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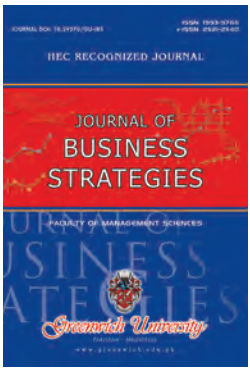

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June 2021

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June 2021

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EDITORIAL NOTE

I am pleased to introduce the Journal of Business Strategies (JBS) (ISSN: 1993-5765) a rapid peer-reviewed Journal. We have been started in the year 2007 and is growing continuously. It is our pleasure to announce that we have also switched to Online Journal System OJS during the y ear 2020, all issues were published online on time. All published articles of this journal are included in the indexing and abstracting coverage of EBSCO Business Source Complete EBSCO Business Source Premier, EBSCOhost, Crossref, RePEc, SyndiGate, Google search engine, and among many other reputed scientific databases. The submissions to the journal are subjected to the peer-review process by the editorial board members or external subject experts. The complete editorial processing of the manuscript is done through the integrated online editorial manuscript submission and review system for greater transparency and faster article throughout. During this calendar year 2021, Editorial Board and Advisory Board are improved with young Editors, more Reviewers joined the board of JBS and contributed their valuable services towards contribution as well as the publication of articles, and their valuable reviewer comments will beneficial to publish quality of the article in the Journal.

I take this opportunity to acknowledge to eminent Prof. Dr. Hammadullah Kakepota's academic contribution towards Greenwich University's Journals and technical support specially in this edition. I would also like to express my gratitude to all the authors, reviewers, the publisher, Assistant Editors, and the editorial board of JBS. With their support, we have released the new volume (Volume 29) of JBS for the calendar year 2021. This is the first issue in Volume 29, and we look forward to bringing out the next Issue Volume 30 of the Journal of Business Strategies (JBS) in the month of December.

Editor

Dr. Aamir Rashid

Journal of Business Strategies, Vol.15(1)
June 2021

TABLE OF CONTENTS

Journal of Business Strategies, Vol. 15 No.1, 2021, pp 01–24 *DOI:10.29270/JBS.15.1(21).01*

THE IMPACT OF FLEXIBLE SUPPLY CHAIN MANAGEMENT PRACTICES ON CUSTOMER SATISFACTION

Marzia Fatima, Dr. Muhammad Asim, and Salman Manzoor

ABSTRACT

The sole reason of research conducted was to know the impact of flexible supply chain management practices on customer satisfaction. Different literature reviews done in this research emphasized on the fact that the customer satisfaction has create an impact on supply chain practices. In this research focus was on Manufacturer sector. This research was of quantitative in nature and data was collected through close ended questionnaires. The sample size was set to 250. Descriptive analysis, reliability test, correlation and regression tests were run for study. All hypothesis were accepted in conducted research. Outcomes of the study showed the optimistic and significant relation between Flexible SCM Practices on Customer Satisfaction. Supply Chain Management Practices are not taken serious in every organization. To research on this topic, I will show that there is a strong impact of Flexible Supply Chain Management Practices on Customer Satisfaction.

***Keywords**: Flexible Supply Chain Management Practices, Customer Satisfaction, Supplier Flexibility, Manufacturing Flexibility, Logistics Flexibility, Information Sharing.*

INTRODUCTION

SCM is a chain which link with the every component of supply process and the manufacturing starting from raw materials to the consumers, and the supply chain of all the firm work as a unified virtual business entity (Ellinger, Shin, Northington & Admas, 2012). The next SCM goes to recycling. (Beamon, 1998). SCM focuses on the supplier side, in what way organization consume their supplier's expertise, its capability and the processes to enhance competitive advantage and within an organization, the more functions are involved, logistics, distribution, manufacturing, materials, and transportation. Gunasekaran, Patel & Tirtiroglu (2001) classified SCM development into two categories, the procurement and the logistics categories in order to trace the

SCM development. The competition has been taken a next level of change. Now the competitions are not in between the organizations, but it is between the supply chains (Ellinger, Shin, Northington & Admas, 2012).To advance the usefulness and competence of the organization's supply chain, it will add value in your supply chain, in order to remain in a competition, (Singh & Sharma, 2014). Stakeholders of an organization involves customers, the most important stakeholder of any organization. Customers are the main reason of your success in your business. To fulfill your customer's need, you have to add value in your supply chain. Increase the efficiency in order to satisfy your customers. And in order to satisfy the customers, the quality of your supply chain must be prove (Beamon, 1998). The article is based upon SCM practices to know the impression and relationship of flexible SCM practices on customer satisfaction. The article covers maximum aspects of SCM to know the impact. The research methodology has been used in this study which moves onto the data collection. In this article the observations are based on secondary data which is mainly collected through websites, articles and journals. This data has been thoroughly studied to get to the relationships among variables. The article is based upon four hypothesis. With increasing competition globally, the Supply Chain Management Practices has evolved to a level which is now linking together tiers of supply chain i.e. the suppliers and customers. Every organization in almost every sector is trying to adopt SCM Practices for achieving competitive advantage which is called as enabler in Supply Chain. The key task in SCM is considered as to plan and control different business processes from the initiation point i.e. raw material from suppliers to consumption point which is consumer for maximizing value for consumers. To achieve exceptional performance from the entire supply chain, we need to manage the activities within the supply chain and coordinate between them accordingly. Therefore, supply chain integration (SCI) is measured as one of the effective means (Chu, Chang & Huang, 2011). Various investigators have acknowledged SCM Practices main four factors; Supplier capabilities, Manufacturing capabilities, Logistics capabilities and information sharing are the major contributor in any organizations success for increasing customer value. Organization's major success depends upon its capability to perform in the market environment. To achieve customer value, company must possess with efficient capability in suppling, manufacturing and logistics side, as these are the core of supply chain while with effective flow of information. Moreover source, make and deliver as discussed in SCOR model; more they are efficient and stronger the company's supply

chain would be better and the flow of information lessen the chances of miscommunication. Due to changing needs of customer and changing market environment, fast changing trends it is now important to bring flexibility in working process ever than before to compete in the market and to achieve customer satisfaction. Further it has been suggested that by the support of real time information firms are capable to manage demand of customers effectively. With the increased flexibility levels firms may able to grow additional cooperative relations with clients and suppliers grounded on keen understanding of demands that makes supply chain of a firm to react more rapidly and excellently to shifting consumer and suppliers need. Following are the four factors upon which this study is based upon to achieve customer satisfaction.

- Supplier Flexibility; Satisfying customers specially by offering item information to them, getting orders from them, linkage with customers to oversee demand and making requested item delivery organized. Shared visions lead to trust and flexibility in new product and delivery (Chu, Chang & Huang, 2011).
- Manufacturing Flexibility; Manufacturing is typically internal and difficult to transfer therefore it can be the core activity of company that is why it is valuable. Bringing flexibility in manufacturing dimension of the organization to strengthen operations on the basis of which company be able to compete (Chavez, Wantao Yu, Jacobs & Feng, 2017).
- Logistics Flexibility; The capability to react rapidly and resourcefully to client's changing desires in terms of inbound and outbound supply, support and services (Zhang, Vonderembse & Su Lim, 2005). It helps organization to satisfy demand simultaneously rather than forecasting and then reacting to the orders.
- Information Sharing; It is the capability of an organization to share information with supply chain partners in a very effective and efficient methodology. It is most imperative tool to gain integrated and coordinated supply chain.

Globally the supply chain has evolved to its fourth stage i.e. extended integrated enterprise, where supply chain is completely integrated within the organization as well as with the suppliers and their suppliers and on forward side to retailer to distributers to consumers. In order to this, their supply chain practices are getting higher. They have more resources to fulfill the customer

demand in an efficient way. Customer satisfact ion is considered to be the key factor for getting the competitive advantage over the rivals globally but in Pakistan we are not able to achieve the customer satisfaction and customer loyalty for our business in an efficient way due to not focuses on the supply chain management practices because we are lagging way too far from the world in terms of Information Sharing in Supply Chain Management. If we continue to ignore the fact about customer satisfaction factor, we will find it more and more difficult to complete in the global market. Thus it is necessary to find the effectiveness of information sharing, flexibility in supply, manufacturing and logistics dimension of the supply chain management practices on customer satisfaction.

THEORETICAL FRAMEWORK

Managing supply chain practices today has become complex ever than before. Businesses today are facing a lot of pressure in order to improve their performance so that they can deliver the best possible output to the consumer and to remain competitive in the market. At first customer weren't clearly aware of their needs, demands and wants. The process was typical starts from supplier or manufacturer or service providers and ends to the customer receiving the product or service without putting any extra effort, where suppliers to customers were satisfied with it. But as the time passes need emerges it clarifies that there is need to add more value to the process. As awareness rises customer now has become more and more conscious about their needs, in order to satisfy them flexibility is required throughout the chain, every department in their own area should try to become more and more flexible in order to provide a better output. Differentiation between companies now merely depends upon their capability to manage numerous difficulties in order to control the price and provide better quality service, therefore this attribute justifies that today competition is not among companies but among their supply chains (Ellinger, Shin, Northington & Admas, 2012). Good supply chain not merely targets to fulfill their customers' needs but wants to amuse them by their performance which has increases the competition and options for the customer. Flexibility is a difficult, multidimensional and inflexible to capture idea (Sethi & Sethi, 1990). Flexibility in terms of customer's perspective can be define as usage justifying the cost, level of quality, expanding the range of product variety, increasing the product or service availability, able to respond quickly, lesser lead time, innovation or even after sales service. For customer's perspective companies need to put cross functional efforts in order to exclude bottleneck,

increase responsiveness and to gain competitive edge (Mark & Su-Lim, 2005). Flexibility from organization's perspective could be lowest possible cost, minimizing the internal production structure, reducing capacity constraint, reduce freight cost, and reduce uncertainty through better control, and upgrade technologies and most importantly to be efficient but without compromising customer preference.

Flexibility in Supply Chain

In this era of globalization as needs and requirement of customer are changing very quickly also product lifecycle has been shorten companies are now force to lessen cost and lead time, increase the consistency of item by altering their development time to time same is the reason that SCM has grown into vital part of almost every business plan, more strengthen the supply chain is more effective and improved results would be. Supply chain to become approachable towards marketplace needs requires to optimize available resources therefore flexibility in supply chain is important for organization's success. (Singh & Sharma, 2014) The size of supply chain of every other organization differ from one another but there are some core decisions made at critical stages from supply chain perspective that are Planning. Sourcing, Manufacturing, Delivering and Return. Major level of flexibility of a supply chain also may depends upon flexible sourcing, flexible manufacturing and flexible logistics and information sharing.

Supplier's Flexibility

In SCM, the flexibility of supplier can be taken as an instrument to tackle uncertainties. Suppliers are flexible when are able to provide more than the activity for which they are originally hired (Chan, Bhagwat & Wadhwa, 2014). From organizations perspective supplier flexibility can be presented in a way that organization is capable enough to have multiple supplier for same operation in this way they're flexible enough to get that task completed from an alternate supplier of their choice (Chan, Bhagwat & Wadhwa, 2014). In order to have supplier flexibility an organization may add alternative supplier rather than who are currently in the supply chain to perform the operation or organization can increase the flexibility of existing supplier in supply chain to proceed other than particular product or task. Although by growing the numbers of suppliers it is possible that quantity supplied per supplier can be decreases due to which it may results in not availing quantity discount, also increase in number of supplier may also increases

the complexity to manage, however rising the flexibility of supplier who already exists possibly manage this drawback and adds some advantage like with the rising demand of flexible manufacturing system in quickly shifting variety of product it is more suitable to go with existing suppliers that may also benefit in using the additional manufacturing dimensions of the supplier (Chan, Bhagwat & Wadhwa, 2014). From last few years researchers have given attention towards role of supplier's development to customer satisfaction (Chu, Chang & Huang, 2012). Supply chain management is better recognized due its capabilities to lessen lead time by incorporation and logistics management, although it has several other scopes like enhancing performance of SC partners. As per previous studies part of production has moved from producers of products and services towards supplier (Chu, Chang & Huang, 2012). Through flexibility of supplier the purchaser can react to the fluctuations in marketplace due to shorter life cycle of product. According to Chan, Bhagwat, and Wadhwa (2014) flexibility is dynamic for the achievement of supply chain, as it occurs in an uncertain conditions. In order to gain competitive edge and to dominate in market it is important to create goodwill among customers same is the reason that it is essential to deliver best possible product and service, as supply chain starts from supplier companies with this goal need to focus on supplier development (Sanchez, 1995). In supply chain management there is an actual or original supplier of the product, because of manufacturing flexibility presented in suppliers the company may also go for substitute supplier between their existing suppliers rather than the original one for that particular product. Along with business, companies also need to get involve in supplier development, as per previous studies if concentrated on cluster methodology for supplier development in close vicinity for more control and vertical incorporation in supply chain the intentions can be implementation of JIT, reduction in freight cost and lead time, to reduce uncertain situation, transfer of technology if capable enough, for close synchronization, to reduce capacity constraint and importantly utilizing advantages of supplier's manufacturing flexibility. The cluster approach for flexible supplier development in supply chain management may help in better control and synchronization of activities such as supply planning, production control, logistics movement, demand planning and etc. (Sanchez, 1995). If integration with supplier is smart and strong it enables organization to take more knowledgeable decisions and avoid bottle neck and uncertainties. Strategic supplier partnership relationship exercises assume an imperative job in SCM (Zhang, Vonderembse, & Lim, 2003). Through cozy

association supply chain partners may stake risks and compensate, and retain the connection on long term grounds (Cooper & Ellram, 1993).

Manufacturing Flexibility

Manufacturing capabilities has most strong association with business performance. As these activities are performed within the company which are not easy to replicate and allocate so they become valuable and inimitable. At first manufacturing capabilities were considered as dimension on the basis of which companies compete therefore more focus was on decision and practices regarding the operational structure (Chavez, Yu, Jacobs & Feng, 2017). Before manufacturing capabilities were referred as operating capabilities and outcome while as per present studies refer it as manufacturer's definite competitive asset against major competitor in market (Chavez, Yu, Jacobs & Feng, 2017). Manufacturing capabilities are basically related to operational management but is also utilize in additional jobs like purchasing therefore can be protracted to supply chain. In order to make your manufacturing capabilities more flexible it is important to have closer supplier relationships like product quality is most significant and core component for supply chain management and closer relationships with supplier are result in to attain product quality improvement (Sanders, 2014). Flexibility in manufacturing can be referred as a capability to adjust and react to variations in manufacturing product's capacity in order to provide consumers separate action or in order to present innovative product or service in the market place (Chavez et al, 2014). Therefore flexibility in manufacturing entails the capability to react to unique desires and product or service modernization to gain range of manufacturing results. Organizations are now also engage in utilizing big data to facilitate greater level of overall network coordination, beside this to achieve the formation of competencies that permit organization with firm and effective reaction to consumer requirements (Sanders, 2014). Quality has a major optimistic influence on satisfaction of customers. Typically studies are more focused on that quality is an element that is seen as point to where product meets production specification, however it is also suggested that other than quality there are more aspects on upon which manufacturing standards may relay like functionality, features, and fitness for use or even styling. Although it is another debate that what customers perceives as a quality, as for customer quality can be in fitness for use or features or product functionality. When actual data flows through the supply chain it permits company in a way to lower merchandise defects and wastages with in manufacturing area (Lee et al, 2013). Quality is typically said to be

optimistic provider in achieving customer satisfaction (Chavez et al, 2014). A cost capability involves producing product and service at a level of cost where product or service provided is priced appropriately to satisfy customer while with a profit margin for organization (Slack et al, 2009). It is also suggested that manufacturer are apprehensive to somewhat extend with cost (Ward et al, 1998) therefore cost can be said as very substantial competency of manufacturing meanwhile other capabilities effect it. Furthermore sharing of upgraded information among supply chain functions known to be allied with key cost enhancement (Jones & Towill, 1997). On the other hand flow of poor quality information may result in rise in total cost for responsive supply chain that may leads to chances of loss of customers (Rossin, 2007). More the unnecessary indirect channels, more it will lead to lower customer satisfaction. In supply chain management channels should be design in a way that it should be related to satisfaction. Manufacturers either can distribute their product directly or indirectly through use of different channels such as distributors, brokers and retailer. Usually it is suggested that more the indirect chancel means longer the chain where far customer is from originator there is chances of more complexity, time taking means from the producer of the product to customer (Stern & El-Ansary, 1992). Below such condition, might be chances of loss of customer base as manufacturer may fails to meet customer expectation that leads to lower level of satisfaction. Channels with in supply chain must be configured where it must influence customer service-satisfaction link. As per channel theory concept more the subsidiary channel is lesser power manufacturer devises above marketing dimension which includes price, promotion strategy, outlet types due to numbers of intermediaries those are involve to make the product sell to customer (Cateora, 1990).

Logistic Flexibility

Logistics flexibility involves major attributes that are range, mobility and consistency which are blend with the component of flexibility that are demand management and purchasing flexibility, the blend of attributes and components cofounded logistics flexibility concept (Upton, 1995). It is about organizational capability to react rapidly to the requirement for distribution, assistance and facilities that is achieve through planning and governing the movement also storage of mechanisms, parts, inventory also associated info from point of beginning to the point of depletion. It involves movement inside and outside organization. The synchronization and strong linkage between planning, sourcing, production and distribution enhance firm's capability to

react to the changing requirements of the marketplace. Flexibility in logistics involves four constituents those are supply flexibility and purchasing flexibility that can be categorized internal competence while other two are distribution flexibility and demand management flexibility that can be categorized as external capabilities. As per Day (1994) competence could leads to straight and optimistic impact on capabilities. In addition to this demand management and distribution are outward element of opposition which possibly directly leads to customer satisfaction. Firm is set to have supply flexibility when is able to deliver range of inbound supplies for the rapid production. Supply flexibility in logistics have an indirect impact customers through supplying materials on time to satisfy customer orders. Like supply flexibility, purchasing flexibility may also have an indirect impact on customer satisfaction through excellence, speediness and rate of the purchased material where again inbound logistics plays an important role to make timely delivery of purchased material in right condition. On the other hand demand management flexibility and distribution flexibility are outbound element of the logistics that involves variety of needs of customers that company is able to serve and types of packaging & mode of transportation respectively. The outbound logistics flexibility has a direct impact on customers. Distribution flexibility is capability to maintain the merchandise, boxing, warehousing and distribution of products in order to satisfy consumer requirements efficiently (Zhang et al, 2002). Distribution flexibility includes parts, product and flow of information also it requires smartness in actions like packaging, warehousing, and outward transportation. The mentioned capabilities must be strategically planned as they are directly visible to customer and create an impact through delivery, speed and quality. While consistency is view through quality and delivery of various out going products. Firsthand experience of customers are based on performance of distribution system. Demand management flexibility is known as the capability of the organization to react to the number of consumer requirements intended for services, time of delivery, price, and quantity rapidly and resourcefully. In order to accomplish this companies promote shortest customer interaction, gather data about their demand, utilize customer-supplied information to develop and distribute products (Schneider & Bowen, 1995). Services like billing, repairing and setting up products at client's location, getting and inspecting deliveries and enhancing products features are part of demand management.

Information Sharing

It is the capacity of the organization to create awareness by sharing

information with supply chain associates in an operative and capable methodology. Operative information sharing is measured as one of the most imperative capabilities of supply chain progression. (Allen & Wilburn, 2002) specified that information ought to be interoperable. It has also been seen the technical movement of internet what's more, e- com offers a novel chance to generate a "smart" incorporated supply chain (Yee, 2005). (Allen & Wilburn, 2002) specified that sharing of information as the entrance to remote data among professional partners along these lines allowing them to display the growth of products and orders as they go over different practices in the supply chain. Information sharing has now shown the ability to substitute physical movement of goods in a way that with the advancement in information technology supply chain partners are able to work with tight coordination in order to optimize supply chain's wide performance. Information sharing is the basic enabler of tight coordination among partners that has been greatly supported by advance information technologies. In today's vibrant market environment information sharing has become essential in order to deal with rapid changing customer preferences that has increased customization of products and modification of demand mix (Yee, 2005). To cater this trend of customization and demand mix that has create an influence on supply chain performance companies need to understand this and should properly react to the demand in order to satisfy customer. As discussed that information sharing in supply chain may create influence on several customer related decision such as; it may impact total customer wait time, can affect customer order incongruity, information sharing among supply partners may significantly also influence product stock age and process time, and can also impact on transit time.

