

**THE IMPACT OF ORGANIZATIONAL
IMPROVISATION ON SUSTAINABLE PERFORMANCE:
THE MEDIATING ROLE OF KNOWLEDGE WORKER
PRODUCTIVITY AND RESOURCE CONSTRAINT AS A
MODERATOR**



AUTHOR NAME: SYEDA NIDA ALI

BATCH NUMBER: MS HR 19

A thesis submitted to NUST Business School for the degree of Master of Science in Human Resource
Management

2023

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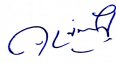
SUPERVISOR: DR. ADEEL TARIQ

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Management

2023

THESIS ACCEPTANCE CERTIFICATE

It is Certified that final copy of MSHRM thesis written by **Ms Syeda Nida Ali** Registration No. **320078** of **2019** has been vetted by undersigned, found complete in all aspects as per NUST Statutes/Regulations/MS Policy, is free of plagiarism, errors, and mistakes and is accepted as fulfilment for award of MS degree. It is further certified that necessary amendments as pointed out by GEC members and foreign/local evaluators of the scholar have also been incorporated in the said thesis.

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DECLARATION

I hereby state that no portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this or any other University or other institute of learning.

Student's Name Syeda Nida Ali

Signature _____

Date 10-5-2023

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Title - The impact of Organizational Improvisation on Sustainable Performance: The mediating role of Knowledge Worker Productivity and Resource Constraint as a moderator

Abstract

The purpose of this thesis is to investigate the relation between organizational improvisation and sustainable performance. This study contributes to the literature by not just discovering the direct impact of improvisation on sustainable performance but the extent to which knowledge worker productivity mediates this relation. As resources are the backbone in the organizational working and goal attainment, so we have also analyzed the role of resource constraint as a moderator in our research. Deductive approach is used where questionnaires were designed and got filled from the employees working in the IT sector of Pakistan. Hypothesis were tested using Structural equation modelling (SEM). The research study proves that knowledge worker productivity mediates the relation between organizational improvisation and sustainable performance. It also demonstrates that resource constraint has a significant impact on knowledge worker productivity, however it does not moderate the relation between organizational improvisation and knowledge worker productivity.

Keywords: Organization Improvisation, Sustainable Performance, Knowledge Worker Productivity, Resource Constraint

Chapter 1: Introduction

1. Background of research

In the present era where everything is changing at a rapid pace, the achievement of sustainable performance has become a hard nut to crack. However, by adapting to the changing needs and requisite, one can attain sustainability. This idea directs us to the phenomenon of improvisation. To meet the changing demand and increase the work efficiency to compete with the established firms, organizational improvisation is considered an asset for new businesses (Baker et al., 2003). According to the study of Hmieleski & Corbett (2006), improvisation is a hit and trail method which is very different from the conventional ways of performing tasks. It requires individuals to work not just by keeping in view all the opportunities, strengths, risks and weaknesses but also bring about required changes. Although, relatively a new field, organizational improvisation has managed to grab attention of many researchers and scholars discovering new ways of performing tasks.

In today's world, sustainability is an important aspect to bring success in organizations. So there lies a social responsibility on firms to contribute to establish sustainability (Voegtlin & Scherer, 2017). Globally, various businesses are attaining sustainability by ensuring the financial success, social stability, and preservation of environment (Epstein et al., 2015). These firms maintain a balance and do not compromise on their future resources (Baumgartner, 2014). According to Voegtylin and Scherer (2017), the main aim of sustainability still appears to be unclear, however businesses show eminent interest in publishing sustainability reports (Baumgartner & Ebner, 2010). Therefore, researchers have put forth some theoretical studies regarding sustainability (Amini & Bienstock, 2014; Bansal, 2005; Lozano, 2015, 2015; Perez-Batres et al., 2010). Furthermore, the work of Chow & Chen (2012) and Engida et al., (2018) have also pointed out the indicators to measure sustainability. According to Walker & Jones (2012), organizations should not only just focus on their economic or financial performance but simultaneously work on social and environmental performance. Sustainability is achieved if all three constructs are met (Carter & Rogers, 2008). However, environmental, and social performance makes

sustainability harder to achieve (Wolf, 2011). According to Popescu, (2019), there is a need to establish a new economic growth model that also highlight social and environmental responsibility to attain sustainability. In the current research, we aim to study the impact of Organizational improvisation on Sustainable Performance.

In this era of 21st century, most of the sectors are driven by digitalization and knowledge workers. There's a need to increase knowledge worker productivity so the intellectual tasks can be carried out efficiently and sustainability can be achieved (Drucker, 1999; Giotopoulos et al., 2017; Iazzolino et al., 2017; Palvalin, 2017; Palvalin et al., 2017; Turriago-Hoyos et al., 2016). Drucker's knowledge worker productivity theory (1999), points out 6 determinants of knowledge worker productivity that says that knowledge workers should have clear idea of the task, should have an autonomy, innovate continuously, should focus on both quality and quantity of work, should learn on continuous bases and should be treated as intellectual asset. These elements of knowledge worker productivity shows that knowledge worker productivity can support improvisation to bring sustainable performance. As improvisation not directly bring outcomes in term of performance, but it is dependent on various other contextual and circumstantial factors (Hmieleski et al., 2013; Hmieleski & Corbett, 2008; Vera & Crossan, 2005), so we aim to include the variables of knowledge worker in a relation between organizational improvisation and sustainable performance and check how the variable of Knowledge worker productivity act as a mediator.

The previous studies have viewed improvisation as a mechanism to manipulate opportunity and directly involve in building firm's stature (Baker et al., 2003; Hmieleski & Corbett, 2008), however the availability of resources seems to play huge part in improvisation. Many of the new ventures lack resources including the time, capabilities, experimentation, budget, and implementation (Grichnik et al., 2014). For that matter we aim to include the variable of resource constraint in our research and see that to what extend it act as a moderator in the already established model.

To summarize, our study focuses on the involvement of knowledge worker productivity as a link between improvisation and sustainable performance and the extent to which resource constraint moderates this relation.

2. Research Gap

Although improvisation is believed to bring greater prospects for a variety of businesses especially startups, but many researchers are curious about the conditions that facilitate the effective working of improvisation (Fisher & Barrett, 2019; Hadida et al., 2015). There are studies that found the direct relation of improvisation and new venture performance, however Hmieleski et al., (2013), Hmieleski & Corbett (2006) and Hmieleski & Corbett (2008) studied the same relation in the presence of certain contextual factors like self-efficacy etc. Recently, Fultz & Hmieleski (2021) studied the impact of improvisation on firm's performance through serendipity and the eventualities that further enhance this indirect relation.

