalexandris, A., Papachroni, M. & Ioannou, G. (2011). Absorptive capacity, innovation, and financial performance. *Journal of Business Research*, 64(12), 1335–1343.
- Mehwish, N. & Mustafa, U. (2016). Impact of Dust Pollution on Worker's Health in Textile Industry: A Case Study of Faisalabad, Pakistan
- Muller-Carmem, M., Jackson, S., Jabbour, C. J. & Renwick, D. (2010). Green human resource management. *Zeitschrift Für Personalforschung*, 24(1), 95–96.
- Nunnally, J.C. and Bernstein, I.H. (1994) *The Assessment of Reliability. Psychometric Theory*, 3, 248–292.
- Pandey, S., Viswanathan, V. & Kamboj, P. (2016). Sustainable green HRM-importance and factors affecting successful implementation in organizations. *International Journal of Research in Management and Business*, 2(3), 11–29.
- Ren, S., Tang, G. & Jackson, S. E. (2018). Green human resource management research in emergence: A review and future directions. *Asia Pacific Journal of Management*, 35(3), 769–803.
- Renwick, D., Redman, T. & Maguire, S. (2008). *Green HRM: A review, process model, and research agenda*. University of Sheffield Management School Discussion Paper, 1, 1–46.
- Renwick, D. W., Redman, T. & Maguire, S. (2013). Green human resource management: A review and research agenda. *International Journal of Management Reviews*, 15(1), 1–14.
- Roschangar, F., Colberg, J., Dunn, P. J., Gallou, F., Hayler, J. D., Koenig, S. G., ... others. (2017). A deeper shade of green: inspiring sustainable drug manufacturing. *Green Chemistry*, 19(1), 281–285.
- Schiederig, T., Tietze, F. & Herstatt, C. (2012). Green innovation in technology and innovation management-an exploratory literature review. *R&D Management*, 42(2), 180–192.
- Shrivastava, P. & Berger, S. (2010). Sustainability principles: A review and directions. *Organization Management Journal*, 7(4), 246–261.
- Solér, C., Bergström, K. & Shanahan, H. (2010). Green supply chains and the missing link between environmental information and practice. *Business Strategy and the Environment*, 19(1), 14–25.
- 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.
- Wolf, J. (2013). Improving the sustainable development of firms: the role of employees. *Business Strategy and the Environment*, 22(2), 92–108.
- Wong, K.-L., Tan, P. S.-H., Ng, Y.-K. & Fong, C.-Y. (2013). The role of HRM in enhancing organizational performance. *Human Resource Management Research*, 3(1), 11–15.
- Wong, S. K. S. (2013). Environmental requirements, knowledge sharing and green innovation: Empirical evidence from the electronics industry in China. *Business Strategy and the Environment*, 22(5), 321–338.
- Wu, G.-C., Cheng, Y.-H. & Huang, S.-Y. (2010). The study of knowledge transfer and green management performance in green supply chain management. *African Journal of Business Management*, 4(1), 044–048.
- Xie, X., Huo, J., Qi, G. & Zhu, K. X. (2016). Green process innovation and financial performance in emerging economies: Moderating effects of absorptive capacity and green subsidies. *IEEE Transactions on Engineering Management*, 63(1), 101–112.
- Zibarras, L. D. & Coan, P. (2015). HRM practices used to promote pro-environmental behavior: a UK survey. *The International Journal of Human Resource Management*, 26(16), 2121–2142.