Customer Satisfaction

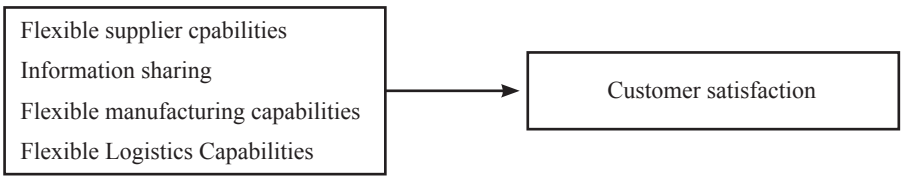
The capability of the firm to produce advanced levels of customer satisfaction is view that create differentiation and same is the reason that it has grown into a crucial component for numerous organizations and their commercial strategy. Customer satisfaction can be seen as a measure or tool that how product or service provided by firm are performing that whether they are able to fulfill or surpass customer expectation (Fornell, 1992). Customer satisfaction metrics are able to indicate that how well and successful company is at generating and communicating products to marketplace (Anderson, Fornell, & Lehmann, 1994). Improving customer satisfaction levels are essential to firms because customer satisfaction has an influence on monetary enactment (Anderson, Fornell, & Lehmann, 1994). From microeconomic view, customer

satisfaction can be linked with rise in market stake and profitability (Anderson et al, 1994). Customers search for new ranges, improved services, advanced quality, and quicker delivery. The connection with consumers has bowed a deliberate matter for the present businesses. (Fornell, 1992), who observe that organizations would infer better results on the off chance that they stay, occupied with collaborative relationship with customers. Customers usually in every organization are on top priority for the management same is the reason that higher customer satisfaction achievement has become key element for every business, customer satisfaction maybe considered as a tool or measure that how well company's product or services are performing in the market, does it meet exceed or lesser than expected (Ellinger, Shin, Northington & Admas, 2012). Today we are living with those trends that changes every fast that has create a big challenges for companies to remain connected with their customers and tries to make uncertain environment certain, in order to succeed in increased uncertainty, companies must quickly respond customer changing needs (Mark A & Jeen Su-Lim, 2005). To make customers feel special by providing them differential design, product, delivery it requires companies to apply flexibility from supply chain viewpoint and process perspective (Mark A & Jeen Su-Lim, 2005).

Hypothesis Development

Flexible Supply Chain Practices

Figure 1. Conceptual framework – The impact of flexible SCM practices on customer satisfaction.



By using above mentioned studies as a reference subsequent Hypothesis are created to inspect the impact of flexible supply chain management practices on customer satisfaction

H1; Flexibility in supplier capabilities increases customer satisfaction

H2; Information sharing leads to increased customer satisfaction

H3; Flexibility in manufacturing capability dimension leads to customer satisfaction

H4; Flexibility in logistics capabilities increases customer satisfaction

METHODOLOGY

Research Approach & Type

Research design used here was survey. Research conducted was cross-section, it examine sample taken from the population at a particular timeframe. The research was accompanied from industrial employees, part of manufacturing related companies. As targeted audience was in huge number therefore to extract sample convenient based sampling was used. Prime data collection was collected from respondent with the help of questionnaire which was administrated with the use of selected companies. The questionnaire contained five point Likert scale structured questions. Principled contemplations kept from side to side by every one of the means in direct of current investigation, for instance, intentional support, withdrawal whenever, regarding participant's perspectives and protection so participants' classification was not broken. The participants' assent revelation was looked for before the meeting because of ethical reasons and as it included intentional investment. Privacy was seen in securing all information gathered inside the extension.

Research Design

This article was designed in such a way so as to get maximum info from sources within given time limit. This research is quantitative in nature. Hypothesis for each factor of supply chain was formed to define the impact of flexible SCM Practices on Customer Satisfaction so, there were four hypothesis created in this research. Questionnaire was formed in order to collect the primary data that involved questions related to all five factors of supply chain. Questions were designed in such a way so as to build a connection between SCM Practices and customer satisfaction. Data was also collected by various discussions and observations because it's quantitative research. After collecting the data different statistical tools were used to analyze it.

Research Population

As employees of different organizations of manufacturing firms were involved here to participate, therefore population was in large number. Employees who are actually responsible for making decisions are management level employees who were part of the study, as we can't take responses from lower level employees who are not aware of supply chain or who have no authority.

Sample Size & Sampling Technique

Sample size was drawn of 250 respondent approx. on the basis of convenience therefore 250 questionnaires were given out to collect data for the study. In total 25 questions were asked from respondent. In this research, convenience sampling was undertake for collection of data as population was in a large number. Convenience sampling is a non-probability based sampling where population is huge can't be calculated in exact numbers, here data is extracted from respondent whoever is easily available from the population.

Research Instruments

Research instrument for primary research consists of a questionnaire which is crafted on the basis of five Likert scale;

- Strongly Agree (5)
- Agree (4)
- Neutral (3)
- Disagree (2)
- Strongly Disagree (1)

Data Analysis Method

The questionnaire addressed all the variables sensibly for getting response from our sample regarding the impact of flexible supply chain management performance. SPSS based software was used for the purpose of analysis of the collected data. Reliability and regression check were run for data analysis. Outputs which were obtained after applying tests were presented in the form of tables and further interpretation was done to explain the significance of the obtained results.

RESULTS

Four factors upon which study is based upon; supplier flexibility, manufacturing flexibility, logistics flexibility, and information sharing in manufacturing industry. Customer satisfaction is also measured in the likewise. There were many areas which can be covered for our research but due to some constrains we focused on selected areas for each driver. The conceptual framework that I have presented consists of four hypothesis relationships which include Information Sharing, Supplier Flexibility, Manufacturing Flexibility, Logistics Flexibility and Customer Satisfaction Variables.

DEMOGRAPHIC STATISTICS

Table 1: Statistics

		Gender	Age	Educational status
N	Valid	252	252	252
	Missing	0	0	0
Mean		1.48	2.26	2.52
Median		1.00	2.00	3.00
Std. Deviation		.500	.790	.665
Variance		.250	.624	.442

The statistics of the demographic represents the respondents of the study which highlights the characteristics of the respondents. The questionnaire of the study represents following demographic questions along with frequencies of responses.

Table 2: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	132	52.4	52.4	52.4
	2	120	47.6	47.6	100.0
	Total	252	100.0	100.0	

The table above mention represents the gender of 252 respondents. Most of them are male, as mention above 52% are male while 47% are female.

Table 3: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	4.8	4.8	4.8
	2	192	76.2	76.2	81.0
	3	30	11.9	11.9	92.9
	4	6	2.4	2.4	95.2
	5	12	4.8	4.8	100.0
	Total	252	100.0	100.0	

The table mention above represents that there were 252 respondents and mostly they were from the age of 23 to 26, they were around 76 % of the total respondent. However a lower frequency of the responses were of age bracket 31 to 35.

Table 4: Educational Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	4.8	4.8	4.8
	2	108	42.9	42.9	47.6
	3	120	47.6	47.6	95.2
	4	12	4.8	4.8	100.0
	Total	252	100.0	100.0	

Anothere demographic factor here was analyze that is education status of the respondent, to know whether respondent is a graduate, post graduate, under graduate or other than this. The above mention table represents that most participants were of post graduated status that were of 47% of all.

Descriptive Analysis

Table 5: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CS	252	2.00	5.00	4.3333	.77819
SF	252	2.00	5.00	4.2143	.83363
IS	252	2.00	5.00	4.0000	.75743
MF	252	3.00	5.00	4.0238	.67351
LF	252	2.00	5.00	3.9722	.71636
Valid N (list wise)	252				

The above table of descriptive analysis displays the central tendency and variation of every variables; customer satisfaction, supplier flexibility, information sharing, manufacturing flexibility and logistics flexibility.

Reliability Analysis

Reliability test show that how closely each variable is related to other variable. In reliability test we look at Cronbach's alpha value as it tells the internal consistency of the variable within our model. Reliability test was run on the collected data to identify the internal consistency of our variables.

Cronbach's alpha should be above than 0.60 for accepting any model, therefore with our results we can see that the internal consistency of our variables in model is high and thus it is acceptable.

Table 6: Summary of Reliability Analysis

Variables	Cronbach's Alpha	No of Items
CS	0.807	5
SF	0.794	5
IF	0.864	5
MF	0.781	5
LF	0.729	5

Separate reliability test were run for each variable we have in this study and its summary is been shown in above mentioned table. As we know Data with a reliability index above than 0.60 is always significant and reliable .as we lookout on the table given above all variable are having Cronbach's alpha values above then 0.60 which makes constructs more reliable.

CORRELATION

Correlation analysis is used to assess the limit to which the variables have an association with one another. In this article the correlation test has been conducted to measure the linkage among Customer Satisfaction, Supplier Flexibility, Information Sharing, Manufacturing Flexibility and Logistics Flexibility. The result of the correlation in this study has used Pearson Correlation which is presented below:

Table 7: Correlations

		CS	SF	IS	MF	LF
Pearson Correlation	CS	1.000	.848	.730	.441	.503
	SF	.848	1.000	.644	.417	.390
	IS	.730	.644	1.000	.656	.558
	MF	.441	.417	.656	1.000	.571
	LF	.503	.390	.558	.571	1.000
Sig. (1-tailed)	CS	.	.000	.000	.000	.000
	SF	.000	.	.000	.000	.000
	IS	.000	.000	.	.000	.000
	MF	.000	.000	.000	.	.000
	LF	.000	.000	.000	.000	.
N	CS	252	252	252	252	252
	SF	252	252	252	252	252
	IS	252	252	252	252	252
	MF	252	252	252	252	252
	LF	252	252	252	252	252

The table above shows that customer satisfaction and supplier flexibility have a correlation value 0.848 which shows that the association between both the construct is high. It shows that flexibility in supply dimension has a strong impact on customer satisfaction. Similarly it is also shows the higher correlation among satisfaction of customer and information sharing variables. The correlation value is found to be 0.730.Therefore better the flow of information more efficiently company may perform to satisfy customer. Then comes the correlation between customer satisfaction and manufacturing flexibility, it is lower as compare to the correlation of customer satisfaction with other variables, it shows correlation of 0.441 but still create an strong impact. The correlation between logistics flexibility and customer satisfaction is around 0.503 which indicate a good association between customer satisfaction and logistics flexibility.

REGRESSION

The regression check was taken to know the impact of flexible SCM practices through five variables. The analysis for regression is shown below

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.889[a]	.791	.788	.35861

a. Predictors: (Constant), LF, SF, MF, IS

The above mention table shows R square value which is 0.791 which indicated that the impact of Flexible Supply Chain Management Practices is around 79%. Adjusted R square value is more purified value which shows how much variables in our model explains other variable which is considered as significant value.

Table 9: Anova[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	120.236	4	30.059	233.744	.000[b]
	Residual	31.764	247	.129		
	Total	152.000	251			

a. Dependent Variable: CS

b. Predictors: (Constant), LF, SF, MF, IS

The table of anova represents the significance value of .000 that indicates the regression model is suitable to predict the results.

Table 10: Coefficients

Model B		Unstandardized Coefficients		Standardized Coefficients	t	Sig. Lower Bound	95.0% Confidence Interval for B	
		Std. Error	Beta				Upper Bound	
1	(Constant)	.443	.158		2.797	.006	.131	.755
	SF	.594	.036	.636	16.712	.000	.524	.664
	IS	.323	.048	.314	6.689	.000	.228	.418
	MF	-.129	.047	-.112	-2.744	.007	-.222	-.037
	LF	.155	.040	.143	3.848	.000	.076	.235

a. Dependent Variable: CS

The table here mentions shows the significance of variables: the customer satisfaction has significance of .006 which is lower than the threshold. The significance to supplier flexibility is 0.00 which means that it is acceptable. Supplier flexibility do has an impact on customer satisfaction. Then information sharing significance also lies within the range hence is acceptable i.e. 0.00. Manufacturing flexibility shows significance of 0.007 which is good as it is within the range of acceptance also its coefficient value shows the reverse relationship. Lastly logistics flexibility also meets the criteria having significance level of .000. When the value of significance is below than 0.05 then there is a probability that the constructed hypothesis can be true. Hence it proves that flexible supply chain management practices do have impact on customer satisfaction.

SUMMARY OF HYPOTHESIS TESTING

Table 11: Summary of Hypothesis

S.No.	Hypothesis	Status	Sig. Value
1	Flexibility in supplier capabilities increases customer satisfaction	Accepted	.000
2	Information sharing leads to increased customer satisfaction	Accepted	000
3	Flexibility in manufacturing capability dimension leads to customer satisfaction	Accepted	.007
4	Flexibility in logistics capabilities increases customer satisfaction	Accepted	.000

All variables are accepted summarizing that flexible SCM practices has impact on the satisfaction level of customer.

DISCUSSION

Hypothesis 1

Results obtain from our analysis shows that there is an optimistic impact of flexible SCM practices from supplier's perspective on customer satisfaction thus it leads to increased satisfaction from customer. With the help of SCM practices, factors like Strategic supplier relationship, supplier's involvement, supplier development has been able to increase flexibility from supplier's end and has been more accurate than it was before. Sharing of information between partners was one of the major problems in supply chain due to which service was in decline which leads to poor satisfaction at customer end. Problem seems to reduce to some extend with the implementation of proper Flexible SCM practices.

Hypothesis 2

As per results obtained from our analysis of data which shows the positive impact of information sharing on customer satisfaction. Through the help of supply chain management practices, Information sharing has been more accurate than it was before. Information sharing which was one of the major problem in supply chain because of which service decline, excessive inventories, sales decline, inaccurate planning of capacities, deprived production schedules, late deliveries, growing logistics cost and etc. problems were also rising. These problems reduce with the implication of flexible supply chain management practices. As mention above if implications of SCM practices are controlled and sharing of information among factors is accurate, it will eventually result in improved performance of entire supply chain and increased flexibility.

Hypothesis 3

Results obtain shows the positive influence of flexible manufacturing capabilities on satisfaction of customer. As discussed per (Chavez, Yu, Jacobs & Feng, 2017) in their research paper they conducted it was shown that manufacturing capabilities has positive relationship with customer satisfaction. Similar results are shown as per collected data. Manufacturing capabilities has most strong and prominent association with firm's

performance. With help of bringing flexible practices of supply chain management manufacturing ability has been increased than it was before. It was observed that more focused towards cost and quality dimension increases the level of flexibility which helps in satisfying customer, also short and only needed channels of distribution helps to avoid distortion between manufacturer and customer.

Hypothesis 4

As per results through data analysis it indicates the positive impact of logistics flexibility on customer satisfaction. As per (Zhang, Vonderembse & Su lim, 2005) research on logistics flexibility it shows the positive, durable and direct association among flexible logistics capabilities and consumer satisfaction. In order to bring flexibility, both inbound and outbound logistics need to be accurate, as outbound logistics have direct impact on customer satisfaction while if inbound logistics isn't efficient enough it will eventually create trouble for outbound logistics.

CONCLUSION

This research delivers observed validation aimed at framework that categorizes four important dimensions of Flexible SCM practices and describes the connection among SCM practices, customer satisfaction. It scrutinizes four hypothesis.

Since we have tested the impact of SCM Practices onto the customer satisfaction statistically and it's been concluded that Flexible SCM Practices does contribute in enhancing the performance of supply chain. With further research this study can also be generalized to other sector as well. Our four hypotheses related to SCM Practices were tested and proved. Hypothesis displays the positive impact of flexible supply chain practices on customer satisfaction. As per statistics it is extract that supplier flexibility has the most impact.

Current research is done to evaluate the impact of SCM Practices factors on Customer Satisfaction. It is necessary to implement SCM practices on every manufacturing organization. The factors of SCM practices are used to enhance efficiency and effectiveness of supply chain management.

As of the examination outcomes, it concludes that flexible SCM practices improve customer satisfaction. Consequently there is requirement

for manufacturing industry to consider creating flexible supply practices, flexible manufacturing practices, flexible logistics practices and practices of information sharing. Based on the theory according to which customer satisfaction upgrades loyalty of customer, shows the requirement for organizations to develop the nature of company's services and indulgence customers as organization's main need with the goal that they wind up faithful to the company and furthermore prescribe the association's offerings of products to other people.

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THE ROLE OF LEADERSHIP BEHAVIOURS AND ORGANIZATIONAL CULTURE ON EFFECTIVE KNOWLEDGE SHARING; CASE OF STATE-OWNED ENTERPRISES IN PAKISTAN

Khawaja Asif Tasneem and Saba Feroz Qureshi

ABSTRACT

The purpose of the study is to explore the influence of leadership style on knowledge sharing in state-owned enterprises. We also study the role of organizational culture that is cultivated by the servant and transformational leaders in the workplace. Sample of 297 respondents from state owned enterprises of Pakistan was used in the research. Data was collected by conducting a survey and was analysed through multivariate analysis; PLS "partial least squares" and SEM "structural equation modeling". The results of the study reflect that both leadership styles i.e. servant and transformational, significantly and positively effect knowledge sharing in state-owned enterprises of Pakistan and organizational culture also has a positive and significant mediating role in the relationship between two leadership styles and knowledge sharing process in the targeted state-owned enterprises. The current study provides the mechanisms of organizational culture in terms of systems and procedures which evaluate its impact on knowledge sharing effectiveness in organizational managers by the help of examining the relationship between servant leadership, transformational leadership, organizational culture and knowledge sharing.

Keywords: *Transformational Leadership, Servant Leadership, Organizational Culture, State Owned Enterprises, Knowledge Sharing.*

INTRODUCTION

Knowledge is deemed as an information holding high value and therefore, it is very crucial to perform the task of managing knowledge with utmost precision and appropriateness in an organization so the organization can make sustainable competitive benefit among the competitors in its respective

markets (Birasnav et al., 2011). Knowledge management process involves the tasks of identifying, selecting, organising and classifying the information in an enterprise in such a way that the knowledge makes a positive impact on individual performances by improving them and by developing competitive edge over rivals. All the tasks of knowledge management processes can be effectively accomplished by creating a supportive organizational culture which promotes production and sharing of knowledge among the organizational from top to bottom and across the organization. Considering this, it can be deduced that the work environment and culture of an organization indeed plays a vital part in effective knowledge management on organisational level (Akhavan et al., 2014).

The importance of knowledge management and the effect of leadership styles on its processes steers the attention to formulate the current paper with a clear objective of finding out the nature of interrelation in particular leadership styles and knowledge sharing and management in context of business organizations. Moreover, it can also be observed that leadership styles affect knowledge management by breeding effective culture in the firm therefore the current study also undertakes the organizational culture as a mediating variable between leadership styles and knowledge management in state-owned enterprises of Pakistan.

The state-owned enterprises of Pakistan are chosen in current paper because like many other areas, state-owned enterprises of countries also heavily rely for their success on their intellectual capital rather than the physical capital. It is already established that knowledge being the most important information is one of the most valuable intellectual assets for the enterprises and therefore it can play an important role in the growth of government organizations (Abbas et al., 2011). It is also closely observed that government sector of Pakistan has received very less attention by researchers and practitioners when it comes to their governance of knowledge management. Also, the area is less developed in terms of mechanism of knowledge management and also lacks sufficient investment in knowledge sharing systems (Amber, Khan & Ahmad, 2017). Therefore, the study has selected the said area to conduct the research on the interrelation of leadership styles, organization culture and knowledge sharing processes.

It is identified that in many small or less resourced enterprises such as government organizations, identification, creation, storage, capture, mapping and dissemination of knowledge is challenging. Therefore, it is crucial to

identify that what factors can contribute in an effective knowledge management in such enterprises. Studies (Farooq et al. 2017; Mishtaq & Bukhari, 2017; Akhavan et al, 2014) prove that leadership and its particular styles have important parts in mitigating the difficulties that arises in the accomplishment of knowledge management processes, therefore this paper seeks to investigate the different classifications of modern organizational leadership styles such as transformational style, servant style and transactional style and also that how can these styled (transformational, servant and transactional) can affect knowledge management processes in an enterprise and how organizational culture mediate the relationship. Moreover, the literature reveals that the two concepts of leadership styles and organization culture have been linked to Knowledge sharing processes individually. This means that researchers have investigated the correlation of leadership and knowledge management (Crawford, 2005; Mushtaq & Bokhari; Farooqi et al., 2017), and correlation of organizational culture and Knowledge sharing (Tseng, 2010; De Long & Fahey, 2000), but the literature lacks in addressing the phenomenon that how leadership style creates and 'maintains' particular organizational cultures to promote knowledge sharing. Addressing this gap, the current paper aims to provide empirical evidence to prove the existence or nonexistence of interrelation between the modern leadership styles (servant and transformational), organizational culture and practices associated with knowledge sharing practices which gives way to the following research questions:

THEORETICAL BACKGROUND

Leadership Styles

If one wants to understand the concept of leadership styles, it is integral to go through the concept of leadership which is a process of influencing the followers and orienting them (Banai & Reisel, 2007). A definition defines leadership as process of penetration among subordinates to accompany them with utmost support in the achievement of common goals and milestones (Akhavan et al., 2014). Well-known and leadership theories that are brought under discussion in current researches are servant style of leadership and transformational style (Smith et al., 2004).