This brings us to the conclusion that improvisation has an amplified impact on performance under certain conditions and contextual factors. The gap in the existing literature can be find by introducing variables in the already established relation.

Researchers indicate that knowledge-worker productivity enhances innovation which in turn increase organization's performance. (Drucker, 1999; Palvalin, 2017; Turriago-Hoyos et al., 2016). As we see knowledge worker productivity has a significant effect on performance, so we aim to study the effect of organizational improvisation on sustainable performance and the extent to which knowledge worker productivity further facilitates this relation.

The degree to which an organization is capable to improvise also depends on the resources it has. According to (Baker et al., 2003), resource constraints trigger improvisation. To get done with the operations quickly, most is made out of the available resources. Alternatively, it is also believed that resource constraint may lessen the degree of freedom to perform improvisation. (Davis et al., 2009). Therefore, resource constraints narrow the avenues and opportunities to

improvise (M. P. E. Cunha & Antonacopoulou, 2016). These conflicting point of views grab our attention for a further research. The recent study of Andrew E.F Fultz, Keith M. Hmieleski (2021), also checked the moderating effect of Resource constraint on relation between improvisation, serendipity, and firm performance.

As we introduce the variable of knowledge worker productivity as a mediator between improvisation and sustainable performance, we also use resource constraint as a moderator in this model. Many researchers have already worked on these variables in various settings but almost little to no research has taken place where these variables could be seen operating together. The growing trend of these variables require profound, insightful, versatile, and evidence-based research in this area.

3. Problem Statement

Although the impact of organizational improvisation on performance has been studied earlier but the linkage between organizational improvisation and sustainable performance through knowledge worker productivity has not been explored yet. We aim to expand the literature not just by introducing the mediating variable of knowledge worker productivity, but we also aim to include resource constraint as a moderator in this model as the scarcity of resources is the eminent feature that can impact the efficient working in an organizations. Hence, we aim to fill the gap and contribute in this field as this aspect is un-explored yet.

4. Research Objectives

Objective 1: To determine the impact of Organizational Improvisation on Knowledge Worker Productivity.

Objective 2: To study the impact of Knowledge Worker Productivity on Sustainable Performance.

Objective 3: To explain the mediating impact of Knowledge Worker Productivity between Organizational Improvisation and Sustainable Performance.

Objective 4: To analyze the impact of Resource Constraint on Knowledge Worker Productivity.

Objective 5: To explain the moderating impact of Resource Constraint on relation between Organizational Improvisation and Sustainable Performance.

5. Research Questions

Question 1: What is the impact of Organizational Improvisation on Knowledge Worker Productivity?

Question 2: What is the impact of Knowledge Worker Productivity on Sustainable Performance?

Question 3: Does Knowledge Worker Productivity act as a mediator between Organization Improvisation and Sustainable Performance?

Question 4: What is the impact of Resource Constraint on Knowledge Worker Productivity?

Question 5: Does Resource Constraint act as a moderator between Organization Improvisation and Knowledge Worker Productivity?

6. Scope, significance and contribution of the study

Due to the rapidly changing trends and circumstances, organizations need to improvise to cater to the changing needs and demands. Not only the individual productivity but resources are required to establish a sustainable performance. The focus of the study is to dig into this matter and check the impact of improvisation on sustainable performance via knowledge worker productivity and to what extent resource constraint moderates the relation. The study is significant for both the academics and experts in the field of human resource, as it discusses and links the four important variables that can help attain the sustainable performance. This study can also help the management to implement the findings in practice. It clarifies that although knowledge workers are essence of any growing and rapidly changing markets but the scarcity of resources highly impact the capabilities of the knowledge workers – which clarifies that knowledge workers as well as resources are required to get sustainable results. As the study is carried in the IT sector

so it will help understand the working in the IT sector of Pakistan and the extent to which improvisation is being practiced to attain sustainable performance.

7. Theory

Ducker's Knowledge worker productivity theory states that the productivity of knowledge worker is influenced by number of factors. It is important to gain his maximum productivity so the sustainable performance can be achieved. Thus, the aim of the study is to analyze the impact of organizational improvisation on sustainable performance by enhancing the knowledge worker productivity.

Chapter 2: Literature Review and Hypothesis

2.1 Organizational Improvisation and Knowledge worker Productivity

According to Cunha(2016) and Fisher and Barrett (2019) improvisation works entirely opposite to the conventional autocratic management style which is known to foster profitability and productivity. However, as far as start-ups are concerned, improvisation is believed to bring unprecedented opportunities and that is why the variable improvisation has gained attention of many entrepreneurial researchers (e.g. Baker et al., 2003; Davis et al., 2009; Hmieleski et al., 2013). According to Hmieleski & Corbett (2008; 1998), organizational improvisation is an impromptu but deliberate action. This process of improvisation can be understood by four aspects. Archer (2009) and Cunha et al; (1999) explain first aspect that improvisation is goal-directed and cater to certain challenges and adopt given opportunities. It's a deliberate process which help attain desired results. Second, improvisation occurs when the planning and action take place simultaneously and there are various studies discussing this phenomenon (Baker & Nelson, 2005; Hadida et al., 2015; Miner et al., 2001). However, this idea is opposite to Baker et al (2003) concept which states that planning comes before execution. Third, improvisation is based on the idea of innovation and uniqueness which differentiate it from the routine tasks (Moorman & Miner, 1998). Fourth, improvisation not directly bring outcomes in term of performance, but it is dependent on various other contextual and circumstantial factors. (Hmieleski et al., 2013; Hmieleski & Corbett, 2008; Vera & Crossan, 2005)