Initially, the specifics of transformational theories reflected that leaders with this style inspires their subordinates which results into the benefit that subordinates and leader are clear on organizational vision and also such leaders are known to develop the potential in followers by providing them resources and thereby empowering them to achieve the vision that is shared with them

by the leaders (Bass, 1996). Leaders with transformational leadership style not only act as role models but also support optimism and attain commitment from their followers while focusing on tasks while simultaneously working on subordinates' professional development and personal and career growth (Bass & Avolio, 1988). Transformational style of leadership focuses on the accomplishment of leader rather than on his or her personal traits and relationship with peers and subordinates. Transformational leadership can also be described as the leadership process that transforms the behaviour of individuals. In simpler words, this leadership style inspires the followers to be changed under the leadership (Northouse, 2016).

Likewise, the initially presented theory of Servant leadership not only depicts leaders as servants of their followers but the theory shows such leaders placing their followers' interest before their own (Greenleaf, 1977). The primary object of servant leader is to serve and fulfil the requirement of others and such leaders think that this should optimally be the core motivation for an effective leadership. Servant leaders gain credibility and immense trust from their followers by influencing them with their own contributions and efforts (Anderson, 2018).

Leadership Styles and Knowledge Sharing

In the phase of knowledge sharing in knowledge management process, leadership plays a very important role by forming mutual knowledge sharing practices, by encouraging the members of organization members to exchange ideas and have knowledge-based discussions and dialogues among them (Micic, 2015). Empowering leaders takes one step higher and get engaged themselves in knowledge sharing activities (Mishra & Pandey, 2018). When employees perceive their leaders as encouraging and supportive of knowledge sharing in an organization then their involvement in knowledge sharing activities are also positively influenced as such leaders encourage the followers openly in discussion meetings to share their skills and ideas with others. This openness elevates both internal and external knowledge sharing behaviour in subordinates (Carmeli et al., 2013).

The relationship of servant leadership style with knowledge sharing can be seen through theories of social learning and social exchange (Bandura, 1977) and social exchange theory (Blau, 1964). Social exchange theory indicates a social exchange between employees and leader behaviours (Tuan, 2016). The leaders with Servant leadership style lead employees by providing service to them, by transcending their self-interest, by demonstrating care

and empathy for others and by acting in best interest of subordinates (Van Dierendonck, 2011). In social exchange theory, people are inclined to return favours to the ones who act in their interest. This reciprocity increases till a perceived balance is emerged in the exchanges (Blau, 1964). The more a servant leadership demonstrate and practice care to the employees, the more employees respond. This reciprocation is not only in terms of treatment but also happens in leader's commitment to organizational mission and transcendent contributions, importantly contribution such as knowledge sharing.

Transformational evidently is a leadership style that promotes and develop the methods of organizational learning by creating opportunities in the firm so the organizational members are enabled to gain learning through can learn through dialogues, communication, interaction and experimentation (Liu & Li, 2018). The interrelation of transformational leadership style and knowledge sharing is seen in the light of exchange relationship by various researchers where exchange relationship occurs between subordinates and transformational leade201according to the social exchange theory (Lee, et al., 2010, Han, et al., 2016). Li et al. (2014) deduced that transformational style of leadership positively influences the exchange between leaders and organizational members which leads to improved and increased knowledge sharing in the workforce. Transformational leadership facilitates the process of knowledge sharing as this style incorporates and promotes trust among followers for not only leaders but also for each other and for organization as well. In return, when the leadership asks them to engage in the processes of knowledge sharing then the followers oblige trustingly (Lee et al., 2010).

H1: Servant leadership style has a positively relates with knowledge sharing in an organization

H2: Transformational leadership style has a positively relates with knowledge sharing in an organization

Organizational Culture

Organizational culture can be defined as basic shared assumptions that an organization and its members learn while coping with internal and external environment and solving problems related to internal integration and external adaptation. The same are then taught to new members so they can also solve problems in same way (Parket al., 2004). Tseng, (2010) defined organizational culture as the thoughts and acts of members in an organization (Tseng, 2010). Edwards (1988), Robbins and Barnwell (1994) and Nicholls

(1984) described organizational culture as the shared beliefs, values and perceptions of employees and other stakeholders in an organization. Culture is learned socially and organizational members transmit it in organization. It can be cultivated in in stable social set up of any type and size (Yang, 2007).

Leadership and Organizational Culture

Once the concept of organizational culture is examined closely along with the role of leadership in an organization, it can be conveniently concluded that both concepts are strongly interlinked with each other (Schein, 2004). One concept cannot be understood completely without understanding the other. A leader forms an organization that can reflect his or her beliefs and values, means he or she shapes the organizational culture accordingly. On the other hand, the cultural conditions shape the actions, values and beliefs of its members and support those of the leaders (Northouse, 2016) If organizational culture doesn't support leaders, it is impossible to form a leadership style that is based on the common values. Therefore, organizational culture determines the major part of leadership styles and what and how the leaders operate in an organization (Nguyen & Mohamed, 2011). Leader in an organization needs to understand the culture on organisational and community level both in order to successfully establish knowledge management practices in a work place (Rijal, 2010). The employees and other members of organizations must be substantially willing to exchange and share skills and knowledge with peers and other organizational member.

Organizational Culture and Knowledge Sharing

When it comes to organizational culture, various authors have shed light on the significance of a culture in knowledge sharing, transfer and its creation in an organization (Rijal, 2010; Poul et al., 2016; Al-Alwai et al., 2007; Kathtiravelu et al., 2014). Culture is an essential element of an organization because it has the potency to immensely influence the behaviours and attitudes of organizational members. This is one of the main reasons that organizational culture directly affects knowledge sharing processes in an organization (Rijal, 2010). Effective knowledge sharing requires constant and operative interaction among organizational members. Other than that market orientation, trust among individuals, intrinsic motivation, element of enjoyment in helping others, support from leadership are some other factors that are very influential in the process of knowledge sharing (Khatiravlu et al., 2013).

Another influence to a knowledge sharing willingness in an organization's

culture is the reciprocity. This means the need of an individual to perceive a future or current return on knowledge that he or she chooses to transfer or share in a workplace. This may be a direct compensation, something intangible such as enhanced reputation or the trade of knowledge against knowledge. A leaser plays an important role in cultivating such culture of reciprocity in organizations to promote knowledge sharing behaviour and intentions (Tuan, 2016). All in all, authors have particularly emphasized in their studies (Ngyen & Mohamed, 2011; Yang, 2007; Rijal, 2010; Akhavan et al., 2014) that the cultural component which mainly influence the process of knowledge sharing in organizations is the way in which it is managed by its leadership or the organizational culture in itself.

The theoretical background helps in formulating the below hypotheses

H3: Organization culture positively relates with knowledge sharing in an organization

H4: Organizational culture mediates the positive relationship between Servant leadership style and organizational knowledge sharing.

H5: Organizational culture mediates the positive relationship between Servant leadership style and organizational knowledge sharing.

METHODOLOGY

The current paper has taken Pakistan's state-owned enterprises to study the conceptual framework of the study. In this study, positivist research philosophy is being utilized which will test the theories through quantitative techniques and tools.

The study has employed the approach of quantitative calculations because the research is emphasized on statistical and numeric analysis of the collected data to fulfil research objective. Generally, quantitative method starts with data collection against proposed hypothesis and mostly it employs the of deductive approach (Babbie, 2009). Ahimbisibwe, Omudang, Tusiime and Tumuhairwe (2016) and Perepelkina (2018), have employed the combination of quantitative and deductive approach in their studies because it is suitable to explain and draw inferences from results on relationships of variables. Considering the mentioned logics, the current study has utilized the said approaches by formulating hypothesis by extensive reviewing the relevant literature and available theories. There is also an element of exploratory research design in the study as the purpose of an exploratory design is to establish a better perceptive of the aspects that are being investigated in a

study and to produce an innovative data to form a suitable base for future investigations. This type of research design is used to study new developments and is characterized by the flexibility. Such design is also helpful to understand new insights, clarify concepts, and to assess them (Routio, 2007).

Population and Sample

The current study is considering state-owned enterprises of Pakistan as the target population. The state-owned enterprises refer to those that are owned by the government of the country. The state-owned enterprises of Pakistan are chosen in current paper because like many other areas, state-owned enterprises of countries also heavily rely for their success on their intellectual capital rather than the physical capital. It is established fact that knowledge being the most important information is one of the most valuable intellectual assets for the enterprises and therefore it can play a significant role in growth of government organizations (Abbas et al., 2011). It is also closely observed that government sector of Pakistan has received very less attention by researchers and practitioners when it comes to their governance of knowledge management. Also, the area is less developed in terms of mechanism of knowledge management and also lacks sufficient investment in knowledge sharing systems (Amber, Khan & Ahmad, 2017). Therefore, the study has selected the said area to conduct the research on the interrelation of leadership styles, organization culture and knowledge sharing processes. The population for the study is the 581,240 employees who are working in the state-owned enterprises in Pakistan (Establishment division report, 2018-2019). It means the population of the study can be categorized as known or countable population because the number of population is known to the investigator (Panichkitkosolkul, 2013).

The strategy of Sampling encompasses the technique that researcher adopts to select a certain sample population of the study (Robson and McCartan, 2016). Sampling techniques are generally classified into two classes. One is probability sampling and the other is non-probability sampling (Saunders et al., 2012). When every population unit has an equal chance to get selected then it is probability sampling. While non-probability sampling provides each population unit with variation in chances of getting selected (Sekaran and Bougie, 2016). The population of current research is the state-owned enterprises of Pakistan and in order to select the sample the method of purposive sampling which is method for non-probability sampling is adopted.

For which the formula is as follow

$$N = N/\ 1+N\ (e)^2$$

Where, 'n' denotes sample size, 'N' population size and 'e' is the level of accuracy at 5% which is most suitable as per the population size.

By putting the values in the formula and sample proportion of 50%, the required sample is 399 participants for the survey from all public sector organizations purposively.

Initially, 399 questionnaires were distributed and response rate was 81.2 % and further at the point of data entry other 27 questionnaires were also discarded owing to the incomplete responses. However, sample of 297 used in process to analyse data against hypotheses developed.

Research Instrument

Leadership styles' items adapted from Avolio's (1997) to measure the transformational and servant leadership behaviours. The items representing organizational culture are adapted from Denison's Organizational Cultural Survey (DOCS) (Fey & Denison, 2003). Knowledge sharing items are adapted from Becerra-Fernandez and Sabherwal (2001) study. These items are used to let participants to specify how frequently each of the acknowledged effective knowledge sharing processes are used within their particular organization (Sabherwal and Becerra-Fernandez, 2003).

DATA ANALYSIS

Data is collected by conducting a survey and then the collected data is analysed through multivariate analysis PLS SEM, where PLS stands for "partial least squares" and SEM for "structural equation modelling". This method is widely recognized widely as a variance based, descriptive and predictive technique of structural equation modelling (Hair et al., 2017). This method is deemed among most suitable ones when the objective of the research is to maximize and expand dependent variables via variance comprehended by the independent ones (Richter et al., 2016). The current study adopts the PLS method for its further suitability due to the aim of predicting dependent variables and also due to the extensive intricacy in terms of complex relationships in hypotheses.

Since, SEM is applied to determine the impact of respective leadership styles (Servant and Transformational Leadership) on Knowledge Sharing directly and indirectly with organizational culture. First, results from confirmatory factor analysis (CFA) were extracted by employing SEM. As convergent validity was assessed by computing factor loading its value should exceed 0.60 (Fornell & Larcker, 1981). If value does not exceed 0.60 then item is removed to maintain the convergent validity of instrument. Next,

composite reliability, cronbach's alpha and average variance extracted (AVE) were computed to confine reliability and internal consistency of items.

Composite reliability should exceed 0.80, AVE 0.50 (Fornell & Larcker, 1981) and reliability 0.70 (Fornell & Larcker, 1981; Nunnally, 1978).

Table 1: Convergent Validly & Reliability

Variables	**Items**	**Loadings**	**T-value**	**p- value**	**CR**	**α**	**AVE**
Knowledge Sharing					0.931	0.910	0.695
	KS-1	0.618	11.513	0.000			
	KS-2	0.780	23.652	0.000			
	KS-3	0.877	44.462	0.000			
	KS-4	0.904	59.660	0.000			
	KS-5	0.907	66.925	0.000			
	KS-6	0.879	54.674	0.000			
Organization Culture					0.853	0.801	0.554
	OC-1	0.629	16.830	0.000			
	OC-2	0.636	13.477	0.000			
	OC-3	0.643	13.703	0.000			
	OC-4	0.692	16.491	0.000			
	OC-5	0.729	19.428	0.000			
	OC-6	0.730	17.704	0.000			
	OC-7	0.652	11.910	0.000			
Servant Leadership					0.852	0.784	0.537
	SL-1	0.642	12.470	0.000			
	SL-2	0.773	29.853	0.000			
	SL-3	0.798	32.042	0.000			
	SL-4	0.738	19.180	0.000			
	SL-5	0.704	16.346	0.000			
Transformational Leadership					0.925	0.902	0.673
	TL-1	0.861	44.702	0.000			
	TL-2	0.836	31.559	0.000			
	TL-3	0.828	31.766	0.000			
	TL-4	0.860	44.050	0.000			
	TL-5	0.823	29.562	0.000			
	TL-6	0.706	16.804	0.000			

Table 1 posits factor loading values > than 0.60, t values > 1.96 & p values

< 0.05. Factor loading values of knowledge sharing range in between 0.618 to 0.907, loading values of organization culture range in between 0.629 to 0.730, loading values of organization culture range in between 0.629 to 0.730, loading values of servant leadership range in between 0.642 to 0.798 and loading values of transformational leadership range in between 0.706 to 0.861. Next, to the reliability statistics, composite reliability posits all values > 0.80, AVE values > 0.50 (Fornell & Larcker, 1981) and cronbach's alpha values > 0.70 (Nunnally, 1978).

Model fit was assessed by employing fit indices such as SRMR and NFI and these criteria's values with a certain threshold (e.g., SRMR < 0.08 and NFI > 0.90) to assume fitness of model (Hair et al., 2017).

Table 2: Overall Fit Indices

Fit Index	Score	Cut-off Values
SRMR	0.079	< 0.08, < 0.10
NFI	0.947	> 0.90

Discriminant validity confined the degree to which items of a variable are supposed to measure a specific construct but must not be correlated with other constructs or to predict the other constructs (Hair et al., 2017). Hence, the correlation values in discriminant validity table (3) are not strongly correlated > 0.50 with other variables which supports discriminant validity.

Table 3: Discriminant Validity

Variables	1	2	3	4
1.Knowledge Sharing	0.834			
2.Organization Culture	0.270	0.674		
3.Servant Leadership	0.312	0.348	0.733	
4.Transfermational Leadership	0.317	0.350	0.336	0.820

Structural model shows path coefficients of all constructs. Servant leadership shows significant positive relationship with organization culture, β = (0.393), t value = (7.306 > 1.96) and p value = (0.000 < 0.05). Transformational leadership shows significant positive relationship with organization culture, β = (0.400), t value = (7.017 > 1.96) and p value = (0.000 < 0.05). Servant leadership shows significant positive relationship with knowledge sharing, β = (0.203), t value = (2.604 > 1.96) and p value = (0.009 < 0.05). Transformational leadership shows significant positive relationship with knowledge sharing, β = (0.434), t value = (6.624 > 1.96) and p value = (0.000 < 0.05). Both of leadership styles signify positive relationship with knowledge sharing.

Table 4: Path Coefficients

Structural Path	Coefficient	t-value	p-value	Decision
Servant Leadership → Knowledge Sharing	0.146	2.604	0.009	Supported
Transformational Leadership → Knowledge Sharing	0.434	6.624	0.000	Supported
Servant Leadership → Organization Culture	0.393	7.306	0.000	Supported
Transformational Leadership → Organization Culture	0.400	7.017	0.000	Supported

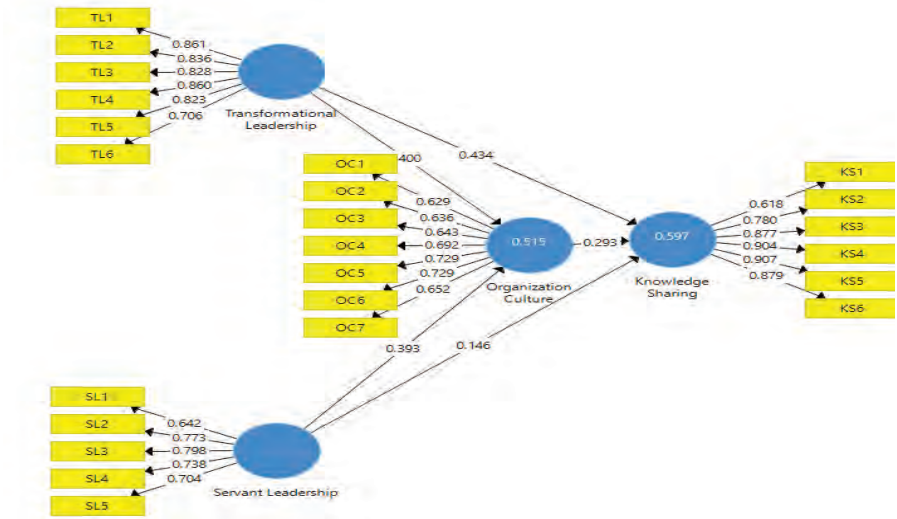
Table 5 & Figure 1 posit results of hypothesis testing based on SEM relationship among the latent constructs. It is found servant leadership significantly influence knowledge sharing, $\beta = (0.261)$, t value = $(9.672 > 1.96)$ and p value = $(0.000 < 0.05)$, hypothesis 1 is supported. The influence of transformational leadership is significant on knowledge sharing, $\beta = (0.552)$, t value = $(4.643 > 1.96)$ and p value = $(0.000 < 0.05)$, hypothesis 2 is supported. It is found organization culture significantly influence knowledge sharing, $\beta = (0.293)$, t value = $(5.369 > 1.96)$ and p value = $(0.000 < 0.05)$, hypothesis 3 is supported.

It is found organization culture mediates (indirectly) relationship of servant leadership and knowledge sharing, $\beta = (0.115)$, t value = $(4.328 > 1.96)$ and p value = $(0.000 < 0.05)$, hypothesis 4 is supported. The influence of transformational leadership on knowledge sharing is also mediated (indirectly) by organization culture, $\beta = (0.117)$, t value = $(4.054 > 1.96)$ and p value = $(0.000 < 0.05)$, hypothesis 5 is supported.

Table 5: Total Effect & Indirect Effect

Structural Paths	Coefficient	t-value	p-value	Decision
Servant Leadership → Knowledge Sharing	0.261	9.672	0.000	Supported
Transformational Leadership → Knowledge Sharing	0.552	4.643	0.000	Supported
Organization Culture → Knowledge Sharing	0.293	5.369	0.000	Supported
Servant Leadership → Organization Culture → Knowledge Sharing	0.115	4.328	0.000	Supported
Transformational Leadership → Organization Culture → Knowledge Sharing	0.117	4.054	0.000	Supported

Figure 1. PLS-SEM



Source: Author

DISCUSSION

Results reflect that servant leadership styles make a positive influence on knowledge sharing practices in an organization. The studies by Sial et al., (2014) and Tuan (2016) support the current results that leadership with servant style behaviours positively relate to the attributes of knowledge sharing. The obtained results further show that transformational leadership is another style that positively relates with knowledge sharing processes in organizational context. This is supported by various studies such as that of Nguyen & Mohamed (2011) and Han et al., (2016) stating that transformational leadership provides subordinates with more decision making power and self-determination which results into stronger commitment and engagement in employees in terms of helping behaviours and these psychological and social behaviours become antecedents of norms and values that support knowledge sharing. The study opted organizational culture as a mediating variable between leadership styles and knowledge sharing in an organization. The results draw attention to a significant mediating variable of organizational culture and shows that organizational culture indeed plays a positive role in supporting leadership to enhance knowledge sharing in the organization. Past studies have also stated the same mediating effect of organizational culture to knowledge sharing such as Cabreraet et al., (2006) and Block (2003).