The performance outcomes also depends on the proficiency of the knowledge worker working in the organization and the extent to which he utilizes his knowledge to get effective results (Drucker, 1999). Peter Drucker first used the term of Knowledge worker productivity that points towards the phenomenon that encompasses various impacting factors of a given task like the nature of task, how much time is allotted for the task, details of output, etc. The study of Kianto et al., (2019) also discusses the valuable input of knowledge worker in terms of utilizing his knowledge to present innovative ideas. The phenomenon of knowledge worker productivity is well understood by the developed countries that considers knowledge worker productivity as an

only way to bring the competitive advantage in this highly competitive environment. As far as the unstructured jobs and disorganized assignments are concerned, knowledge workers perform exceptionally well as they quickly adopt new practices and procedures (Bosch-Sijtsema et al., 2009). This shows that knowledge workers tend to perform efficiently in creative and rapidly changing environment as that requires creativity and adaptability. So, it can be said that organization improvisation is an impromptu practice that requires workers to be adaptive and innovative to meet the changing demands of the organization, so knowledge worker productivity increases in such scenarios. The above-mentioned literature brings us to our first hypothesis

“H1: Organizational Improvisation has a significant impact on Knowledge worker Productivity”

2.2 Knowledge worker productivity and Sustainability

Productivity has always been measured as the ratio of input to output, however the concept of knowledge worker productivity has its own meaning. The initial idea of productivity focuses on the manual worker performance which has always been measured by the quantitative value of output, however, knowledge worker productivity has a very different focus. It focuses on the intellectual ability for not just getting the task done but attaining the competitive advantage. Therefore, Knowledge worker productivity is enhanced with knowledge worker efficiency and their intellectual capital (Drucker, 1999). According to Sahibzada et al. (2022), knowledge worker productivity is measured with a more dynamic criteria as compared to productivity of a manual. In an organization, tasks can be performed both in a structured and unstructured manner. For unstructured nature of tasks, Knowledge worker productivity is proved to be effective as it focuses on both quantity and quality of the task (Palvalin et al., 2015).

Likewise, the idea of sustainable performance focuses both on the quantity and quality and caters to 3 different dimensions namely economic, social, and environmental. Carter & Rogers, (2008). The economic dimension caters to the material wealth, the economic output that can help

organization attain profitability and competitive edge to remain a market leader (Lee & Saen, 2012; Sidhoum & Serra, 2018). Even if the organizations are not making profit, they should be economically stable enough to reach the break-even (Gonzalez & Melo, 2018). The social dimension, on the other hand focuses on the individual well-being and the quality of life of the stakeholder and building the positive image in the community (POPESCU, 2019; Sidhoum & Serra, 2018). The third dimension which is the environmental dimension is the overseeing all the operations to lessen the adverse environmental impacts during the production process (Lozano, 2015). The thing that differentiates knowledge worker productivity from individual level productivity is the allocation of time to perform a certain task in an efficient manner. According to Vladimirovich Kirillov et al. (2015), time management is measured on three aspects i.e completing the task on time, starting the task on time and finalizing the task taking additional hours. The knowledge worker is capable to perform the task of any complexity level with the available resources and in the given time frame (Khaksar et al., 2020). Generally, organizations only focus on gaining profits however according to Walker & Joner (2012), for a performance to be sustainable, firms must focus on their environmental and social performance as well. Knowledge worker productivity is measured on different dimensions. It not only focuses on the ultimate output but the time and order in which the work is performed. The literature of knowledge worker productivity indicates that this phenomenon is not only a measure of economic performance but encompasses social aspects as well. The productivity of knowledge worker is believed to be attained if all economic, social and environmental targets are met which are the measures of sustainable performance (Carter & Rogers, 2008). Thus, based on these arguments, the following hypothesis is formed

“H2: Knowledge worker Productivity has a significant impact on sustainable performance”

2.3 The mediating role of Knowledge Worker Productivity

Organizational improvisation can impact organizational performance in terms of economic, environmental, and social performance. These three indicators define sustainable performance. The idea of sustainability is that the organization benefit not just in short term but for future

generations as well. Generally, organizations only focus on gaining profits however according to Walker & Jones (2012), firms must focus on their environmental and social performance as well. On the other hand, knowledge worker productivity not just focuses on the production quality and economic benefits but also on other service-oriented aspects. The concept of knowledge worker was introduced in mid-20th century. Most of the task at that time were carried out manually. The focus at that time was on production quality (Drucker, 1999; Palvalin, 2017; Turriago-Hoyos et al., 2016).

Later in 21st century the focus changed from production quality to some service-oriented aspects that require creativity, innovativeness, and intellect. At that time Peter Ducker introduced the concept of the knowledge worker productivity (Iazzolino et al., 2017). Workers are required to use their cognitive abilities and intellect to be called as knowledge workers (Mládková et al., 2015). The knowledge worker utilized his already present knowledge to bring new information (Kelloway & Barling, 2000; Turriago-Hoyos et al., 2016).

The use of cognitive abilities is the primary requirement for a knowledge worker. There are certain measures through which the productivity of knowledge worker can be measured (Fernandez 2013, Iazzolino 2017, Moussa 2017 and Palvalin 2015). These include Job autonomy, self-sufficiency, innovation, appropriateness, and efficiency (Iazzolino et al., 2017; Palvalin et al., 2015).

As improvisation has an amplified impact on performance under certain conditions and contextual factors, therefore, we introduce knowledge worker productivity as a mediating variable in a direct relation between organizational improvisation and sustainability.

“H3: Knowledge worker Productivity mediates relation between organizational improvisation and sustainable Performance”

2.4 Resource Constraint and Knowledge Worker Productivity

Much of the research caters to the idea of entrepreneurial start-ups with abundant resources (Florin et al., 2003; Hallen and Pahnke, 2016; Kanze et al., 2018). However, many of the new ventures lack these resources including the time, capabilities, experimentation, budget, and implementation (Grichnik et al., 2014). Therefore, this limits our understanding regarding the identification and exploitation of opportunities under resource constraint and what impact this has on performance. There is almost always scarcity of resources as far as new ventures are concerned (Aldrich, 1999; Yang et al., 2020). Resource constraints is the scarcity of resources to meet the requirements of the project. These resources may be tangible and intangible including physical, financial, human resources, equipment etc. The constraints can also be the risks associated to the project, shortfalls, restrictions which means all those things that hinder meeting the resource demand. However, the resources should be used very carefully.