CONCLUSION

The research attempts to evaluate the role of leadership and organizational culture on knowledge sharing in the organization. Results entail positive relationship between knowledge sharing and leadership styles including servant leadership and transformational leadership and also reflects a positive role of mediating variable organization culture. The results are supported by past studies including Sial et al., (2014), Tuan (2016), Nguyen & Mohamed (2011), Han et al., (2016), Cabreraet et al. (2006) and Block (2003). This research paper is an effort to grasp the mechanism as an important identification in an intricate process through which leadership sharing caters and nurture the processes of knowledge sharing in an organization. On the other hand, the current study also embeds the mechanisms of organizational culture in terms of systems and procedures to evaluate its impact on knowledge sharing behaviours in organizational members.

MANAGERIAL IMPLICATIONS

The findings suggest that both servant and transformational leadership behaviours essentially enhance and promote knowledge sharing practices. The successful knowledge sharing system, depends on the way in which leaders balance servant and transformational leadership behaviours to maintain a balanced culture in organization which can support knowledge sharing effectively. It can be seen in the results that transformational leadership allows the leaders to adapt to the organization culture and realign the culture with new vision, whenever needed. Results and literature review also summarize that with servant leadership behaviours, managers can establish trust relationship among organizational members so a culture is formed where individuals trust each other enough to share their knowledge with them by considering that their leader also keep their development and growth on upper most consideration and therefore share as much knowledge and experience with them as he or she can. These way managers can cultivate a culture in their organization where they will not have to put much effort in establishing knowledge sharing processes because the members will engage in the knowledge sharing processes by taking it as a norm and part of their job functions and not a burden or an act of favour. This will more likely affect the overall performance of employees and thus organization as well.

FUTURE DIRECTION

The literature review and findings of this study present various points and angels that can be further discussed in future researches. The analysis

by Wang & Noe's (2010) and has already given a set of individual level and team level measures related to knowledge sharing processes. On the bases of these measures, further research can entail many other types of leadership such as transactional leadership style, charismatic leadership styles, commanding leadership styles and many others to check their effect on knowledge sharing processes so managers are provided with a wide area to adopt from and implement in their leadership of their subordinates. Wang & Noe (2010) also identified various elements of organizational culture such as reward systems and structure that can be checked as influential antecedents for knowledge sharing in future. Also, knowledge sharing is a phase of knowledge management (Micic, 2015), therefore future studies can research more leadership styles and the influence they make on the whole knowledge management system in organizations.

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THE IMPACT OF SUSTINABILITY ON FASHION INDUSTRY

Farhat Naseem Shaikh

ABSTRACT

The Fashion industry in one of the most dynamic and fluctuating industry across the world. New fashion has two main aspects of fast and slow fashion. The purpose of this study to identify the conflict in customer understanding and perception about slow and fast fashion. Quantitative research approach is conducted with survey data from 140 diverse set of people. Two-stage PLS-SEM technique is used due to multiple dependent variables and small sample size. After classification of articles related to the scope of the study, findings are categorized in two different ways: 1) Slow fashion and sustainability and 2) Fast fashion. 14 articles from the 19 articles have done detailed working on our first category of slow fashion and sustainability. This study produced. Some recent trends in the domain of sustainability on slow and fast fashion industry that how it changes the lifestyle of people, it focuses on some practices in the context of supply chain management and how it shapes the society. This paper is a contribution towards framework slow fashion and fast fashion theories. This research objective after reading different articles to achieve better outcome.

***Keywords**: Fast Fashion; Slow Fashion; Sustainability; Ethics; Fashion Industry.*

INTRODUCTION

Fashion is accepted as an individual's choice instead of a collective mandate or group decision. In reality, now a day's dresses and styles of clothes are being created for shorter lifecycles (Clark, 2008). Major economies like the US have developed frameworks to encourage slow fashion, as indicated by Trejo, Smith, Trejo, and Lewis (2019). Mixed cultured research focused on males has been developed by Sung and Woo (2019) presented that comprehensive and concrete information on slow fashion positive outcomes should be given to the buyers by the sellers, retailers, and marketers. It will increase the understanding of individuals who may have an affinity to buy

such products. However, the culture of overconsumption has been established by the fashion industry which leads to the unsustainability of the environment. Negative environmental, societal and economic consequences are the result of too much consumption which is fueled by the name of "style" or "fashion" (Gupta, Wencke, & Gentry, 2019).

"Slow Fashion" is a word used to represent sustainability, high quality, durability, low carbon footprint, and low impact production. A Common man usually relates slow fashion to the speed of production in parallel to the slow use of products. Whereas, the slow nature of raw material or long product lifecycle is the correct notions which often fails to recognize by consumers (Goldsworthy, Earley & Politowicz, 2018). Slow fashion products have many positive sides such as environmentally friendly, socially responsible, ethically reasonable along with good and long-lasting quality (Sung & Woo, 2019). Therefore, Kedron Thomas (2018) has summed up in his recent study that fashion designers and business managers have varying concepts for sustainability and understand sustainability practices differently. The Difference of understandings is backed by one's personal and professional experiences which do not necessarily help individuals to make ethical decisions successfully.

Individual buyers or consumers want to show their concerns about social responsibility while feeling satisfied with their dresses and styling sense. Ethical policies and practices have two main selling points namely fair wages and satisfied employees. Everyone in the value chain from manufacturer to consumer has a collective responsibility to make sure that no harm has been made from production to consumption of the product (Khandual & Pradhan, 2018).

This systematic review is designed to answer the following research questions in light of past research:

- What are the ethical issues of the fashion industry?
- What are the sustainab ility issues of the fashion industry?
- What are the issues that the fashion industry is facing for slow fashion and fast fashion?
- Does consumer's understanding of slow fashion affect the fashion industry's future direction?

This systematic review is aimed to provide an understanding of the slow fashion positives side along with a clear understanding on the downside like low profitability, lesser production and decreases in sales as compared to fast fashion products.Many Pakistani clothing brands are now promoting the concept of sustainability and consumer social responsibility. However, Pakistan is a developing country, it will take ample time to make people understand in Pakistan the concept of sustainable fashion or slow fashion. Only consumer education and recalling of ethical and social responsibility may help our buyer to learn about slow fashion.

DESIGN / METHODOLOGY /APPROACH

Systematic Literature Review (SLR) Methodology

A systematic literature review (SLR) is a planned and structured approach that is used to review published academic articles broadly. The SRL approach is inductive in nature as during the process of review categories were classified, ordered and reformed preciously. The method for this research has been adopted form systematic review carried out by Thorisdottir and Johannsdottir (2020). The review, which was done by Thorisdottir and Johannsdottir in 2020, had a purpose to understand how fashion industry business models are integrated with sustainability and how can sustainability practices gauged to guarantee transparency and to improve the current situation. Thorisdottir and Johannsdottir (2020) used six key phases of systematic review followed by Mapping through scoping, comprehensive research, quality assessment, extraction of data, synthesis, and write-up.

Inclusion Criteria

Characteristics or elements that allow any article to include in the literature are known as inclusion criteria. Checking points for eligibility of articles in the study were; studies were published in the English language are included. Also, studies that were published in the last 12 years are included, as focus on the subject was highlighted during the last 12 years. Those studies which are focused on the “Fashion industry for fast and slow fashion” and “consumer behavior and understanding for fast and slow fashion” included in the review. Whereas, there is no limitation for articles adopting either qualitative and quantitative methodology or mix method are included. “Publish and Perish” has been used to gather a list of articles as it is a publically available tool for searching prominent databases like Elsevier, JSTOR, Taylor & Francis, Emerald, Springer, Sage, and MDPI. Keywords that are used to get relevant articles are “Slow fashion” and “Fast fashion”.

Exclusion Criteria

The articles left after checking on inclusion criteria are fall under exclusion criteria. There are some parameters or characteristics which disqualify the articles to include in the study. The parameters have taken for the exclusion of articles were the study was published in any language except English are excluded and conference proceedings, thesis, and non-peer-reviewed journals are not covered in this study. Furthermore, the study focused on the sustainability of the supply chain of the fashion industry are excluded. Studies are focused on the business model for fast and slow fashion are not included. Researches related to branding and buying behavior of fast and slow fashion are also excluded.

Quality Assessment

During quality assessment step 131 articles were read and analyzed. Assessment of quality of articles included reading of titles, abstract and conclusions whereas, few articles were not available due to access restriction. After reading and checking quality paraments 28 articles were taken for the full text reading, as 28 articles did compliment the scope of the study.

Fig.1: Quality Assessment

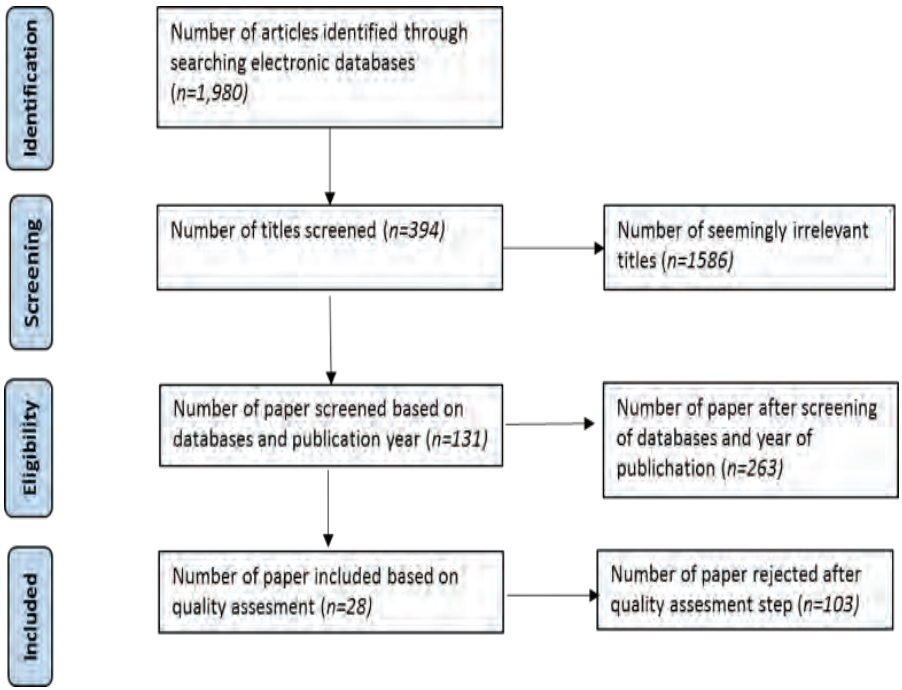

Table 1: List of 29 Articles along with Title, Year and Journal Name

Year	Title	Journal
2008	SLOW + FASHION—an Oxymoron—or a Promise for the Future …?	Fashion Theory The Journal of Dress, Body and Culture
2010	Fast fashion: response to changes in the fashion industry	The International Review of Retail, Distribution and Consumer Research
2011	Transforming the fashion and apparel curriculum to incorporate sustainability	International Journal of Fashion Design, Technology and Education
2012	Fast Fashion, Sustainability, and the Ethical Appeal of Luxury Brands	Fashion Theory
2014	Fashion Design Industry Impressions of Current Sustainable Practices	Fashion Practice The Journal of Design, Creative Process & the Fashion Industry
2014	Popularization of sustainable fashion: barriers and solutions	The Journal of The Textile Institute
2015	Ethical foundations in sustainable fashion	Textiles and Clothing Sustainability
2015	Slow Fashion: An Invitation for Systems Change	Fashion Practice
2016	A critical approach to sustainable fashion: Practices of clothing designers in the Kallio neighborhood of Helsinki	Journal of Consumer Culture
2016	Communicating green fashion across different cultures and geographical regions	International Review on Public and Nonprofit Marketing
2016	Understanding fashion consumers' attitude and behavioral intention toward sustainable fashion products: Focus on sustainable knowledge sources and knowledge types	Journal of Global Fashion Marketing
2017	Fashion Futuring in the Anthropocene: Sustainable Fashion as "Taming" and "Rewilding"	Fashion Theory
2017	Ethical Consumption Patterns and the Link to Purchasing Sustainable Fashion	Sustainability in Fashion
2017	Sustainability in Fashion and Textiles VALUES,DESIGN,PRODUCTION AND CONSUMPTION	[Book] Sustainability in Fashion and Textiles
2017	Re-visiting an old topic with a new approach: the case of ethical clothing	Journal of Fashion Marketing and Management

2018	Circular Speeds: A Review of Fast & Slow Sustainable Design Approaches for Fashion & Textile Applications	Journal of Textile Design Research and Practice
2018	Fast Fashion, Fashion Brands and Sustainable Consumption	Textile Science and Clothing Technology
2018	Key Issues in Slow Fashion: Current Challenges and Future Perspectives	Sustainability
2018	Circular by Design: A Model for Engaging Fashion/Textile SMEs with Strategies for Designed Reuse	Journal of Fashion Marketing and Management
2018	Consumer attitudes and communication in circular fashion	Journal of Fashion Marketing and Management
2019	Made in New York: A Collaborative Model to Encourage Slow Fashion	Research Journal Clothing and Textiles
2019	The Role of Style Versus Fashion Orientation on Sustainable Apparel Consumption	Journal of Macromarketing
2019	Cultures of Sustainability in the Fashion Industry	Fashion Theory The Journal of Dress, Body and Culture
2019	Investigating male consumers' lifestyle of health and sustainability (LOHAS) and perception toward slow fashion	Journal of Retailing and Consumer Services
2019	Fashion Brands and Consumers Approach Towards Sustainable Fashion	Textile Science and Clothing Technology,
2019	Slow Fashion in a Fast Fashion World: Promoting Sustainability and Responsibility	Laws
2019	Tools for Sustainable Fashion Design: An Analysis of Their Fitness for Purpose	Sustainability
2019	Fast Fashion and Sustainable Consumption	Textile Science and Clothing Technology

However, on the bases of keywords 19 articles have been figured out for the prime focus, the research papers include keywords like "Slow Fashion", " Sustainable Fashion", Fast Fashion" and "Sustainability" are high lighted and listed in a Table 2.

Table 2: List of 19 articles along with author, title, year and keywords

Author (s)	Year	Title	Key Words
Hazel Clark	2008	SLOW + FASHION—an Oxymoron—or a Promise for the Future …?	Design, fashion, slow fashion, sustainable fashion
Vertica Bhardwaj & Ann Fairhurst	2010	Fast fashion: response to changes in the fashion industry	Fast fashion; supplier; consumer; quick response; fashion season
Trudy M. Landgren and AnupamaPasricha	2011	Transforming the fashion and apparel curriculum to incorporate sustainability	Sustainability, curriculum, apparel; textiles
Annamma Joy, John F. Sherry Jr, AlladiVenkatesh, Jeff Wang & Ricky Chan	2012	Fast Fashion, Sustainability, and the Ethical Appeal of Luxury Brands	Luxury brands, fast fashion, sustainability, quality and consumer behavior
Karen Ka-Leung Moon, Charlotte Sze-Yeung Lai, Elita Yee-Nee Lam & Jimmy M.T. Chang	2014	Popularization of sustainable fashion: barriers and solutions	Sustainable fashion; environmentalism; fashionism; popularization barriers; Asian market
KirsiNiinimäki	2015	Ethical foundations in sustainable fashion	Environmental ethics; Values; Sustainable fashion; Corporate social responsibility (CSR); Ethical consumption; Extended producer responsibility (EPR); Sustainable business; Greenwashing
Kate Fletcher	2015	Slow Fashion: An Invitation for Systems Change	Slow, fast, sustainability, systems change
Olga Gurova and Daria Morozova	2016	A critical approach to sustainable fashion: Practices of clothing designers in the Kallio neighborhood of Helsinki	Finland, small-scale entrepreneurship, sustainability, sustainable fashion, urban culture, clothing designers
Corinna Dickenbrok & Luis F. Martinez	2016	Communicating green fashion across different cultures and geographical regions	Eco-fashion, Sustainability, Cross-cultural issues, Communication . Brand awareness

Hyun Min Kong, EunjuKo, HeejuChae & PekkaMattila	2016	Understanding fashion consumers' attitude and behavioral intention toward sustainable fashion products: Focus on sustainable knowledge sources and knowledge types	Sustainable fashion; sustainable knowledge sources; knowledge types fashion consumer; corporate marketing information
Alice Payne	2017	Fashion Futuring in the Anthropocene: Sustainable Fashion as "Taming" and "Rewilding"	Anthropocene, sustainable fashion, technology, futuring
Kate Goldsworthy, Rebecca Earley& Kay Politowicz	2018	Circular Speeds: A Review of Fast & Slow Sustainable Design Approaches for Fashion & Textile Applications	circular textile design, design research, sustainable fashion, fast & slow
Aline Buzzo and Maria José Abreu	2018	Fast Fashion, Fashion Brands and Sustainable Consumption	Fast fashion, Sustainability, Slow fashion, Social media, Value chain, Consumption
RóbertŠtefko and VladimiraSteffek	2018	Key Issues in Slow Fashion: Current Challenges and Future Perspectives	Slow Fashion; Fast Fashion; sustainability; creative industry; support of networks
Helen X. Trejo , Haley A. Smith, Nidia K. Trejo, and Tasha L. Lewis	2019	Made in New York: A Collaborative Model to Encourage Slow Fashion	Slow fashion, fiber farms, textile design, fiber science, actor–network theory
Asimananda Khandual and Swikruti Pradhan	2019	Fashion Brands and Consumers Approach Towards Sustainable Fashion	Sustainable fashion, Eco-friendly, Up-cycling Post-consumer wastes, Bio-degradable, Slow fashion Circular economy
Mark K. Brewer	2019	Slow Fashion in a Fast Fashion World: Promoting Sustainability and Responsibility	Fashion law; fast fashion; sustainability; corporate social responsibility
Anika Kozlowski, Michal Bardecki and Cory Searcy	2019	Tools for Sustainable Fashion Design: An Analysis of Their Fitness for Purpose	Sustainability; sustainable fashion; fashion design; sustainable design; design tools; design practice
FaustineBinet, Ivan Coste-Manière, Clément Decombes, Yan Grasselli, DortmolkOuedermi and MuktaRamchandani	2019	Fast Fashion and Sustainable Consumption	Sustainable, Fast fashion, Consumption, Customer centric,Triple bottom line, Fast luxury, Hard luxury, Human scale development

FINDINGS

After classification of articles related to the scope of the study, findings are categorized in two different ways 1) Slow fashion and sustainability and 2) Fast fashion. 14 articles from the 19 articles have done detailed working on our first category of slow fashion and sustainability. Whereas, rest 5 articles support concept of fast fashion.

Slow Fashion and Sustainability

The first directly related article on slow fashion and the concept of sustainability is from Hazel Clark was published in 2008. Author has identified that are some evidence that slow concept is getting recognized, but the challenge is how it extend on larger scale. Also, redefinition of slow in fashion is required for the principle and practices which need to be described further. In addition to this 13 from our categorized articles support this concept.

The second article from our categorized list that supports the concept of sustainability was published in 2011. The writer suggest that beginning of change to incorporate sustainability in fashion industry can possible via higher education (Landgren & Pasricha, 2011). A survey study has been done in South Korea has given three suggestions one of them is development of multifaceted education and training program, second suggestion is to devise marketing/advertisement strategies, third and last suggestion was to set up of knowledge-based institution for fashion industry and professional association to promote sustainability in the community (Moon, Lai, Lam & Chang, 2014). Kate Fletcher (2015) has been researched the challenges of slow fashion and sustainability, writer has find out that the biggest challenge is to influence the overall regulating fashion system which in turn promote balance in economy, society and ecological system.

Three articles in our summarized list were published in 2016 and reinforced the outcomes of above three discussed articles, two researches out of three have used quantitate method to support their findings. Prominent conclusions include understanding of sustainability is always a work-in-progress or continual process (Gurova & Morozova, 2018). Consumer desire to enhance self-esteem is positively impacted by transparent communication and brand eco-fashion interest (Dickenbrok & Martinez, 2018). Types of sustainable knowledge and their marketing strategies must identify to expand scope of fashion business (Kong, Ko, Chae, & Mattila, 2016).

Then two articles published in 2017 and 2018 consecutively, Alice Payne (2017) has highlighted the anthropocenain concept regardless the economic view of sustainability. Also, for positioning the slow fashion concept in industry a fashion-Matrix-based framework has been presented to further detect and investigate future challenges for sustainable fashion (Štefko & Steffek, 2018).

Mark K. Brewer (2019) has suggested that legal reforms and organization's increased support pursue improved sustainable practices that are necessary to adjust fashion industry. To further support this article another study has been presented by Kozlowski, Bardecki and Searcy in 2019. The paper incorporated in three perspectives are innovation levels, dimensions of sustainability, and the interlinking of both in fashion system (Kozlowski, Bardecki & Searcy, 2019).

Fast Fashion

Fist directly related published article that supports our second concept of "Fast Fashion" was presented in 2010. Bhardwaj and Fairhurst (2010) have done an extensive work on emergence concept of "Fast fashion" along with changing dynamics of the fashion industry since 1990s. Article has focused on concept of fast fashion from both supplier and consumer point of view that how supply side for fast fashion is important for retailer and how consumer react to the trends how their purchasing behavior get effected.

In 2012, research has been done in Hong Kong and Canada on a sample size of 33 by Joy, Sherry, Venkatesh, Wang and Chan. Author identified that participants have shown fast fashion and luxury fashion as a priority and do not take sustainability as an important measure. Young participants have their separate feeling and understandings on fashion and sustainability. Participants understand the concept of sustainability, but lacking is in application of ethics when it comes to sustainable fashion.

Goldsworthy, Earley, and Politowicz (2018) has discussed to contrasting approaches those approaches on slow and fast fashion:

There are three Super slow approaches

a) Extending single-user lifetimes

b) Enabling multiple-user lifetimes

c) Scaling garment upcycling

There are three Fast forward approaches:

a) Advancing material recovery

b) Designing for recovery

c) Reducing production impact

To support this, Buzzo and Abreu (2018) have showed fast fashion as per consumer perception but study only focused on Mechanics of fast fashion, value chain, media impact, fair trade and labor practices along with buying, borrowing and collaborative consumption. Recently, Binet, Manière, Decombes, Grasselli, Ouedermi and Ramchandani (2019) have presented sustainability as described strategy for business in future. However, author have not included a societal and an economic view of the sustainable fashion in the study.

CONCLUSION

Fashion is accepted as an individual's choice instead of a collective group decision nowadays. Also the sustainability in fashion industry is still a question to understand for consumer or end user. Our review has categorized previously published articles on two broad aspects a) Fast fashion and sustainability and b) Fast fashion.

The research question has been answered in both categories ethical and sustainability issues of fashion industry can be minimized by educating end use or consumer. Practice and training will positively impact consumer behavior and perception. Although, in Pakistan consumer and business owner are still in learning face which has been evidenced as no study was found directly on the subject topic in research.

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PREVENTION OF PRODUCTION LOSSES IN PAKISTANI POWER GENCOs DUE TO OPERATOR ERRORS-A QUALITATIVE ASSESSMENT

Dr. Abdul Rehman Abbasi and Paras Rajpar

ABSTRACT

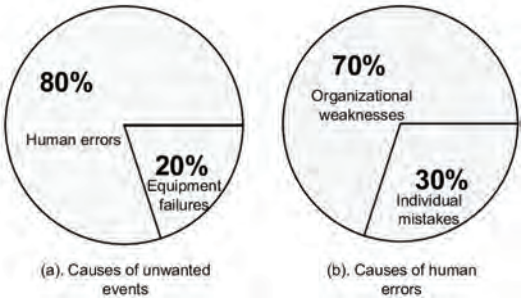
In this paper, we report on performing qualitative assessment of leading sources of human error, and its bearing on the nature and scale of production losses in power generation sector of Pakistan. Once identified, mitigation techniques and management controls are explored, to avoid their (re-) occurrences. The data collection included conducting two focus groups, five individual interviews and across the industry large-scale survey, which consists of 3780 responses from 108 participant. From the obtained results, causes of human error could be narrowed down into three prominent areas that include organizational, personal and environmental factors. Prominent among the organizational issues found, are bad procedures, insufficient operator knowledge, and poor teamwork. Similarly, the personal factors set identified skill level, motivation, experience, work attitude and self-discipline as key parameters. Results also indicated that workplace lighting is a significant environmental factor that must be taken care of. For the prevention strategy, participants pointed out to improve training, job planning, in-house incident reporting and learning management system, with assurance of management commitment as a key factor. The paper concludes with recommendations to the generation stations and to the national power regulator.

Keywords: *Operator Error, Production Loss, Power GENCOs, Qualitative Assessment.*

INTRODUCTION

Human (operator) error has been a source of great concern in industries and businesses alike and especially in power generation sector where a minor lapse by an operator may lead to losses amounting to billions. The contribution of operator error that is analyzed in a comprehensive study reported in DOE-HDBK-1028-2009 (2009) is illustrated in Fig. 1.

Figure 1: Occurrence of unwanted events, and contribution caused by human error in industry. Reproduced from DOE-HDBK-1028-2009 (2009)



The contribution caused by human error in industry is well established, however, it is yet to be explored for specific industry types such as power generation for instance which is a high-risk industry as well. Furthermore, the relationship between the human error and revenue loss especially for Pakistani power generation companies (GENCOs) needs to be explored.

In the current study, we report on performing qualitative assessment of leading sources of operator errors and ways to prevent their occurrence, for Pakistani GENCOs. In fact, the study contributes to identify operator errors that are being perceived or experienced as precursors to production (or revenue) losses. Secondly, once identified, prevention techniques and management controls are explored and recommended to avoid their occurrences. In this regard, this study significantly contributes to the current body of knowledge with case studies and data analysis performed in the Pakistani perspective.

Three major questions were formulated for this research:

(a) Is there any direct relationship between the production (or revenue) loss and operator errors?

(b) Are there any formal mechanisms/tools/techniques that are being practiced in local industry to prevent occurrence of operator errors?

(c) What strategies would be effective to prevent the operator errors and thus eventually avoid the production losses?

Our research methodology is based on a three-step procedure. First, we conduct two focus group sessions with operation & maintenance (O&M) personnel groups, respectively. Based on the focus group results and integrating these results with evidences reported in literature, we formulate interview and survey questionnaires, separately.

For individual interviews, five (05) number of interviews were conducted with industry practitioners. Furthermore, survey questionnaires are distributed to the target survey participants from where large number of individual responses were obtained.

The results obtained through interviews and survey questionnaires were analyzed and recommendations are made to address the reported problem.

From the first focus group (related to Operation department personnel of the sampled organization), the participants reported different situations that they experienced during their work experiences. Their experiences and verbal reports were documented and transformed to survey questionnaires. The second focus group was related to maintenance department personnel of the sampled organization. They reported few situations where failures or loss of production occurred. Their experiences and verbal reports were also documented and transformed to survey questionnaires. Next, individual interviews were conducted with five (05) number of industry professionals. Finally, data was collected through survey questionnaires from more than 100 industry professionals. Two parts of the survey questionnaire included queries regarding organizational, personal and environmental factors. Third part include probing perceived solutions and final part include probing for the awareness on error prevention tools in the industry.

LITERATURE REVIEW

Power Sector in Pakistan

The power sector in Pakistan comprises of multiple entities (S. Khan and H.F. Ashraf, 2015) that includes Ministry of Water & Power, Pakistan Atomic Energy Commission (PAEC) run nuclear power plants, private sector power generation companies (commonly known as IPPs), and transmission & distribution companies (e.g., K-Electric). The scope of this research is limited to selected entities from Generation Companies (GENCOs), i.e., PAEC's nuclear power plants, K-Electric and few other power generation units.

Inefficiencies in Power Sector

On January 9, 2021, the national power grid breakdown plunges Pakistan into darkness (NEPRA Report, 2021). The event occurred in the mid night at Guddu Thermal Power Station due to an apparent human error (not timely and procedurally removing earthing from the repaired breaker).

The inefficiencies in power sector are of three types. First one is those

which arise from management and policy issues. Second one are those which relate to equipment and machinery issues. Third one are related to human performance. The first two types of inefficiencies are beyond the scope of this research work. However, this work probes the causes leading to production losses and management controls to prevent issues arising due to human performance.

Since the power sector in our case is also limited to generation companies (GENCOs) and does not include transmission or distribution set up so there is dire need to address the in-efficiencies caused due to human errors that could save billions of rupees in terms of money and production availability and this research deals with these issues.

Human Factors as Risk to Production Processes

Frank B. Gilbreth (1911), known as an early advocate of scientific management and pioneer of time and motion study, studied bricklaying, and consequently, scaffold was invented that increased the productivity of labor by almost three times. In 1945, human factors engineering was formally recognized as a specialized domain in engineering as well. Thus, the role of human factors in production processes and industry is not only inevitable but of critical nature too.

In modern times, even with higher levels of automation, human factors are considered very important for production process sustainability and safety in nuclear power plants (Carvalho, 2008). Some researchers termed these as soft factors (Vogt et al., 2010) and quasi-technical inputs (Leenstra, 2017) in production.

Homburg et al. (2003) were the first to put emphasis on soft factors. The context was the Aloha Boeing 737 fuselage failure accident in 1988 that attracted the attention of impact of human factors (Johnson & Hackworth, 2008). Contrary to equipment, human factors are very unpredictable and varying (Xie & Guo, 2018) thus are considered a concern or risk at workplace (Sobhani et al, 2017).

Orme and Venturini (2011) highlighted the significance of human factors in power plant production processes and mentioned that they may risk operational and maintenance activities. The identified causes of production risk include procedure usage, fatigue, knowledge, experience, time pressure (Sheikhalishahi et al., 2017), turnover (Vaurio, 2009), efficiency of implementing orders (Bevilacqua & Ciarapica, 2018), mental pressure (Jou

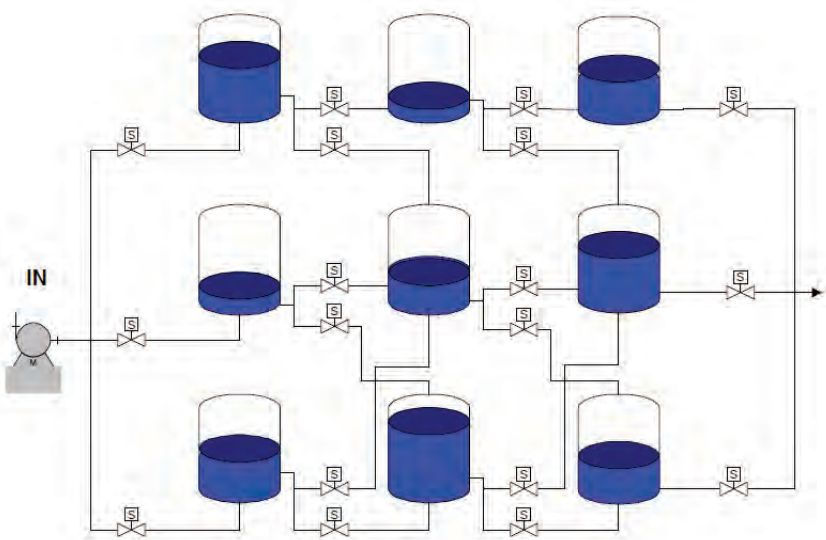
et al., 2011), maintenance planning (Krishnasamy et al., 2005), ergonomic work conditions, discomfort, pain, stress, reduced visual, hearing, smell and tactile abilities (Govindaraju et al., 2001), equipment failures (Lavasani et al., 2015), monitoring systems (Chang et al., 2010), land, labor (Tiedemann & Latacz-Lohmann, 2013), and weather (Karki et al., 2012).

Causes of Human Error

It is worthwhile to discuss two relevant studies on human error causes in industrial operations and maintenance context. One is NASA Simulation study, and other is EPRI switching study.

NASA Simulation study (Morris & Rouse, 1988) which was also reported by Bilke (1998) with the recommendation of establishing of error database at plant level. The study itself is based on observing and recording responses of process operators on likely causes of error during operation. The operators were controlling a simulation known as *PLANT* as shown in Figure 2. The results of that interesting study were that operator with less control on what is happening was more careful in taking the next step.

Figure 2: NASA Simulation Study Setup. Reproduced from Terry Bilke (1998).



Actually, the operators could control the fluid flow in the tanks through a network of interconnected piping and valves. Other operations include starting and switching off the pumps through computer commands. Production was the primary goal in the process.

The results of this interesting study was that operator with less control on what is happening was more careful in taking the next step. In fact, the key findings were to relate the error occurrence with the workload reported subjectively by the operators at various stages of operation. Another interesting finding was that complex failure scenarios yield more errors than the simple failure scenarios, i.e. 10.1% for simple failure scenarios to 12.2% for complex failure scenarios.

The second study by Electrical Power Research Institute (EPRI) in which switching safety study was conducted, probing operating errors that included more than 400 events reported by the utilities. Common errors include planning the task, communication with team members and execution by the control room personnel (dispatcher) and field operators.

Table 1 illustrates the distribution of errors committed by the dispatchers as well as field operators.

Table 1: Contributors of Errors. Reproduced from EPRI Report.

	Dispatcher	Field Operator	Both	Maint. & Testing
# of Errors	163	175	29	34
Omission	33%	25%	34%	32%
Wrong Sequence	17%	6%	10%	0%
Wrong Action	18%	22%	14%	41%
Wrong Equipment	31%	47%	41%	12%
Fail to Check	53%	20%	71%	33%

An interesting finding of the report was that the field operators were more prone to slips. i.e. a physical action different than intended (DOE-HDBK-1028-2009). The report strongly suggests workload control and training on switching safety and error in the qualification curriculum.

Human Error & Loss of Production

In an interesting study reported by Bertha Ngereja, and Bassam Hussein (2019), the authors compared the soft factors (which often are intangible) in the two contexts (i.e. developed economies versus developing economies and especially in African context) in order to provide an understanding of whether they have the same level of importance, regardless of their differences in economic, social and environmental aspects. The authors reported to have conducted 17 semi-structured interviews to identify the critical soft factors for optimum performance of maintenance operations at a natural gas processing plant in Tanzania. The results show that soft factors included top management engagement, oversight, trainings, ergonomics,

collaboration, safety and security, recognition programs, education and career growth being the of significance. Furthermore, the authors also found conformity between developing and developed countries in these soft factors' importance, however, the difference exists due the level of the emphasis developed countries place on implementation.

Operator errors are strong precursors of financial and revenue losses in many industries and especially in power generation sector. In Pakistan, power generation from thermal as well as nuclear reactors is being an emerging area of attention, where financial viability is related to smooth and safe operation of the plant. However, there are threats to safety as well as to revenue generation (productivity) during the non-productive periods of the plant caused by operator errors. The three significant studies found regarding this area are reported here:

Diao and Ghorbani (2018) investigate production risks caused by human factors in thermal power plants and management methods to address identified human factors through a cross-sectional inductive study. The authors reported carrying out 18 semi-structured interviews with front-line, middle, and senior managers from four thermal power plants in China. Fault tree analysis and causal network analysis were used. The results show that working attitude, safety consciousness, creativity, and awareness of environmental protection as essential human factors potentially influencing production risks.

Sheikhalishahi et al. (2017) have reported results of their study using HFEA (Human Factor & Effect Analysis) in maintenance activities. This is a rare study that found relevance of human error with operational cost (inclusive of productivity losses, workforce lost time and spare part cost). Their results indicated operator's fatigue and procedure usage being the big contributor among other factors. They also reported compared error provoking factors earlier reported by Reason and Hobbs (2003) versus the causes of failures.

Common Error Precursors

A comprehensive statement regarding various common error precursors causing operation and maintenance failures due to human mistakes/errors is provided in (DOE-HDBK-1028-2009). The common precursors are provided in Table 2.

When we compare these mentioned list of factors with the other factors reported by earlier researchers, the list is quite exhaustive in nature. However, there is no sufficient quantifiable data available on errors leading to events caused by operation and maintenance failures.

Table 2: Common Precursors of Human Error.Reproduced from DOE-HDBK-1028-2009.

Task Demands	Individual Capabilities
1. Time Pressure (in a hurry)	1. Unfamiliarity with task / First time
2. High workload (large memory)	2. Lack of knowledge (faulty mental model)
3. Simultaneous, multiple actions	3. New techniques not used before
4. Repetitive actions / Monotony	4. Imprecise communication habits
5. Irreversible actions[α]	5. Lack of proficiency / Inexperience
6. Interpretation requirements	6. Indistinct problem-solving skills
7. Unclear goals, roles, or responsibilities	7. Unsafe attitudes
8. Lack of or unclear standards	8. Illness or fatigue; general poor health or injury

Work Environment	Human Nature
1. Distractions / Interruptions	1. Stress
2. Changes / Departure from routine	2. Habit patterns
3. Confusing displays or controls	3. Assumptions
4. Work-arounds / OOS[β] instrumentation	4. Complacency / Overconfidence
5. Hidden system / equipment response	5. Mind-set (intentions)
6. Unexpected equipment conditions	6. Inaccurate risk perception
7. Lack of alternative indication	7. Mental shortcuts or biases
8. Personality conflict	8. Limited short-term memory

When we compare the above mentioned list of factors with the other factors reported by earlier researchers, the list is quite exhaustive in nature. However, there is no sufficient quantifiable data available on errors leading to events caused by operation and maintenance failures.

Error Causes Leading to Significant Industry Accidents

In recent times, apart from Fukushima accident in 2011, other nuclear and process industry accidents does involve human error causes. Reason (1990) comprehensively reported and discusses these errors. Table 3 mentions some catastrophic accidents.

Table 3: Mega accidents along with causes. Reproduced from Reason (1990).

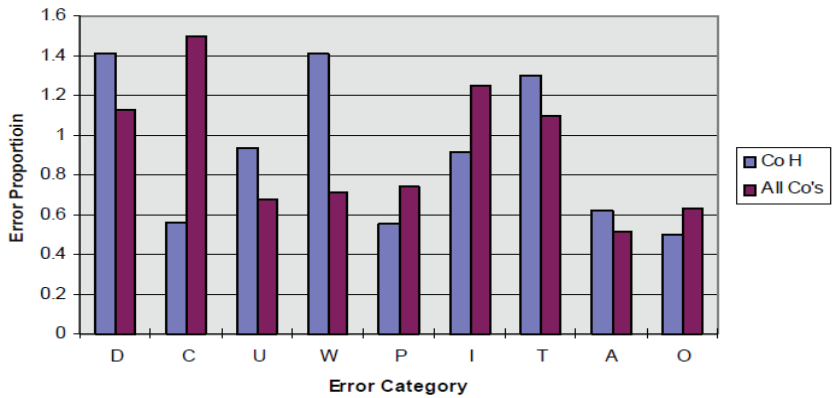
	TMI	Bhopal	Chernobyl	Total
Design	2	6	3	11
Maintenance	1	5		6
Management	5	25	5	35
Operator	2	2	2	6
Procedure		1		1
Regulatory	2	3		5
Training	1			1

We may observe that maintenance and operation related errors are present in most of the cases at considerable extent.

Treatment to Error Causes

Bilke (1998) report provides a comprehensive treatment of causes observed which are prone to error. For example, the report enlists the causes as illustrated in Fig. 3 here.

Figure 1: Error Causes Reported by Operators. Reproduced from Bilke (1998).



The abbreviated causes are also defined in Table 4.

Table 4: Abbreviations used for error causes by Bilke (1998).

D	Distraction	P	Mistake in a procedure
C	Communication	I	I operated the wrong device
U	Unscheduled job	T	Trying to do much at a time
W	Job written incorrectly	A	Automatic device malfunctioned

O: for others

Now the important point to make here is that the author utilized few representation to describe through cause-effect diagram to represent the causes leading to error. In addition, the author also reports using Error Analysis Diagram (EAD).

Human Error Prevention Tools/Techniques

More recently, the nuclear industry has introduced practicing tools and techniques to prevent individual as well as organizational weaknesses leading to failures. These tools/techniques are listed in Table 5.

Table 5: Tools/Techniques used for prevention of human error at workplace (Source: IAEA No.

NG-T-2.7, 2013, DOE-HDBK-1028-2009).