Katz & Kahn (1978), open-system theory states that better outcomes are achieved when organizations use resources more efficiently. There are certain situational constraints that can impact the work behaviors and resource constraints is one such example. Lack of time, resources and workload are examples of such constraint (Peters et al., 1985)

The work of Klein & Kim (1998), McCloy (1994) and Peters et al., (1985) has focused on situational constraint and the influence of these constraints on job performance. This research emphasize on the influence situational context has on the ability of an individual to use his abilities and strengths to perform successfully. Moreover, anxiety, work strain and frustration can also be caused by the perceived situational constraints (Spector & Jex, 1998). Hence the productivity of knowledge worker can be influenced by resource constraints. This discussion helps us reach our fourth hypothesis:

“H4: Resource constraint has a significant impact on knowledge worker productivity”

2.5 Resource Constraint as a moderator

Prior, we have discussed that how organizational improvisation can enhance knowledge worker productivity, however it is not necessary that similar outcome will come in every circumstances. So, in this section, we aim to introduce resource constraint as a moderator between a direct relation between organizational improvisation and knowledge worker productivity and see the degree to which this relation is enhanced or reduced. Resource constraints uncovers the importance of the existing resources as it encourages entrepreneurs to look at their resources differently and improvising simultaneously.

According to Baker & Nelson (2005), the firms that face the scarcity of resources are compelled to find alternative ways to transform low valuable objects into valuable resources. This shows that with the resource constraints entrepreneurs tend to be more innovative and find unconventional ways to generate intricate resources while improvising. According to Dew (2009), such innovative combinations brings some fresh opportunities that otherwise could not be explored. Limited resource availability might lead startups to come with more creative and improvised ideas which can lead to unique solutions. However, the positive impact of resource constraints on the innovative productions has been a subject of debate in the past. These contradictions come because of the diversity of ideas. One such idea states that more the resources, greater are the opportunities to recombine and bring a new outcome. The limited resources give a specified boundary which cannot help perform improvisation better. According to Davis et al. (2009), resource constraint may lessen the degree of freedom to perform improvisation. Therefore, resource constraints narrow the avenues and opportunities to improvise (M. P. E. Cunha & Antonacopoulou, 2016). Taking all the points together, we argue that the nature of the relationship between improvisation and knowledge worker productivity is moderated by resource constraints:

“H5: Resource constraint moderates the relation between organizational improvisation and Knowledge worker productivity”

2.6 Summarized Hypothesis:

Hypotheses
H1: Organizational Improvisation has a significant impact on Knowledge worker Productivity
H2: Knowledge worker Productivity has a significant impact on sustainable performance
H3: Knowledge worker Productivity mediates relation between organizational improvisation and sustainable Performance
H4: Resource constraint has a significant impact on knowledge worker productivity
H5: Resource constraint moderates the relation between organizational improvisation and Knowledge worker productivity

2.7 Theoretical Framework

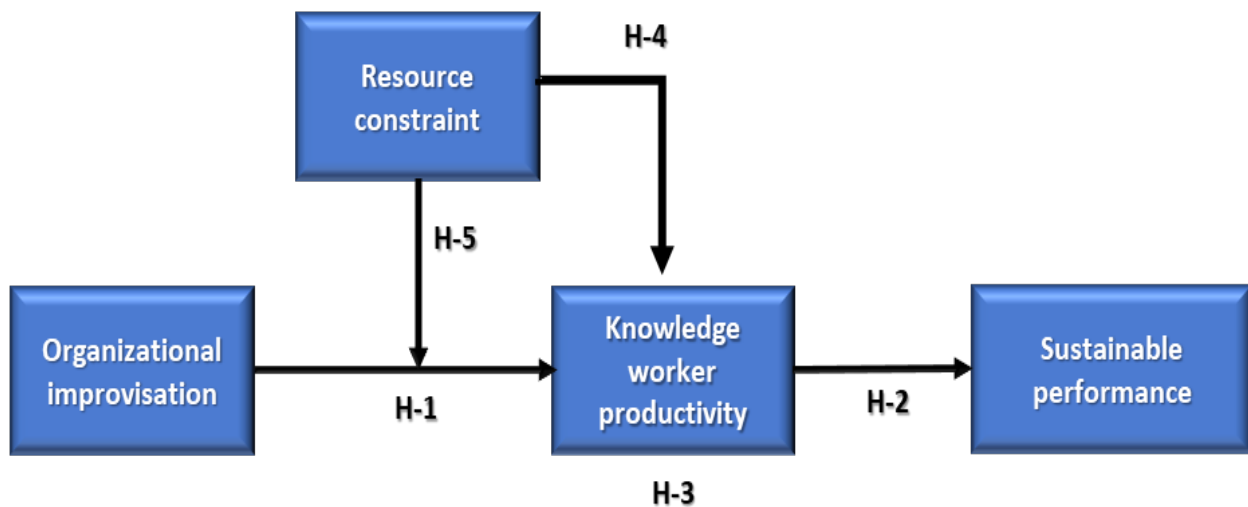


Figure 1

Chapter 3: Methodology

3.1 Philosophy of research, Strategy and Design

The philosophical assumption of this research points towards objective ontology as the study assumes that the given knowledge and reality is absolute truth and is not dependent on the researcher. The epistemological approach shows that the research follows positivist approach. Hence the deductive approach will be used. Conceptual framework is made based on the hypothesis derived from the existing literature and study will use descriptive research design to find answers.

3.2 Population and Sampling

The Data is collected from employees working in Pakistan's IT industry. The IT industry being humongous and scattered across Pakistan leads to an absence of sampling frame due to which we will be using non-probability sampling technique to draw desired respondents. In this case, convenience sampling is utilized to pitch approachable personal from the IT domain timely and economically. Moreover, the variables subject to our analysis can be evidently seen in IT sector. As IT sector is a service provider and must cope up with the changing demands of the market, the concept and practice of organizational improvisation can be easily observed in this sector. Similarly, the knowledge workers productivity are essence of this sector as it is all about coming up with new ideas and networking with the people around. All in all, carrying out our study on IT sector not only make it relevant but help us attain purposeful research results.

The survey was filled by 308 knowledge workers at managerial level in different IT companies across Pakistan e.g Netsol Technologies, TRG Pakistan, Folio 3, Cybervision tech etc.

3.3 Data collecting Instruments

Questionnaires are adopted to collect the required data. The online survey helped to collect data from distant organizations. We emailed questionnaires to participants. Also, questionnaires were manually distributed in various IT firms. We attained a greater sample size of 308 participants so

the findings can be easily generalized. We utilized the cutting-edge tools e.g. Google Docs followed by SPSS and Amos to convert raw collected data into meaningful inferences

Overall, a total of approximately 315 branches of different IT organizations from all the Pakistan were chosen where self-completion questionnaires were distributed and administered by the researchers. The online and manual questionnaires were sent and out of 315 questionnaires we received 308 valid responses, which then became our sample size. Questionnaires included measures of organization improvisation, sustainability, knowledge worker productivity, and resource constraint. The control variables in this study are formal education and years of experience. Participants were assured to withdraw from participating in the research work at any time, if the anonymity and confidentiality of their responses is not kept..

3.4 Measures

There are in total 4 measures and all of them are employed using either 5-point Likert scale from (1) being low agreement and 5 being high agreement. The items for each variable are listed in Exhibit 1.

3.4.1 Organizational Improvisation

The five items for organizational improvisation are adopted from 3 measure by Hmieleski and Corbett (2006, 2008; 1998; 2005). To create a measure of organizational improvisation, responses were averaged. 5-point Likert scale is utilized with 5 being highest score indicating higher improvisational behavior by the organization.

3.4.2 Sustainability

Sustainability has three dimensions to it namely economic performance, environmental performance, and social performance. In total 11 items are adapted. Zailani et al. (2012) and Zhu & Sarkis (2007) four items of environmental performance, Mitra & Datta (2014) and Rao & Holt (2005)'s four items of economic performance and PAULRAJ (2011) and Shane et al. (2010) 's three item of social performance are adapted. A 5-point Likert scale is used for all three

dimensions where 1 indicates decreased significantly and 5 indicates increased significantly. The result of all three dimensions decide on organization's sustainability.

3.4.3 Knowledge worker Productivity

To measure knowledge worker productivity, Palvalin et al (2015) scale is adapted which is a five-item scale. A five-point Likert scale is used where 1 indicates strongly disagree and 5 indicates strongly agree.

3.4.4 Resource Constraint

The 6- item scale is adapted from the previous studies of Baker and Nelson (2005); Desa & Basu (2013) and Sine et al., (2006). The scale consists of 6 items under categories tangible and intangible. Tangible items include physical and financial resources whereas intangible includes organizational, reputational, human and social resources. A 5-point Likert scale is utilized where 1 indicates strongly disagree and 5 indicates strongly agree.

3.5 Analytical procedure

To obtain an accurate meaning of the results different analytical methods were used to analyze the data. The IBM SPSS v.23 was used to perform the descriptive and reliability analysis. Confirmatory factor analysis (CFA) was carried out using AMOS v. 23. In the same way, to attain the reliability and internal consistency of the variables, Cronbach's Alpha was calculated. Further data was analyzed by performing Structural equation modelling which tested the mediation and moderation mechanism and related hypothesis.

3.5.1 Data Screening:

Before starting our analysis, we thoroughly analyzed our data and performed data screening. The incomplete data or with errors were discarded for further analysis. By getting the averages of the available answers of questionnaire we extracted the responses for missing values.

3.5.2 Descriptive Analysis:

To summarize our set of data and to find the mean, standard deviation, minimum and maximum values we performed descriptive analysis.

3.5.3 Reliability Analysis:

To find out whether the items are consistent and stable, reliability analysis was done. It is basically conducted to probe the fact that the items used in the study can also be used again by researchers giving the same kind of results (Gliem & Gliem, 2003). Cronchbach's alpha was calculated to check the internal consistency which says that reliability is good if the Cronbach's alpha is equal or greater than 0.70 (Sekaran, 2006).

3.5.4 Correlation analysis

The next step to reliability analysis is correlational analysis, to find the extent of relation between the variables. The value of the correlation coefficient is between “-1 to +1”. As correlation analysis is conducted to examine how strong the relationship among the variables is there, so a value of the coefficient near to 1 proves the strong link between the variables. The link between the variables can be positive or negative. If the relationship is positive, it shows an increase in one variable will increase the value of other, and vice versa. The negative value of one variable makes it evident that increase in one variable will decrease the value of other and vice versa. The value of +1 indicates absolute positive link whereas -1 value shows absolute negative relation among the variables. On the other hand, 0 shows the absence of any kind of relationship between underlying variables.

3.5.5 Exploratory Factor Analysis:

The EFA is performed to eliminate the additional items of variables by altering the rotated component matrix. The final items are then made part of the variable and used for further analysis.

3.5.6 Confirmatory Factor Analysis:

The next step is confirmatory factor analysis (CFA), which was conducted to test the model fitness through AMOS v. 23. To test the distinctiveness of the variables, CFA is used. The five-factor test model in the hypothesized framework was compared with other models to check biasness of common method variance (Akhtar et al., 2016; Podsakoff et al., 2003)

3.5.7 Structure Equation Modelling:

SEM is the most advanced technique which helps perform CFA, path analysis, setting up causal relation to finally test direct effect, mediation, and moderation. We utilized SEM to test our hypothesis and to see the extent they are accepted or rejected.

3.6 Ethical Consideration:

Ethical concerns were considered while the execution of this research. As the primary aim for this research was to give my valuable input in the field of human resource without duplication of any study, so any type of misrepresentation of primary data or misleading information is strictly avoided.

Moreover, the aim of my study was to get confidential information from organization which required permission of the management. The dignity of the research participants was prioritized, and the purpose of the research was clearly communicated with the respondents in an honest and transparent manner. The respondents were assured that the information will be kept confidential.

To benefit the organization involved, the results and finding of the research will be shared with the respondents. The personal information of participants in questionnaires will not be used for any other purpose and will be kept secure.

Chapter 4: Results

After gathering and compiling all the data we come to the step of data analysis. For that purpose, we initially screened the data and performed descriptive analysis for both demographic variable and underlying variables. The reliability analysis was performed to probe the Cronbach's alpha of the variables. Correlation analysis was followed by explanatory factor analysis and confirmatory factor analysis. Further the chapter discusses the testing of hypotheses via structural equation modelling. All the analysis of the data was done using SPSS and AMOS software.

4.1 Demographics:

The survey was filled by the knowledge workers at managerial level at IT departments of various organizations in Pakistan. The survey was distributed both manually and online. A total of 308 valid responses were collected. The respondents were asked few demographics related questions about education and experience. The respondents came from wide variety of education background and vast experience. The Table I shows the percentage of the demographic variables.