Pre-Job/Post-Job Briefings	Place Keeping	First Check
Two-Minute Rule	Flagging/Operational Barriers	STOP When Unsure
Three-Way Communication	Self-Checking	Peer Checking
Phonetic Alphabet	Independent Verification	Post-Job Review
Procedure Use & Adherence	Concurrent Verification	Event Investigations
Self-assessment	Benchmarking	Trending
Operating experience feedback	Independent oversight	Field observations and coaching

The use of these tools and techniques in the industry is highly recommended in the available literature (IAEA No. NG-T-2.7, 2013 and DOE-HDBK-1028-2009), however, there is no particular study available (or reported), to the best of authors' knowledge, that probes a qualitative or quantitative analysis of usage of these tools in the power generation sector (GENCO) industry in Pakistan.

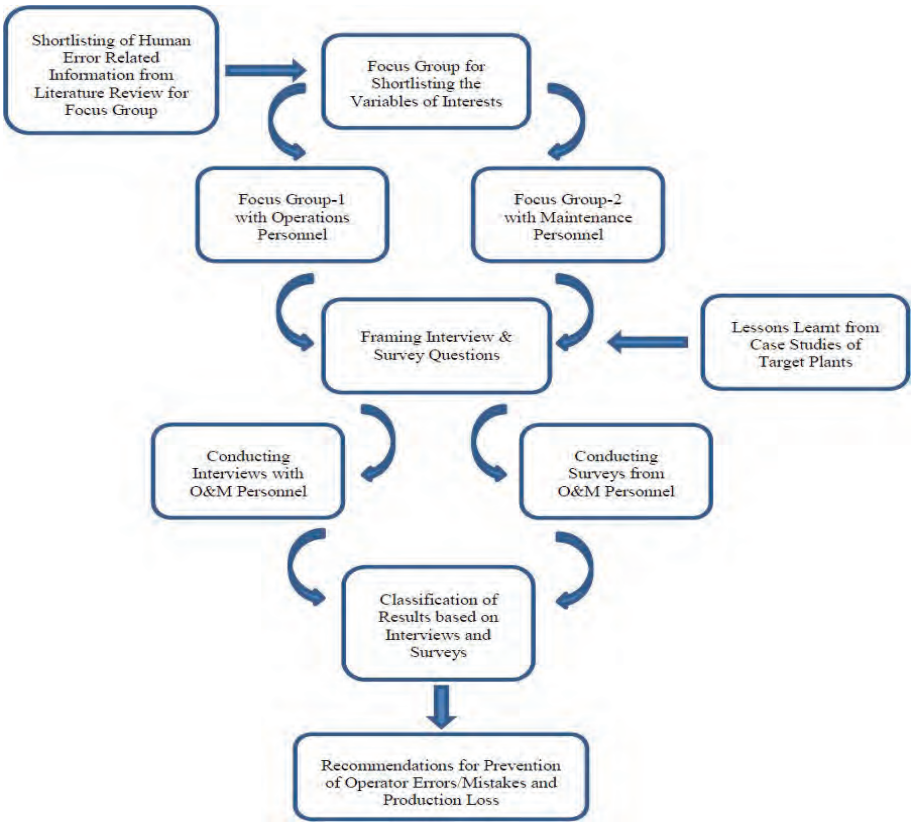
After going through the literature on human error causing revenue losses in industry, it is evident that very few studies actually have targeted identification of a particular human error leading to revenue losses to the industry, rather major industry players have focused on safety aspect which is obviously justified.

Most of the studies and reports reviewed during this work have identified terminologies describing error causes and interestingly these causes do converge to a point where one can start observing the play of these causes by recording and quantifying the error data. We draw the most observed causes of human error leading to revenue or more appropriately production losses from the available literature and design our research methodology to obtain an agreement from industry practitioners based on our selected causes and subjective reports from the industry practitioners. Secondly, regarding the treatment given to the obtained data, we did not find any formal usage of error prevention tools from the available literature, however, such tools are getting familiarity in nuclear industry which is one large segment of this research work. Hence, we do consider obtaining reports regarding usage of tools or management controls to limit the probabilities of human error in the target industry.

RESEARCH METHODOLOGY

When generalization does not bring out the unique insights into the research focus, interpretivism can be a useful approach (Saunders et al. 2009). It means that in the absence of sufficient and authentic set of quantitative studies or results on relationship between production (revenue) loss and operator error(s)/mistake(s), we need to proceed with a selected (or available) sample of population and explore the underlying relationship between variables of interest. In the proposed work, research design is built upon such that the desired research objectives are achieved using appropriate research techniques. Figure 4 illustrates the research design methodology:

Figure 4: Methodology of the Proposed Research Approach.



Primarily, there are two main type of research approaches, i.e., deductive approach and inductive approach. A deductive approach is essentially development of a theory or hypotheses to be tested. Here, our choice is to reach from specific cases of observations such as sampled subjective

interviews and surveys towards generalization of variables of interest. In this scenario, we adopt an inductive approach.

Furthermore, the inductive approach will enable qualitative analysis of the data using the frequency assigned to our variable of interests, by the interviewers and survey replies. This qualitative analysis will lead to generalization of results.

Data Collection

Data through interviews was collected by having a scheduled telephonic, online, or face-to-face conversation with selected personnel of O&M departments. Further data was collected through survey questionnaire using emailing and/or posting of links to various platforms.

Sample Size & Sampling Technique

The intended sample size was 100 personnel for survey questionnaires. The sampling size for interviews is 5 personnel. Snowball or volunteer sampling is a type of sampling where participants volunteered to participate in the research, instead of being chosen by the researcher. For survey questionnaires, we use snowball sampling method where potential participants are invited through various mediums of communications. For interview sessions, we go for convenience sampling where potential participants are chosen as per availability.

Primary Research Sources

For focus group discussion, two target groups were selected as per availability. First group termed as FG1 comprises of 5 personnel from operations department of five different power generation units located across Pakistan.

The personnel of FG1 have experience of working in operations department of the relevant industry ranging from 8 to 15 years of overall experience. All these personnel have a minimum qualification of bachelor's in engineering in concerned field and some of these have professional licensing certification as well.

The second group named as FG2 comprises of 4 personnel from maintenance department from different power generation units located across Pakistan.

The personnel of FG2 possess work experience of relevant area from 10 years to over 20 years. All these personnel have a minimum qualification of bachelors in engineering in the respective field with some having certification and a few having exposure of training abroad.

Interview questionnaires were framed primarily based on the input from FG1, FG2 and secondary research data. We propose to use a semi-structured type of interview since our research is of exploratory nature and as interpretivists, we may take advantage from a semi-structured type of interview that may allow us responses with explanation from interviewees.

Like interview questionnaire, survey questions are framed considering the input from FG1, FG2 and secondary research data. Transcript of survey questionnaire is attached at Annexure-A.

RESULTS

Responses from Focus Group-1 (FG1)

The participants reported different situation that they experienced during their work experience. They however, could not remember any event that alerted the management regarding loss of revenue calculations quantitatively. Few were of the view that if production takes the priority, then safety might be compromised with less ownership of job. Updated knowledge on issues, retention of good working staff and health related issues with workers were seen as challenges to their job.

Major causes of error were identified as time pressure, multitasking, communication issues, complacency, and lack of identification of risk. Remedies for these were identified as updated training, use of operating experience, coaching and effective supervision by the supervisors. The panel suggested to incentivize the operations using reward and penalty schemes with few emphasized on individualized trainings. Finally, the panel suggested that without management commitment, things would not improve. Use of procedures that are technically valid and practicable were focused. Effectiveness of job planning and using lesson learnt from industry were also recommended.

Responses from Focus Group-2 (FG2)

Maintenance personnel group reported few situations where failures or loss of production occurred due to lack of procedure usage, lack of sufficient manpower. They also pointed out lack of proper mechanism for data gathering and keeping. Some indicated these in including as performance indicators for personnel promotion. Maintenance personnel considered skills, grooming, complexity of jobs, unavailability of spares, and ageing equipment as major challenges. Complacency, non-professional behavior, lack of maintenance procedures, time pressure of completing the job were the few causes discussed during the session.

The panel also mentioned that trainings are sometimes deferred due to workload and considered secondary. Mockups and hands-on training setups are expensive to build and utilize. They too recognized job ownership, use of modern tools, provision of better working environment and investing in mockup development as solutions to prevent human errors in maintenance jobs. Other solutions were suggested as uplifting of skill level, risk assessment of job, enhanced coordination between operation and maintenance departments.

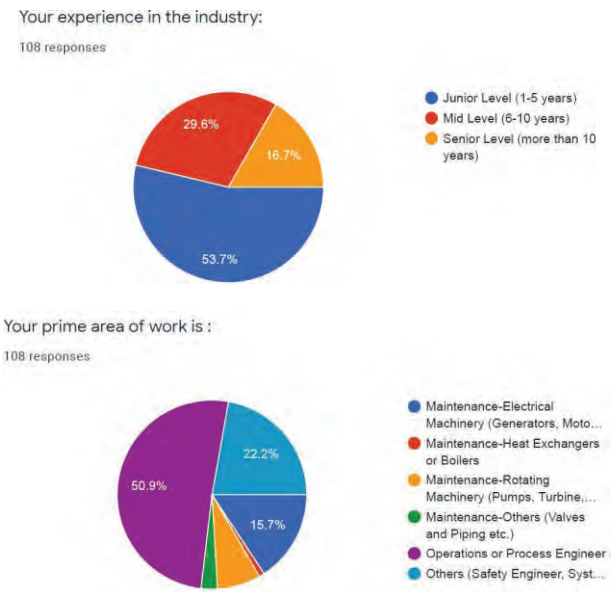
Responses from Interviews

Participants had strong agreement on role of human error in production success or losses. Old plants are more vulnerable to human error thus leading to more revenue losses, where most of plant operations are manual. Plant automation (AI and Robotics based) may prevent error occurrence as new technology has less involvement of human. Few plants keep an eye on performance parameters and reward/penalize the human behavioral based actions. To find out the relationship of variables, multiple correlation test was applied.

Responses from Survey Questionnaires

108 responses were collected from October 01 to October 31, 2020. Participants' profile was also recorded and is shown in Figure 5:

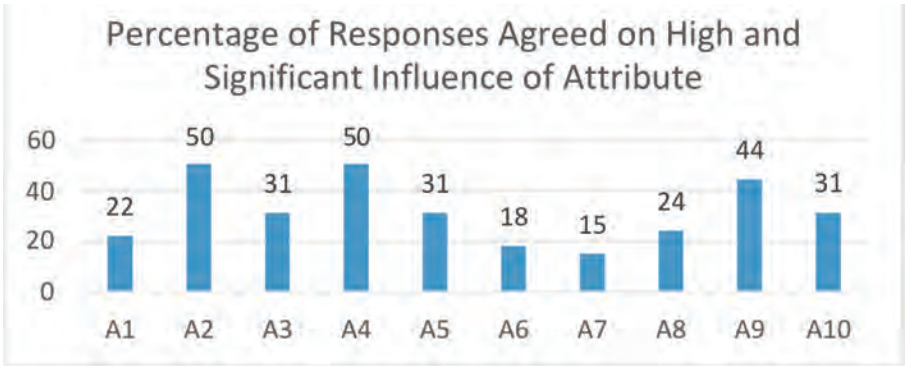
Figure 5: Survey participants' demographics.



Results from Part-A of Survey Questionnaire

This part mainly explores the perception and experience of respondents about issues with operators/maintainers such as complacency, use of incomplete or invalid work practices (procedures), fatigue, insufficient knowledge, lack of experience, time pressure, poor housekeeping, improper tools, lack of team work and inadequate supervision /coaching. The results are illustrated in Figure 6.

Figure 6: Set of responses (A1~A10) rated with high significance by 108 participants.



Codes A_n is described in Table 6.

Table 6:

S. No.	Selected Parameter	Attribute
1.	Complacency in using operation/maintenance procedures. Complacency: due diligence/care not practiced	A1
2.	Use of bad procedures. (e.g., incomplete or invalid procedures)	A2
3.	Fatigue during the job/task.	A3
4.	Insufficient knowledge	A4
5.	Inadequate experience	A5
6.	Time pressure/rush to complete the job	A6
7.	Poor housekeeping in the plant/area	A7
8.	Improper/inadequate tools	A8
9.	Poor teamwork (coordination/communication)	A9
10.	Inadequate supervision/coaching	A10

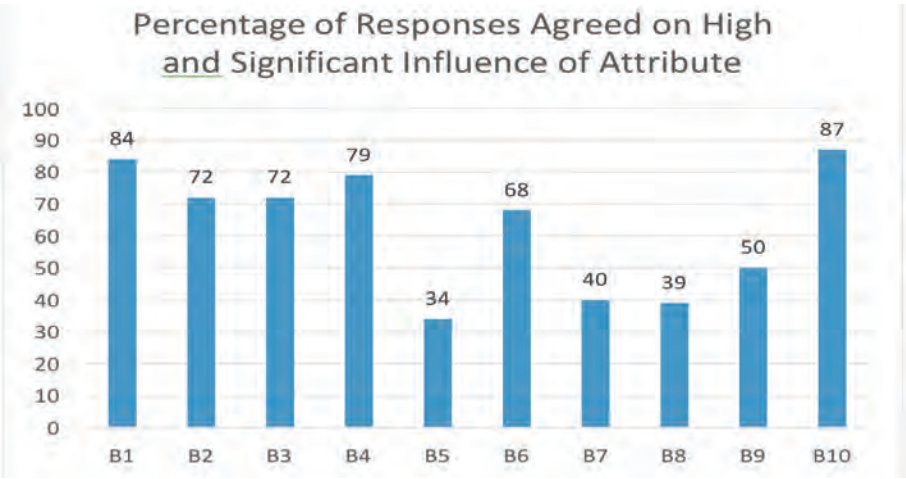
From the results, it is evident that invalid work practices (or procedures) and insufficient knowledge are considered has high influencers in harming

production and in a very significant manner. Similarly, poor teamwork and lack of coordination and communication among team members are key influencers.

Results from Part-B of Survey Questionnaire

This part mainly explores the perception and experience of respondents about issues with operators/maintainers such as skill level, motivation, experience, work attitude, physical capabilities, and self-discipline. There were evaluations made on other environmental factors as well such as temperature, humidity, noise level and lighting. The results are illustrated in Figure 7.

Figure 7: Set of responses (B1~B10) rated with high significance by 108 participants.



Codes B_n are described in Table 7.

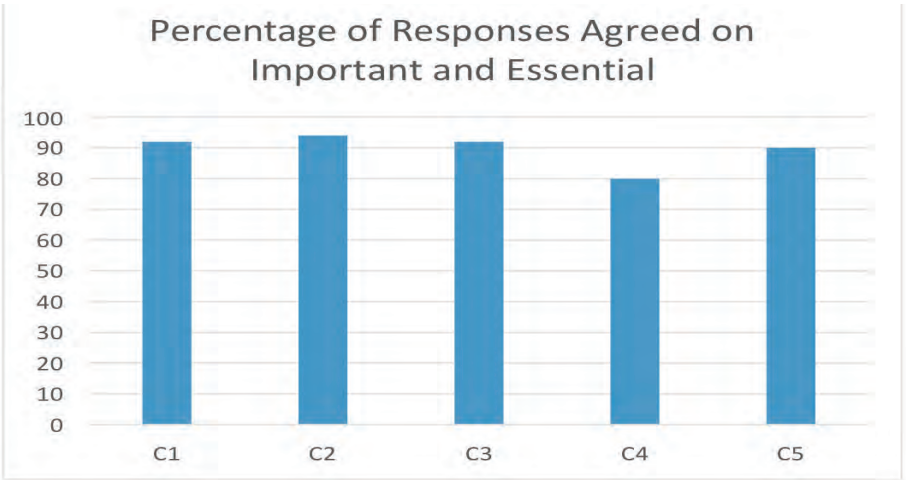
Table 7:

S. No.	Selected Parameter	Attribute Code
1.	**Skill level (tactfulness)**	**B1**
2.	**Motivation**	**B2**
3.	**Experience (seniority)**	**B3**
4.	**Attitude towards work**	**B4**
5.	Physical capability	B5
6.	**Self-discipline**	**B6**
7.	Temperature	B7
8.	Humidity	B8
9.	Noise	B9
10.	**Lighting**	**B10**

Results from Part-C of Survey Questionnaire

This part mainly explores the perception and experience of respondents about solutions to human error, i.e., training, job planning and scheduling, in-house incident reporting, use of industry experience, and commitment of top management. The results are illustrated in Figure 8.

Figure 8: Set of responses (C1~C5) rated with high significance by 108 participants.



Codes C_n are described in Table 8.

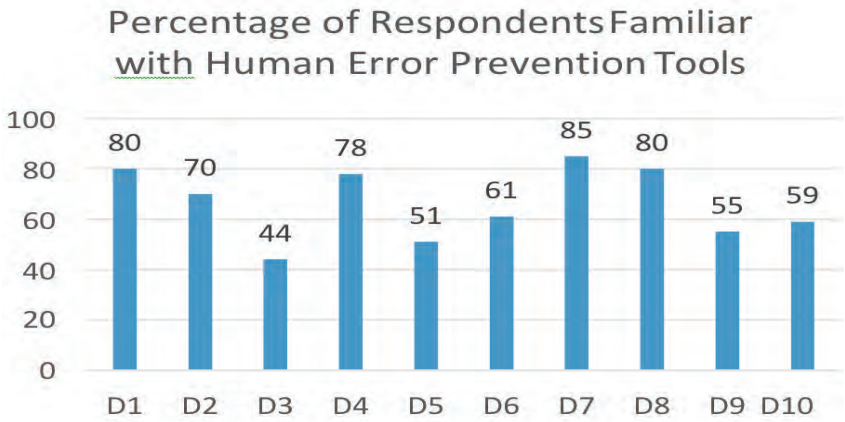
Table 8:

S. No.	Selected Parameter	Attribute Code
1.	**Training**	**C1**
2.	**Job planning & scheduling**	**C2**
3.	**In-house incident reporting and learning system**	**C3**
4.	Use of industry experience/information	C4
5.	**Commitment by the top management**	**C5**

Results from Part-D of Survey Questionnaire

This part mainly explores familiarity of industry participants of this research about human error prevention tools and approaches. The results are based on exploring ten such tools, i.e., Pre-Job/Post-Job Briefing/ Review, Self-Checking/STAR approach, Two-Minute Rule, Three-way Communication, Phonetics, Concurrent Verification, Coaching and Observation, Procedure Use and Adherence, Flagging/Operational Barriers, and finally the Independent Verification tool. Results are shown in Figure 9.

Figure 9: Set of responses (D1~D10) rated with high significance by 108 participants.



Codes D_n are described in Table 9.

Table 9:

S.No.	Tools/Techniques	Attribute Code
1.	**Pre-Job Briefing/Post-Job Review**	**D1**
2.	**Self-Checking/ Use of STAR approach**	**D2**
3.	Two-Minute Rule	D3
4.	**Three-Way Communication**	**D4**
5.	Use of Phonetics	D5
6.	Concurrent Verification	D6
7.	**Coaching & Observation**	**D7**
8.	**Procedure Use & Adherence**	**D8**
9.	Flagging/Operational Barriers	D9
10	Independent Verification	D10

CONCLUSION AND RECOMMENDATIONS

From the results and conclusions from interview analysis suggest that all interviewees had a strong agreement regarding the role of human error in production success or losses. The results analyzed are summarized here:

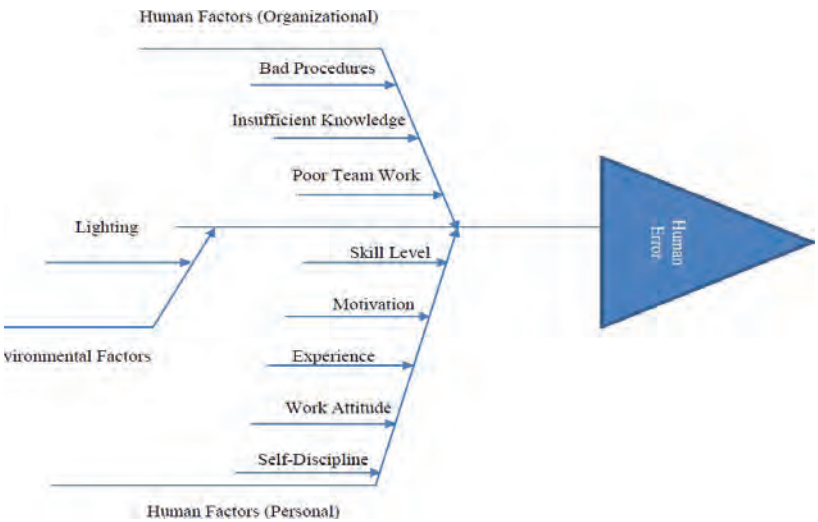
(a) Since old plants are more vulnerable to human error (probably due to excessive maintenance calls and manual operations) thus may lead to more revenue losses. This invites special attention of plant management to observe enhanced levels of caution while operating and maintaining old plants.