Table I (Demographics Table)

Demographic Variable	Code	Percentage
Qualification	Bachelors	30
	Masters	39
	MS/MPhil	26
	Others	5
Years of experience in the current position	0-2	32.2
	2.5-5	59.9
	5.5-7	7.9
Years of experience in the company	0-5	65
	10.5-15	60
	15.5-20	30
	20.5-25	11

	25.5-30	12
	30.5	6
	35	5

4.2 Descriptive, Reliability and Correlation Analysis:

The results of descriptive analysis including mean, standard deviation, minimum and maximum values for all the variables is given in table II. The consistency of the items of the variables presents how the measuring of the items hang together in the form of a set (Sekaran, 2003). The reliability coefficient showing the positive correlation of the items with on another is known as “Cronbach’s alpha”. The table III shows the reliability coefficient i.e. Cronbach’s alpha of the variables used in the study. The value between “0.5-0.6” is considered as sufficient while 0.70 value is acceptable according to the previous findings and the value above 0.8 is good enough to carry the research analysis further (Sekaran, 2003). The findings show that all the values of Cronbach’s alpha are above 0.8 and near to 1 which proves greater internal reliability. As evident from the Table III, all the reliability values of the variables are within the acceptable range showing the accurate scale used for measuring for the research study.

The values of the correlation present how the variables show correlation with other variables. The value lies between +1 to -1, +1 showing a positive link while -1 indicating negative relation with another variable. the table IV is showing that the link between all variables is positive except for the correlation with resource constraint which comes negative with every variable. The reliability analysis of the questionnaire was carried out so the internal consistency of items can be checked. The Cronbach’s alpha all the variables combined is 0.807, which shows that the items are highly consistent, and the questionnaire is reliable.

Table II (Descriptive Results)

		OI	Sustainability	KWP	Reconstraint
N	Valid	308	308	307	308
	Missing	691	691	692	691
Mean		4.4091	4.1558	4.4556	1.8918
Std. Deviation		.61919	.61326	.45595	.83002
Minimum		2.75	2.43	3.00	1.00
Maximum		5.00	5.0	5.00	5.00

Table III (Reliability Results)

Measures	Cronbach's Alpha
OI	.848
Sustainability	.768
KWP	.843
RC	.926

Table IV (Correlation Results)

		OI	Sustainability	KWP	Rconstraint
OI	Pearson Correlation	1	.453**	.412**	-.256**
	Sig. (2-tailed)		.000	.000	.000
	N	308	308	307	308
Sustainability	Pearson Correlation	.453**	1	.524**	-.426**
	Sig. (2-tailed)	.000		.000	.000
	N	308	308	307	308
KWP	Pearson Correlation	.412**	.524**	1	-.356**
	Sig. (2-tailed)	.000	.000		.000
	N	307	307	307	307
Rconstraint	Pearson Correlation	-.256**	-.426**	-.356**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	308	308	307	308

4.3 Confirmatory Factor Analysis

The results of CFA can be seen in table V. No construct validity issue can be seen. We have used the composite reliability (CR) and average variance extracted (AVE) to assess the dimensionality, reliability, and validity of the scales. The scores for all four constructs exceed the threshold level of 0.7 and 0.5 for CR and AVE respectively. Moreover, the CFA results indicates the good fit for the model. According to the CFA baseline results the values of the model are “RMSEA: 0.049; CFI: 0.919, GFI: 0.93 and IFI: 0.91”, CMIN: 21.31, df: 14.

Table V (CFA Results)

Variable	Label	Loadings	CR	AVE
Organizational Improvisation	OI1	0.812	0.825	0.622
	OI2	0.744		
	OI3	0.879		
	OI5	0.905		
Sustainable Performance	S1	0.771	0.932	0.636
	S2	0.897		
	S3	0.823		
	S4	0.872		
	S5	0.904		
	S6	0.845		
	S7	0.754		
Knowledge Worker Productivity	KWP1	0.905	0.875	0.75
	KWP2	0.867		
	KWP3	0.983		
	KWP4	0.916		
	KWP5	0.815		
	KWP6	0.872		
	KWP7	0.812		
Resource Constraint	RC1	0.723	0.822	0.766
	RC2	0.745		
	RC3	0.834		
	RC4	0.856		
	RC5	0.908		
	RC6	0.893		

4.4 Structural Equation Modelling:

The process of SEM is conducted by going through certain steps. At first, we designed and finalized the individual constructs. After that the measurement model is formed whose reliability and validity is checked. The common method biased is also measured. We noticed that our measurement model is valid, so we specified our structural model. After forming a causal relation, we performed the mediation and moderation analysis. The table 5 shows the result of our hypothesis. Hypothesis is accepted if the p value is less than 0.05.

Table VI (SEM Results)

Hypotheses	Coefficient	SDEV	T value	P Value	CI LL	CIUL	Decision																																
Direct Effects																																							
KWP -> Sustainable Performance	0.549	0.04	13.892	0.000	0.477	0.609	Supported																																
Org Imp -> KWP	0.326	0.049	6.631	0.000	0.229	0.394	Supported																																
Resource Constrain -> KWP	-0.269	0.057	4.745	0.000	-0.361	-0.178	Supported																																
Moderation Analysis																																							
OrgImp*RC -> KWP	-0.176	0.191	0.918	0.179	-0.299	0.196	Not Supported																																
Mediation Analysis																																							
Org Imp -> KWP -> Sustainable Performance	0.179	0.032	5.631	0.000	0.118	0.241	Supported																																
<table style="width: 100%; border: none;"> <tr> <td style="width: 20%;"></td> <td style="width: 10%;">R Square</td> <td style="width: 10%;">R Square</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td></td> <td>Adjusted</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>KWP</td> <td>0.259</td> <td>0.254</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Sustainable Performance</td> <td>0.302</td> <td>0.299</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>									R Square	R Square							Adjusted							KWP	0.259	0.254						Sustainable Performance	0.302	0.299					
	R Square	R Square																																					
	Adjusted																																						
KWP	0.259	0.254																																					
Sustainable Performance	0.302	0.299																																					

	Confirmed	Not Confirmed
H1: Organizational Improvisation has a significant impact on Knowledge worker Productivity	✓	
H2: Knowledge worker Productivity has a significant impact on sustainable performance	✓	
H3: Knowledge worker Productivity mediates relation between organizational improvisation and sustainable Performance	✓	
H4: Resource constraint has a significant impact on knowledge worker productivity	✓	
H5: Resource constraint moderates the relation between organizational improvisation and Knowledge worker productivity		✓