(b) Plant automation (AI and Robotics based) may prevent error occurrence as new technology has less involvement of human.

(c) Few plants keep an eye on human performance parameters and reward/penalize the human behavioral based actions. This need to be incentivize so that human actions may respond to the incentives posed in the form of behavioral re-enforcements (both positive and negative ones, whichever applicable).

What we may conclude from our results and earlier discussions is that the causes of human error may be sub-divided in to three prominent areas that include organizational, personal, and environmental factors affecting human performance. These are illustrated in Figure 10 through Fish-Bone diagram.

Figure 10: Factors found most significant through the study, represented through fish-bone diagram.



First, the organizational related causes affecting human performance are summarized here, i.e., bad procedures can be avoided by including the input from the user, and environmental (field-related) considerations. In addition, preliminary validation of procedures may be done to check the usability and applicability.

Regarding the insufficiency of knowledge of operator is concerned, it can be ensured through ensuring appropriate training and qualification processes. Job authorization/assignment shall be linked to job competency that includes knowledge, skills, and attitude (KSA) as fundamental to carry out the job independently.

One possible cause of poor teamwork might be due to lack of communication among working personnel, especially under a dynamic workplace environment. Special focus must be made to introduce team building and intra-team communication must be strengthened.

Secondly, the personal factors affecting the human performance and leading to human error are very much subjective in nature that include skill level, motivation, experience, work attitude and self-discipline. Each of these may be interpreted subjectively, however, the only way to bring these at par is to develop a work culture that may value and reward these factors. Training requirements shall be strictly based on the fulfillment of the desired parameters/factors with a mechanism of continuous monitoring and evaluation and above all improvement.

Finally, the environmental factor which appeared to be most significant from our sampled data is lighting. Nevertheless, earlier studies also recommended this factor as a key factor that might affect productivity but here in our case, this has been identified as one of the significant or potential causes that has a probability of leading to production losses.

Understandably the participants considered training being an essential solution to prevent occurrence of errors. Similarly, job planning and scheduling being a solution as well. This is because when planning is there, less chances of error are there. To prevent the re-occurrence of events, in-house incident reporting and learning system was considered as a good practice. Above all, the management commitment is the icing on the cake to enable rest of the parameters.

From our results and earlier discussion, it is evident that the gap between the problem awareness and practicing the solutions is there. Many of human error prevention tools used in contemporary segments of industry are not being used by other segments of the industry or the participants are not familiar even with the terminology. It is needed to establish a common platform to homogenize the work practices and especially the improvement tools.

Based on the results, discussion and finally the conclusion, we recommend the following:

(a) Generating stations shall provide a comprehensive training plan especially focusing on human performance related objectives. A policy may be formulated with a title of ***Human (Operator) Performance***

Policy. The objectives of the policy shall be clearly target oriented and based on SMART principle, i.e., Specific, Measureable, Achievable, Relevant and Time Bound.

(b) The regulator (i.e., NEPRA) shall provide guidelines and support to the generating stations for implementing the Human (Operator) Performance improvement plan. Initially, this may be introduced as a graded approach with penalizing areas with critical consequences and severity and incentivizing other areas.

(c) Specific focus must be made to old/aging plants where errors are more likely to occur due to technological issues. NEPRA may also take steps to upgrade the safety measures for such stations and gradually phasing out vulnerable stations and encouraging automation.

(d) Timely and effective training of personnel must be ensured incorporating updated practices and knowledge areas. A knowledge repository shall be made available to all generating stations who can access and retrieve the best practices. This can be implemented either through NTDC platform or through regulator (NEPRA) platform.

(e) Human (Operator) Performance Indicators (HPI) program shall be introduced at all working levels.

SUGGESTIONS FOR FUTURE RESEARCH

In future, the present work may be extended to quantitatively categorize the losses causes due to human (operator) error and developing a Human Performance Index based on the HPI statistics

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THE 'ONE BELT, ONE ROAD' INITIATIVE OF CHINA AND ITS IMPACT ON REGIONS

Dr Hamadullah Kakepoto and Sabeen Azam

ABSTRACT

The economy of China dramatically achieved high rate of economic growth, development and infrastructure during previous decades. The resulting from developments in technology, human resources development, influence on regional market activities and high risk on investment plan of Chinese government to gain more capitalist prevailing situation around the globe are major goal by 'OBOR' initiatives. An attempt has been made in present paper to analyze the implications of the project in connecting the different regions and its impact on the socio-economic development of the countries of the region it is passing through. Paper is based on the available secondary date. It includes the newspapers, journals, magazines and written documents available in libraries and periodical sections. The literature indicates that the project has ushered the new area of development not only in the regional perspective but also at macroeconomic level. It has connected the cultures, history, and people to people contact and shaped the region as global village with huge economic market. Policy makers, academicians, and economic experts have found the new arenas of serious academic research. Therefore, it guarantees the social and economic well-being of the nations.

***Keywords**: One Belt One Road, Infrastructure, Economic Development.*

INTRODUCTION

The world's second largest economy China has transformed in one of the most significant alliance in the world. The expansion of economic, cultural and political situation due to globalization increased previous decades. The economic system of power shifted from Western Countries to Asian countries. The great example of this China's emerging economy besides Japan, South Korea, North Korea, Malaysia, Singapore and other countries those reached at their high rate of development and growth. For the moment, the Chinese

leaders are involved to reshape the situation of its country in the international scenario. From historical perspective, starting the decade of 1970 China always tried to manage a low-profile country avoid from wars conflicts and so on. Her main purpose remained to raised a soft image around the globe and identify herself a well known nation in as trade and commerce with the rest of world. The relationship of China with the countries considered very positive in terms of trade.

China stands at number one in terms of population. It has key men-force and update technology as recognized the world over. After 1980, it emerged as viable and capable economic force. It emerged from poor developing country to the developed nation with advanced technology and huge raw material throughout the year and now exporting technology and small items to all countries including the most advanced countries of the world.

China enjoys favourable economic relations and its market is friendly to her various economic partners. Due to her policies and diplomatic relations china is not considered a threat to global security. However, due to its powerful economy it is gaining ground as main stakeholder in global security, global governance and decisions. China maintains good trade relations with Asian, African, and European countries. Executive president of Republic of China Xi Jinping in his official visit to Kazakhstan in 2013 issued a policy statement which is considered as good gesture towards the world. He remarked and emphasized promotion of culture and friendship. It will eventually he remarked will usher a new era of close cooperation for future. It will provide to get closer economic ties regional and international connectivity for cooperation of continent. Around the world due to increase globalization must adopt a new approach based on innovative ideas and join hands boosting up economic activities within the regional countries. He further asserted that the project would connect rest of the world sooner or later. This was a first time China announced officially the "Silk Road Economic Belt initiative" (Wang, 2015). He announced this on the occasion of 'Economic Leaders Meeting of the Asia Pacific Economic Co-operation (APEC)'. President asserted that since long old times the South-East Asia region remained hub of economic activities especially 'Maritime Silk Road'. That is the main reason that China intends to promote economic relations with ASEAN, the Association of Southeast Asian Nations so that trade be promoted through sea route (Xi, 2013). These are some projects launched by Chinese Government and named as 'One Belt, One Road'. This is also

diplomatic source of China promoting cordial diplomatic relations with neighboring countries (Wang, 2015).

'One Belt, One Road'

The name 'One Belt, One Road' is basically regional and international connectivity program through roads, belts and Maritime's routes in Asia, Africa and Europe that include different investment plans to develop Chinese economy as well as economic situation of the Asian continent and other continents. The project will share assistance, exchanges and technical cooperation through different economic activities and create free open economic corridors and free trade zones. The major purpose of project makes a common market around the world (Wang, 2015). The two major routes will link Asia, Africa and Europe, to make free trade exchanges and transport of goods and services. In this regard technological, cultural, political and economic support of member countries of 'OBOR' on the bases of free trade zones and economic belts is the basic purpose and key focus. It will bring prosperity, advantages, economic profits, human resources movement, for China and other Asian countries. The prime motive behind this project is for uplifting socio-economic conditions of people especially living backward provinces of China like the Xinjiang, Gansu, Ningxia, Guangxi and Yunnan- that are the main routes of the project. Xinjiang province due to its backwardness is being considered by China as may lead promoting towards terrorism in the region. Whereas it will implicate strengthening of China's control in Central Asia, and in the Mediterranean region (Romanelli, 2015). The China going to invest in project around $300 billion, and technical assistance (Godement, 2015). Major examples of the investment in the light of 'OBOR'. China Pakistan Economic Corridor (CPEC) will provide direct connection to Gawadar considered the largest port in Pakistan. CPEC is currently become a major talk on the globe and fundamental, essential part of 'One Belt, One Road' projected by China. Republic of China has invested China is put to invest $46 billion on CPEC connecting Gwadar to Kashgar in China's northwest province of Xinjiang. It will provide infrastructure necessary improving railway system, roads, airports and pipelines for trade and tourism purposes. The project is huge in terms of investment and physical infrastructure as this will run around about 2,500/3,000 km from Gwadar, to Kashgar. It is planned to be completed by 2030. There are numerous benefits of China have in terms of trade specially imports of oil. China imports 60% required oil from OPEC countries of (Middle East) which is very costly and risky due to South China Sea conflict and Malacca Strait route. Route takes around about 45 days travel. After completion of CPEC through Gawadar

port (Pakistan) it takes easily shortened to less than 10 days. Thus, Gwadar-Kashghar route is considered as substitute to reach to Malacca and so on will be used for shipping purpose to save time and energy. Not only this but it also helps China to make used of its export to Africa, Central Asia, and Middle East. It is more feasible for China. China has also invested its capital and physical infrastructure on roads and railway in countries like Burma, Sri Lanka, and Bangladesh. China also established cargo rail service for connection from the central-western city of Chongqing to the north-western province of Xinjiang, to central Asia and Europe (Wilson, 2015). A common perception is that China is not the first country launching this project, but other countries also initiated when one peeps into history. During 1998 Japan also attempted such project for strengthening its presence and hold in Central Asian countries. USA also tried to do so. In 2011 US State Secretary Hilary Clinton during an official visit in India came with same proposal as named as 'New Silk Road'. India also *in 2014* announced 'Mausam Project' considerably in one way or the other tried taking firm grip towards the other countries on the coasts of the Indian Ocean (Wang, 2015). Kazakhstan and Korea were the two other countries who attempted or thinking to attempt for such venture. China due to such emerging and alarming situation to detain the malafide intentions of her neighboring countries launched for meeting the desired goals ahead.

Details of 'OBOR'

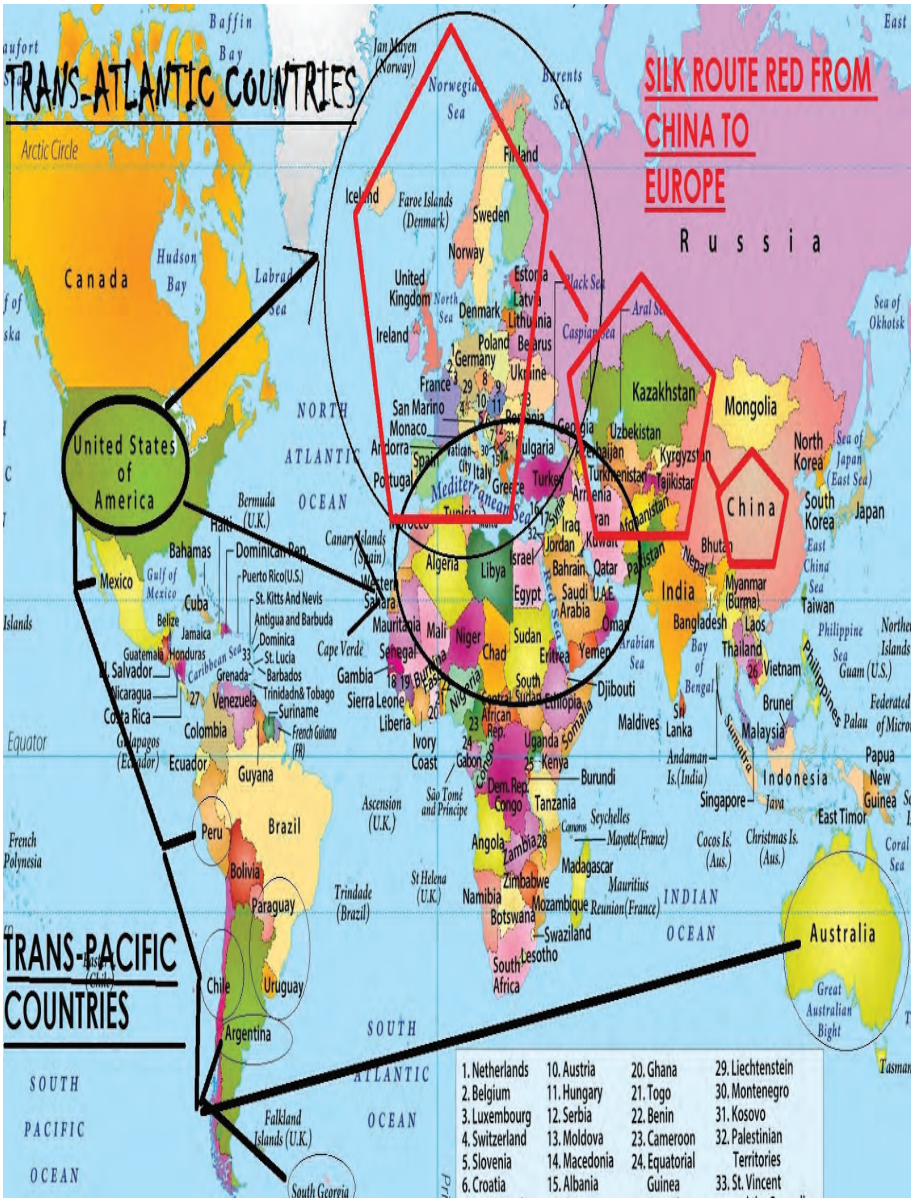
The proposed route of the projects at first stage covers three economic zones called economic corridors. First part of the project will go through central Asia and Russia. The second part of the project gives access China to Mediterranean Sea. It covers Central and West Asia. The last part gives access to China towards Indian Ocean via South-East Asia." The second section of 'One Belt, One Road' project, the 21st Century Maritime Silk Road envisioned as linking two different routes. The first one will cover connecting Coastal China with Europe, via the South China Sea and the Indian Ocean. Its second part of segment will be covering the associations with the South Pacific area. It is crossing through the turbulent South China Sea (National Development and Reform Commission and Ministry of Foreign Affairs of the People's Republic of China, 2015).

The total 60 countries are involved directly in this project. According to Chinese President Xi Jinping, many other countries showed a keen interest in connecting the series of economic corridors and free trade zones. A report was published by the Fung Business Intelligence Centre, the nations who

are going to join the initially becomes 64.2 % of the world's population and 37.3% of the global GDP. Further many countries along with other related routes can achieve economic growth and development (Chin, 2017).

Fig 1: Countries along the Belt and Road Region

Map 1: 'OBOR'



Region	Country
East Asia	China, Mongolia
Southeast Asia	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Vietnam
Central Asia	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
Middle East and North Africa	Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Palestine, Syria, United Arab Emirates, Yemen
South Asia	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
Europe	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine

Source: Industrial Cooperation between Countries along the Belt and Road, China International Trade Institute. The countries are grouped based on World Bank's classification by region.

Impact of the 'One Belt, One Road' Project on China

The government of China planned a new project the 'One Belt, One Road' project, have a great influence on country economy. The, indicator of economic development and growth have positive sign due to this project. Finally, many years of efforts and struggle finally to join in to amalgamate in the intercontinental system. China's Silk Road Economic Belt and the 21st-Century Maritime Silk Road has been given key importance in her foreign policy. It promotes and increases China proactive approach and influence on regional countries. China diplomacy is based on the principle standing with positive approach. Due to China huge investment indicates China immense interests in several African and Asian countries. Due to low per capita income of those countries those are powerfully attracted by the opportunities that the capitals that China. For uplifting their respective economies, they are interested to be part of that project (Jing, 2015). It also facilitates China to import energy and come across new regional markets for its goods in Africa, Central Asia, and Middle East. CPEC will be ready it will begin more trade and industry activities in the North- western Xingjian province and will facilitate China in the implementation of its Western Development Strategy (WDS).

In the OBOR projects the Chinese officials looking for a way to offset part of the accessible conjugal excess numbers by exporting its well-developed technical, assistance engineering skilled labor and construction capabilities, around the globe capitals tools and techniques and equipment and self-developed technology can be a progressive indicator for the country. China has world class experiencing labor and human resources development it will access through OBOR initiatives. OBOR will be considered as a very important step to development of Chinese economies. Through which poverty can be alleviated, employment opportunities can be created towards regional economic development and a game changer plan. OBOR is abroad development contract with the not only aim of grow strategic and economic connectivity and activities of bilateral trade between the regional connectivity is main purpose. OBOR can promote socio and economic expansion in positive way over all regions. It can cover the manner for regional trade and economic connectivity and amalgamation among the region of Central and East Asia South. CPEC as a flagship of OBOR can be a channel to start regional trade and economic integration. In a long-term point of view OBOR can advance an economic community in the complete regions of three continents. China can boost their economy through infrastructure, economic zones, energy sector investment, human resources development, foreign investment and highly well-equipped capital. China by and large intends enhancing connectivity and trade between regions across Asia, Europe and Africa. It is only possible for enhancing her GDP considered important for its superiority in the region. Out of 27 provinces of China almost 16 are being covered by the project. The rest of the provinces also shown deep interest to participate.

Key Opportunities

- Outbound capital projects and infrastructure Supply equipment/ technology/ intellectual property
- Joint or independent engineering, procurement and construction/project finance
- Joint new client developments (e.g. developing market governments)
- Leverage Chinese partnerships abroad for accessing Chinese market itself
- Leverage Chinese funding for divestment, fundraising, etc.

- Outbound financing/private equity fund (e.g. joint AIIB, Silk Road Fund, etc.)

- Better trade with markets

Sociological Impact of the 'One Belt, One Road' Project on Regions

The project initiated by China has major cultural, economic, strategic, and social connectivity implications on the regions from where it passes through from one country to the other. Sociologically, it can be considered as concept of 'Global Village' where people to people contact will reduce the gap through social interaction. It will help understanding the cultures, religions, social institutions, social order of the one region to the other from where it passes through. It is the need of the hour because people of regions are divided into smaller groups and intolerance is due to not understanding each other. Therefore, clashes and conflicts based on misconceptions and apprehensions has divided the region.

Above all the project will help regional economic cooperation helping the poor nations to improve the living standard at par with who are rich. Poverty and illiteracy have made many nations handicapped and livelihood sources are limited for the some of regions from where the project passes through. It will reduce the cost of transportation and global trade and investment opportunities will get boost up. Therefore, this is golden opportunity to reap fruits of the project at optimum level.

CONCLUSION

The project will prove fruitful in coming years. It will usher new era of prosperity and social wellbeing. It will add China's control over the region. The project is also vital for economic prosperity for the countries of the region from where it passes through. It will also change strategic and geopolitical setting of Asia. Through OBOR projects China and Asian countries are interested in industrialization. The reason is that through industrialization they can prosper economically. Investment plans export and savings are also increased due to entrepreneurial activities of countries can increased. A great example of this is CPEC project of Pakistan and China (CPEC). Pakistan by and large faces geopolitical and economic due to its long rivalry with India over Kashmir. CPEC will contribute substantially. The corridor will offer a solution to its problems and will open new horizons of development and

growth. Many plans are under consideration where different economic zones will be initiated in Gilgit-Baltistan, Punjab, Sindh, KPK, and Baluchistan. This will ultimately bring prosperity with the investment from the potential international investors and will assist Pakistan take its economic development and growth.