Table VII (Hypothesis Confirmation)

Chapter 5: Discussion

Previous researches have checked direct impact of improvisation on performance, however Hmieleski and Ensley (2004) and Hmieleski et al. (2013) established that the same relation is enhanced under certain conditions i.e self-efficacy in entrepreneurs. The very recent study of Andrew E.F. Fultz and Keith M. Hmieleski (2021) suggest that with inclusion of serendipity, the performance is vastly influenced by improvisation. Prior research has also studied the phenomenon of improvisation in the face of resource constraints. According to Cunha (2014), improvisation is triggered by the scarcity of resources as scarce resources provides individual with opportunity to take novel actions. (Hmieleski and Corbett, 2006: 46). However, there are some contrasting studies as well where Resource constraint are considered boundary condition for improvising. (Andrew E.F. Fultz and Keith M. Hmieleski 2021). So, these contrasting views instigated this research where we aim to extend the research by introducing some other variables i.e knowledge worker productivity and resource constraint to check the impact of improvisation on performance. The growing and rapidly changing circumstances in markets prompt us to put our focus on more long-lasting performance i.e Sustainable performance. The result of our research helps us come to some unique and worthy results.

First, organizational improvisation has a significant impact on knowledge worker productivity. Organizational improvisation is a hit and trial method where the decisions are made spontaneously according to the changing needs and demands. Such a set up requires individuals to be creative, flexible and adaptive. Now, if we look at the definition of knowledge workers who use their intuition and creative skills to come up with the fresh ideas and cope up with the market competition, we can conclude that knowledge workers tend to perform efficiently in creative and rapidly changing environment as that requires creativity and adaptability. As organization improvisation is a spontaneous practice that requires workers to be adaptive and innovative to meet the changing demands of the organization, so knowledge worker productivity increases in such scenarios.

Our second finding is that knowledge worker productivity has a significant impact on sustainable performance. Sustainable performance being a measure of 3 dimensions social, economic, and environmental is increased with the knowledge worker productivity. The performance is sustainable when all three constructs are met i.e., economic, social, and environmental. Knowledge work is usually performed by highly skillful employees as it requires individuals to come up with non-repetitive, creative, and innovative work (Bosch, et al., 2009). Knowledge workers are highly skillful and creative people who help attain the optimal outcomes be it tangible or intangible. The previous researches have discussed the shift of organizations' focus from tangible outcomes to intangible results and the extent to which knowledge workers contribute to attain these results (Mládková, 2012). Hence, our findings confirm that knowledge worker productivity has a momentous impact on sustainable performance.

Our third finding is that organization improvisation plays a significant role in bringing sustainable performance via knowledge worker productivity. The determinants provided by Ducker theory of knowledge worker productivity (i.e., the clarity of the task, autonomy, innovate continuously, focus on both quality and quantity of work, continuous learning and finally treated as intellectual asset) shows that knowledge worker productivity has different dimensions to it which can have a vast influence on the final outcome of performance. It can facilitate improvisation to bring about sustainable performance as Organizational improvisation requires individuals to be flexible and adaptive enough to respond to changing demands.

As many start-ups are now adopting this new approach of improvisation that is believed to open new avenues even within the limited resources (Haislip, 2019) so we have incorporated the variable of resource constraint in our model. The additional variable of Resource constraint has also brought some new findings for our study. Our fourth finding shows that resource constraint has a significant impact on knowledge worker productivity. Although Knowledge workers are highly skillful people and the performance outcomes depends on their productivity but the availability of resources affect the productivity of the knowledge worker. There are certain situational constraints that can impact the work behaviors and resource constraints is one such example. Hence the productivity of knowledge worker is influenced by the available resource.

Lastly, our fifth and final hypothesis got rejected and proved that although given resources have a significant impact on Knowledge worker productivity, the variable however does not moderate the relation between Organizational improvisation and knowledge worker productivity which means that the impact of improvisation on knowledge worker productivity remain unaltered in the presence of resource constraint. Whatever the available resources, knowledge worker productivity remains solely depend on the organization's working dynamics.

Chapter 6: Conclusion and Implication

The research clearly demonstrates the impact of organizational improvisation on sustainable performance via knowledge worker productivity. It also analyzed the impact of resource constraint as a moderator in this study. This study was conducted in the IT sector of Pakistan. The main participants were the managerial level employees working in the IT sector who has a sufficient experience and knowledge to help us reach the conclusions.

The study help us reach our key result that organizational improvisation has a substantial impact on knowledge worker productivity and knowledge worker productivity has a substantial impact on sustainable perform. Moreover, Knowledge worker productivity mediates the relation between improvisation and sustainable performance as Knowledge worker productivity enhances the process of organizational improvisation. IT sector is a continuously evolving segment and knowledge workers play a key role in surviving continuously changing conditions by improvising.

Furthermore, the study also explains that resource constraint can impact the knowledge worker productivity in IT sector. As resources are key to perform different organizational related task and the workers are very much depended on resources. These resources can be physical, financial, reputational, organizational, human, and social resources. Our results also concluded that although resource constraints impact the knowledge worker productivity, but they do not moderator the direct relation between organizational improvisation and knowledge worker productivity. The degree to which improvisation impact knowledge worker productivity remains unaltered in the presence of resource constraints.

This research has both theoretical and practical implications. Theoretically, this study added in the current literature by presenting 5 results. The study found out that improvisation has a significant impact on knowledge worker productivity, second, knowledge worker productivity has a significant impact on sustainable performance, knowledge worker productivity act as mediator between improvisation and sustainability. Fourth, resource constraints effect the knowledge worker productivity and lastly that resource constraint do not moderate relation between improvisation and sustainable performance.

Practically, this research can give organizations fair idea that to establish sustainable performance, organizations should adopt the practice of improvisation as the changing world market requires more impromptu practices to pace up with the rapidly changing scenarios. The research findings also suggests that by recruiting knowledge workers in organizations the sustainable performance is even easier to attain as knowledge worker productivity mediates the relation between improvisation and sustainable performance.

Chapter 7: Limitations and future research

Although this study provides a valuable input in the field of research and fills the existing gaps but there are certain limitations associated to it. Therefore, to overcome these limitations, future research could be carried in the respective fields. Firstly, this study is limited to the IT sector of Pakistan only, therefore the findings cannot be generalized. Second, this is the cross-sectional study. As the behaviors, patterns and ethics change with the course of time so longitudinal study could have provided a more in-depth analysis and results. Third, although we examined a single moderating variable in our established model, it is possible that some other variable can also be considered for moderation. E.g., firms' stock of human capital (Vera & Crossan, 2005), can act as a moderator between organization improvisation and knowledge worker productivity.

The strategic use of improvisation could also replace the basic improvisation phenomenon as the world market requires more strategic orientation. "Firms stock of human capital" and strategic use of improvisation is a future directed variable in the similar research by Fultz and Hmieleski (2021) where resource constraint is utilized as a moderator in relationship between organizational improvisation and serendipity.

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EXHIBITS

Exhibit - I

Questionnaire

The impact of Organizational Improvisation on Sustainable Performance: The mediating role of Knowledge Worker Productivity and Resource Constraint as a moderator

This questionnaire is designed to evaluate the impact of Organizational Improvisation on Sustainable performance. It also aims to check how Knowledge Worker Productivity and resource constraints add to this relation. There are five parts in this questionnaire which would take you approximately 7 minutes to answer.

Responses are confidential and will only be viewed by the researchers.

Please answer every question to the best of your ability. If you are unsure of an answer and cannot confirm with someone in your company, please provide your best estimate.

Part 1: Company and Personal Information

A: Company information

1. Company Name: _____
2. Number of years since its establishment: _____
3. Number of employees: _____
4. Your organization operates in, name of industry _____

B: Personal information

- 5. Education level: _____
- 6. How long you have been serving in this company? _____
- 7. Your years of experience in this position: _____

- Would you like a summary report of the findings of this project? Yes No

Part 2: Organizational Improvisation

Please circle (○) your desired response, expressing your opinion about the statements below:

5-point Likert-type response scales ranging from low agreement (1) to high agreement (5).

					Strongly
Strongly					
					Agree
disagree					
1. We improvise solutions to problems.	5	4	3	2	1
2. We figure out actions as we go along.	5	4	3	2	1
3. We deal with unanticipated events on the spot.	5	4	3	2	1
4. We respond in the moment to unexpected problems.	5	4	3	2	1
5. We develop and execute novel strategies/approaches for our work in the moment.	5	4	3	2	1

Part 3: Sustainability

Please circle (○) your desired response, expressing your opinion that what in your organization has increased or decreased significantly: a five-point Likert-type scale (1 = decreased significantly, 5 = increased significantly)

Economic Performance	Increased Significantly					d e c r e a s e d
significantly						

1. Sales		5	4	3	2	1
2. Net Profit	5	4	3	2	1	
3. Market share		5	4	3	2	1
4. New market opportunities	5	4	3	2	1	

Social Performance	Increased Significantly					d e c r e a s e d
significantly						

5. Customer satisfaction		5	4	3	2	1
6. Relationship with suppliers		5	4	3	2	1
7. Stakeholder welfare		5	4	3	2	1

Environmental Performance	Increased Significantly					d e c r e a s e d
significantly						

8. Consumption of chemical or hazardous material	5	4	3	2	1	
9. Energy consumption		5	4	3	2	1
10. Emission of water or solid waste	5	4	3	2	1	
11. Emission of air pollutants	5	4	3	2	1	

Part 4: Knowledge Worker Productivity

5-point Likert-type response scales ranging from low agreement (1) to high agreement (5).

		Strongly Agree	4	3	2	Strongly Disagree	1
1. I achieve satisfactory results in relation to my goals	5						
2. I am usually able to carry out my work tasks efficiently (smoothly, without problems)	5						
3. I am able to use the majority of my working time for conducting relevant tasks related to my goals.	5						
4. My job mainly includes tasks in which I am able to exploit my knowledge and skills efficiently.	5						
5. I am able to meet customers' expectations.	5						
6. The quality of my work outputs is high	5						
7. The work group I work in works efficiently as a whole	5						

Part 5: Resource Constraints

(1 = Strongly disagree; 5 = Strongly agree)

In general, our firm lacks sufficient:

Tangible

										Strongly Strongly Agree Disagree
1	Physical resources (examples: equipment, technology, raw materials, physical location, etc.).	5	4	3	2	1				
2	Financial resources.	5	4	3	2	1				

Intangible

3	Reputation resources (e.g., positive firm image, brand loyalty, brand equity, etc.).	5	4	3	2	1				
4	Organizational resources (e.g., quality control systems, formal and informal planning systems, routines, etc.).	5	4	3	2	1				
5	Human resources (e.g., individuals' education, training, experience, skills, etc.).	5	4	3	2	1				

6 Social resources (e.g., useful relationships with other people or firms, etc.).

5 4 3 2 1

Exhibit - II

EFA Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.903
Bartlett's Test of Sphericity	Approx. Chi-Square	7461.606
	df	666
	Sig.	.000

Final Rotated Component Matrix^a						
	Component					
	1	2	3	4	5	6
OI1						.795
OI2						.820
OI3						.797
OI5.						.784
S1				.774		
S2				.759		
S3				.770		
S4				.706		
S5				.696		
S6				.542		
S7				.541		
KWP1			.652			
KWP2			.598			
KWP3			.702			

KWP4			.731			
KWP5			.736			
KWP6			.687			
KWP7			.553			
NC3		.623				
NC4		.750				
NC5		.647				
NC6		.766				
NC7		.694				
NC8		.762				
NC9		.745				
DI1					.813	
DI2					.808	
DI3					.741	
DI4					.777	
DI5					.630	
DI6					.666	
RC1	.813					
RC2	.790					
RC3	.823					
RC4	.813					
RC5	.779					
RC6	.865					
Extraction Method: Principal Component Analysis.						
Rotation Method: Varimax with Kaiser Normalization. ^a						
a. Rotation converged in 6 iterations.						

Component Transformation Matrix						
Component	1	2	3	4	5	6
1	-.425	.433	.446	.443	.372	.313
2	.608	.368	.306	.007	-.468	.428
3	.645	-.238	.001	.438	.571	-.095
4	.178	.717	-.177	-.421	.365	-.337
5	.039	-.179	.813	-.247	-.013	-.493
6	.023	-.274	.121	-.611	.428	.594
Extraction Method: Principal Component Analysis.						
Rotation Method: Varimax with Kaiser Normalization.						