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AN ANALYSIS OF THE ROLE AND ECONOMIC CONTRIBUTION OF RURAL WOMEN IN DIFFERENT SECTOR OF THE ECONOMY – A CASE STUDY OF PAKISTAN'S BADIN AND MATIARI DISTRICTS

Dr. Ghazala Umer, Dr. Shabana Tunio, and Dr. Mohan DevRaj Thontya

ABSTRACT

This study examine the contribution of women in diverse sectors of the economy and estimates their workload in order to realize their value which they perform as unpaid workers in the rural area. A sample of 260 respondents were purposively selected from Badin and Matiari districts in Pakistan. Finding of the research reveals that females are main contributors in the household economy and participate fully to support the family income. The results showed that about 8.89% male contribute imperceptibly whose financial worth is equivalent to Pkr 10,000- Pkr 50,000 as compared to 71.9% female in the animal husbandry sector. In farming sector, just female contribute imperceptibly whose monetary worth is equivalent to Pkr10,000-Pkr 50,000 every year. In the household chores male participation is almost negligible cutting woods from the trees and arrange water for the family. About 80.5% male respondent involved in unpaid activities whose financial worth is under Pkr 10,000 out of a year when contrasted with 84.1% of females go through 5 to 7 hours to accomplish domestic management task monetary worth is equivalent to Pkr 50,000 – Rs.100,000 per annum. Thus female perform more unpaid work as compared to male.

***Keywords**: Unpaid Work, Workload, Gender Discrimination, Economic Valuation*

INTRODUCTION

Gender is one of the forming rules of Pakistani society. It has socially defined roles and responsibilities assigned to male and female by society. These differences happen because of social, cultural and economic factors

influence on women. Some cultures have specific gender roles that can be conceived as different from male and female (Naila, 2003).

Razavi (2011) argues that gender roles can be described as traditional norms and values, or rules that prescribe different responsibilities, opportunities, boundaries, and behaviors of men and women. These differences may produce the ideology of gender division of labor.

Shrestha (2008) elaborated workload of women in his research that women's contribution has not been recognized and valued in economic terms yet. Women spend much time to perform household activities including cooking, cleaning, washing, child rearing, besides work that she has to bear the responsibilities of agricultural work, care of livestock and perform community work, the work done in agriculture may not be considered as economic. Thus, men are supposed to be wage earners and have dominancy in home decision. Such non-recognition and ignorance of the valuable work adversely affects women's position in the society, and impacts their self-possession and their access to wealth, income, business, training and other assistances such as access to credit and assent in choice.

Role of Women in Different Sectors of Economy

In the developing countries, due to low income and less productivity females get lesser than the males. Usually they do not get a direct return in terms of money. These differences occur between men and women because of social, cultural, and traditional norms.

Shahnaz Akhtar (2015) elaborated that in entire Sindh all women who depend on agriculture sector work along with men to perform all agricultural activities. Pakhtunkhwa, and in Balochistan women are restricted to do work outside the house due to purdah, rigid society and social-cultural reasons.

In the southern part of Sindh province of Pakistan, district Badin has total area 6,726 square kilometers with a population of 1,804,516 in the census of 2017. Male population is 7,03,254 and females are 5,93,050. Lieracy rate is 24.6%. The district is administratively subdivided into the following talukas: Badin, Matli, Talhar, Tando Bago, Golarchi which are further subdivided into the Union Councils numbering 49, Tapas 109 and Dehs 511. Matiari district was carved out of Hyderabad district in 2005. Matiari district is part of the Hyderabad division. The district is administratively subdivided into three talukas: Hala, Matiari, and Saeedabad. There are 30 union councils in the district. The total population of district was according to 2017 census

769,349 whereas total number of households is 143,023.

According to Ahmed (2001), the role of women is very significant despite many social barriers. They help a male member to perform agricultural activities along with the livestock production activities and actively participate in household management and food preservation. Whatever work she performed contributes towards expending household income. About two thirds of total food production gets produced with the contribution of women. In all the activities of crop production from sowing, harvesting and storage of the crops, women equally participate with their male members of the family. In the same rural environment, women effectively play their role in animal brushing, draining, clean sheds, cutting grain, and slashing grub, etc. What's more, ladies additionally engaged in revenue generating activities to help and boost their family income, such as selling milk, spread, ghee making, and conservation of milk and milk items and showcasing creature.

According to the Census 2017, female population in Pakistan is 10.64 million (Pakistan Bureau of Statistics, 2019) majority of which live in rural area where their contribution is huge in the economic development of the country, but is not to be reckoned. Women cannot participate in the labor market or paid work because of the strict obsrvance of purdah. Romero-Paris (2000) highlighted the women's economic contribution, he said that 66% of women activity are involved in the agriculture, which leads to get two third of GDP from agriculture.

Fig. 1: Gender-Wise Cropping Activities in Punjab

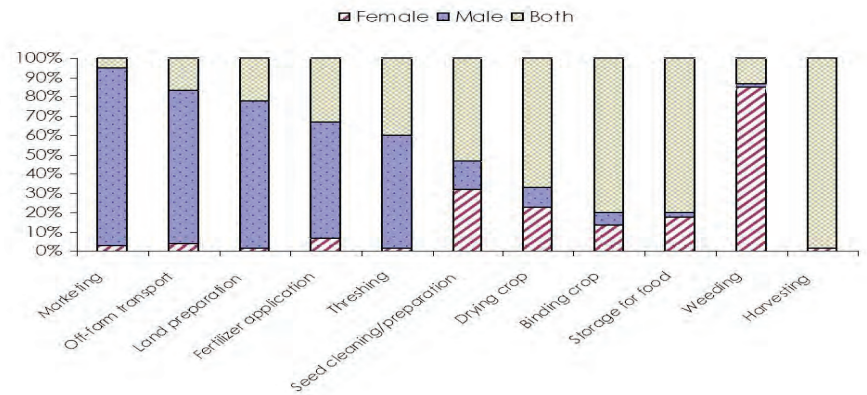


Fig-1 reveals that the female is actively involved in all activities along with men, but their contribution is high in the different activities of agriculture of weeding plants, cotton picking.

Economic Aspect of Visible and Invisible Work

In the less developed countries, much of economic activities performed in the household sector as the informal economy, and the output from the informal economy excluded from money transaction and producer do not get a direct return from selling their output. According to the World Bank (1995) report, $11 trillion income is generated with through the contribution of women and $5 trillion of income of women by performing unpaid work are absent from the worldwide economy every year (World Bank, 1995). Additionally, unpaid work, for example, family unit work or work performed for care of older or kids, involves no defensive enactment, strategy, no government managed savings and no economic well being. The income which may contribute to improve the lives of the family are not counted or recognized.

Naila (2006) argues about gender inequality according to her in different societies. She posits that gender inequality occurs in perspective of production and reproduction sphere. A man has to play a significant role in earning household income, but has a neglected status in the unpaid work of reproduction in the household sector. Women's role and their responsibilities in terms of productive and reproductive have changed with time. When she is unmarried, she has to confine limited work when she gets married being a mother and wife she has to bear more responsibility and do more work as an unpaid worker. This unpaid work or invisible work seems to be highest among poorer households. Unpaid work is that work in which mostly women engage in productive and reproductive activities, but their work is not being counted in economic terms and paid work are those work which are mostly performed by men in the productive activities in the labor market and their work is counted in economic terms. They get direct rewards of their services in terms of money.

LITERATURE REVIEW

Charmes (2018) while referring the SNA (United Nations System of National Accounts) report that the location of the production boundary in the SNA is a compromise, but a deliberate one that takes account of the needs of most users. In this context it may be noted that in labour force statistics economically active persons are defined as those engaged in productive activities as defined in the SNA. If the production boundary were extended to include the production of personal and domestic services by members of households for their own final consumption, all persons engaged in such

activities would become self-employed, making unemployment virtually impossible by definition. This illustrates the need to confine the production boundary in the SNA and other related statistical systems to market activities or fairly close substitutes for market activities". As a matter of fact women's work either productive or reproductive has been always unrecognized. In fact, the household work is generally considered as "natural" role of women as primary role which she has to perform every day. Women's work is always considered as the responsibility of women a pre-condition she has to perform anyway. As Brohi (2013) also strengthened in these words, "people in rural areas argued that women work as compared to men, do not involve implements and is largely on human energy. Therefore, their work is known as unskilled and hence less productive. These arguments are made base and result women's work as low paid work and low wage. As a matter of fact women in rural Sindh work harder and for longer hours than do men, are totally ignored".

Elson (2008), applied opportunity cost method to determine the real price of domestic work in a market economy. According to his opinion, this is the best way to measure household work from the market because there is no market value exists for household service. The opportunity cost is forgone incomes which are supposed to get from women from employment instead of performed home activities as unpaid worker is estimated by multiplying income per hour by the amount of time worked at different activities at home.

Let, **A is** the mean income for the working women.

And **n** be the average amount of time utilizes for work

If **m** is the mean of working days, then income per hour for working women is **A/n.**

Now opportunity cost method to estimate the forgone income of domestic activities and gets the income per day. As women who works usually at home usually work more than any employed women who works in the labor market, we can write her total working hour as **(n+c)** where c is represent additional time utilize by a woman to perform domestic works over the mean working hours of those working women who performed formal job that **c** always positive.

In Guinea time poverty was measured by applying the household survey for the period 2002–2003. Traditional concepts and techniques were applied for the estimation of wages/income or consumption poverty due to time

poverty (Wodon & Bardasi, 2006).

Applied methods were applied for the estimation of wages or utilization destitution because of time needed. In a period destitution system, the headcount file speaks to the bit of the populace, which is time poor, that is, the proportion of the populace (Wodon & Bardasi, 2006).

Since the 1970s, time use data proved as a useful tool for assessing non-monetary data of economic activities within the household. (UN, 2005). Time use surveys are now more applicable in European countries. Eurostat, the statistical body of the European Union, conducts time used surveys at five-year time interval. US has recently initiated monthly time use surveys, which is an important step towards the development and provision of a comprehensive record of all activities.

Justification of the Study

AAs we know women usually have lower status and limited access to resources and opportunities due to gender discrimination which highly prevalent in our society. Due to that reason, the women's role has not been recognized. Women are actively participating in all activities, but their work has no recognition in terms of money. Rural women in Sindh perform invisible work in the agriculture sector along with household work with little time for leisure and no right to control productive resources. The role of women is mostly neglected or underestimated in economic term nether measured in quantitative terms, nor valued in the national accounts. Therefore, it is necessary to give visibility of women's work in the national economy.

The purpose of this study is to highlight women's role and their contribution to provide care and basic necessities of life and estimate women's unpaid work and analyze how that work may be internalized in terms of legal perspective in different countries.

Objectives of the Study

1. To assess the women's contribution in agriculture, livestock and household sector.
2. To estimate women's contribution in different sector of the economy.

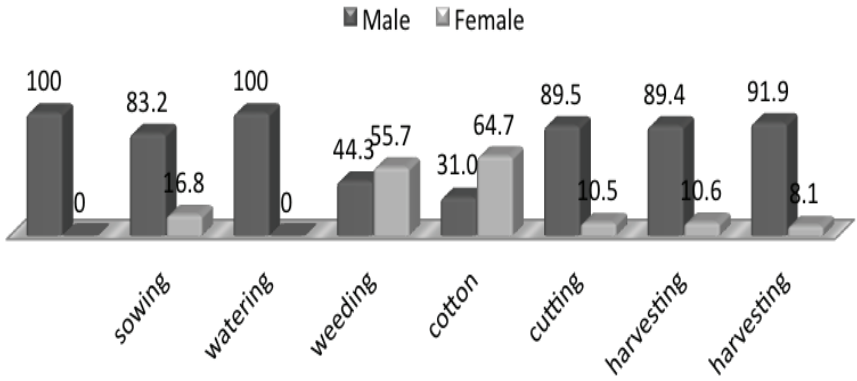
Hypotheses

H_1: Women performed more unpaid work than men in the household and other sectors including agriculture, livestock and fisheries.

H_2: Women's unpaid work contributes substantially to their household incomes, expenditures and savings as compared to men's unpaid work.

RESULTS AND DISCUSSION

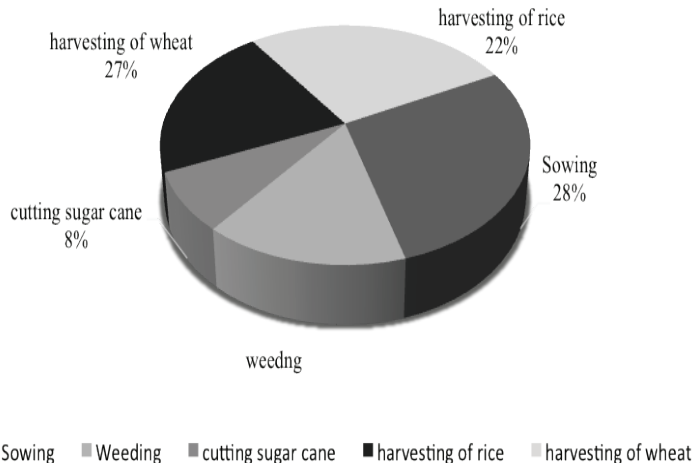
Fig.2: Family Member, Agricultural Paid Activities by Respondent n=260



Source: Study Survey (2014-15)

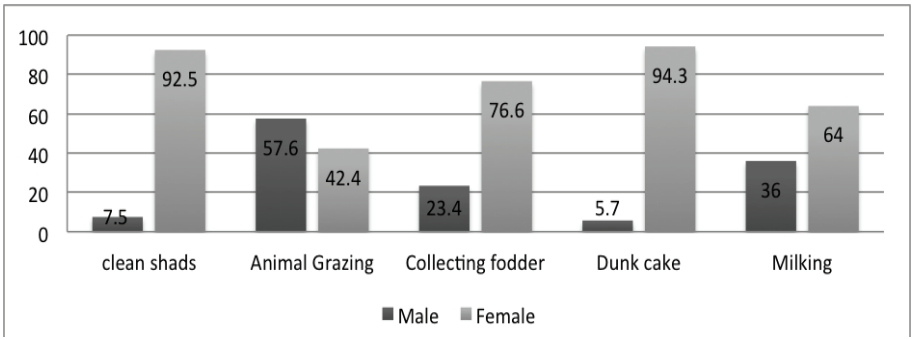
The above diagram (Fig.2) visualizes paid work of male and female respondent in a farming area. The most noteworthy level of females is taking part in cotton picking and weeding paid work on day by day compensation which is about 64.7 and 55.7% when contrasted with 31% and 44% of male. And in land cleaning and watering activities only male has to perform these activities.

Fig.3: Contribution of Women as Direct Beneficiaries



The Fig.3 shows the contribution of women as direct beneficiaries. About 28% of the women contributes in sowing activities, 27% in the harvesting of wheat, 15% in weeding and 22% in the harvesting of rice. In all these activities, female contributing with the men without getting a direct return of their work.

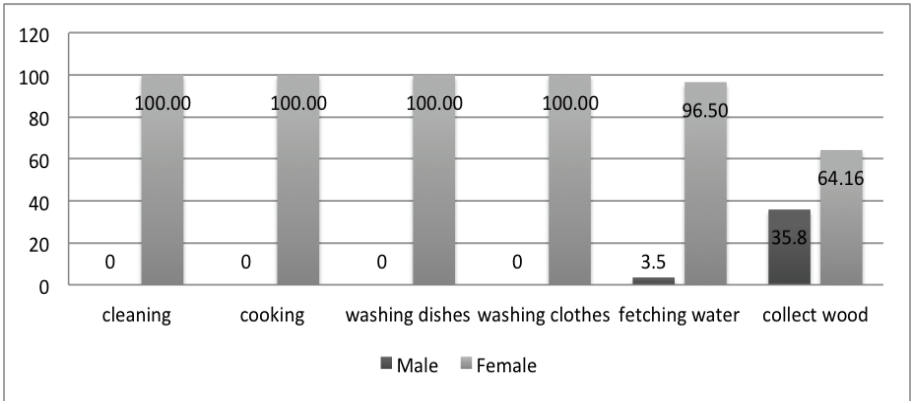
Fig. 4: Family Member livestock Activities by Respondent n=260



Source: Study Survey (2014-15)

This graph (Fig.4) represents the participation of men and women in livestock activities. In livestock sector most of the activities are performed by the female. About 92.5 % women is engaged in clean sheds activity as compared to 7.5 % of men. 94% of women engage in dunk cake activities as compared to 5.7 % of men. About 64 % of women involve in milking activity as compared to 64% of men. The largest proportion of mens is involved in animal grazing activities because this activity performed outside the house and women are restricted to go outside most of the males involve in animal grazing activities.

Fig.5: Family Member Household Activities by Respondent n=260



Source: Study Survey (2014-15)

This graph (Fig.5) assesses the contribution of women in the household sector. Women play a significant role in the management and wellbeing of all household tasks for family members. In contrast to 3.5% of males, 96.5 percent of women fetch water from far off areas. And 64.6% of women collect wood for preparing food compared to 35.8% of men. Other activities like cleaning look after children, washing and cooking all these activities performed by female only.

Table 1: Income Contribution of Invisible Work by Respondent n= 260

Gender	Activity	Level of Income in Rupees	Sum	% of Total Sum	Mean	Std. Deviation
Male	Livestock	Less than 10000	89	32.96%	1.4127	0.71018
		10000-50000	157	58.15%	1.3894	0.68704
		50000-100000	24	8.89%	1.7143	0.82542
		Total	270	100.00%	1.4211	0.70642
	Household	Less than 10000	134	80.72%	1.1858	0.39071
		10000-50000	29	17.47%	1.7059	0.68599
		50000-100000	3	1.81%	0.75	0.5
		Total	166	100.00%	1.2388	0.47776
Female	Agriculture	10000-50000	231	59.69%	2.2647	1.15978
		50000-100000	75	19.38%	2.0833	0.84092
		Above 100000	81	20.93%	1.9286	1.17687
		Total	387	100.00%	2.15	1.11102
	Livestock	Less than 10000	4	1.02%	2	1.41421
		10000-50000	106	27.04%	2	0.85485
		50000-100000	282	71.94%	2.0435	0.98803
		Total	392	100.00%	2.0311	0.95146
	Household	Less than 10000	1	0.21%	1	.
		10000-50000	74	15.68%	1.6444	0.77329
		50000-100000	397	84.11%	2.057	1.04675
		Total	472	100.00%	1.9749	1.01221

Source: Study Survey (2014-15)

This table assesses the contribution of male female income from unpaid work. About 8.89 % of male engaged intangibly whose financial cost are equal to 10000-50000 when contrast with to 71.9% of female contributes in the management of animal husbandry. In farming side, only female contribute

intangibly whose financial cost worth is equal to 10000-50000 thousand in a year. In the household unit, male only engaged in cutting wood or bringing Water from far places for drinking and consumption purpose. About 80.5% of male respondent contribute as a voluntary worker whose financial cost is less than 10000 thousand in a year when contrast with 84.1% of female devote 5 to 7 hours to perform household activities whose financial cost is equal to 50000-100000 in a year.

Table 2: ANOVA of Income Contribution of Male Female Invisible Work

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups Male v/s Female Group	70.602	1	70.602	78.257	.000
Within Groups With Male and Female Group	549.434	609	.902		
Total	620.036	610			

Results: Results showed that with the noteworthy number of .000 which is under .05, there is a measurably critical variation between two numbers.

Table 3: Income Contribution of Visible Work by Respondent n=260

Gender	Activity	Level of Iincome in Rupees	Sum	% of Total Sum	Mean	Std. Deviation
Male	Agriculture	10000-50000	65	11.19%	2.5	1.52971
		50000-100000	316	54.39%	2.2098	1.01989
		Above 100000	200	34.42%	2.2222	1.27003
		Total	581	100.00%	2.2432	1.16751
Female	Agriculture	10000-50000	435	95.60%	2.3641	1.23829
		50000-100000	12	2.64%	2.4	0.89443
		Above 100000	8	1.76%	2.6667	1.52753
		Total	455	100.00%	2.3698	1.22953

Source: Study Survey (2014-15)

This table conceives participation of respondent in agriculture sector around 54 % of male take part in a farming area whose monetary cost be assessed, which is equivalent to 50,000-1,00,000 thousand rupees when contrasted with 95.6% of females whose financial worth is equivalent to 10,000-50,000 thousand rupees in a year.

Table 4: ANOVA Table

			Sum of Squares	Df	Mean Square	F	Sig.
Number * Gender	Between Groups	(Combined)	1.717	1	1.717	1.200	0.02
	Within Groups		645.051	451	1.430		
	Total		646.768	452			

Results: results indicate that with the significant number of .02 which is less than .05, there is a statistically significant variation between two values.

Table 5: Expenditure Pattern of the Respondent n=260

Items	**Frequency**	**%**
Buying Cloth for Children	12	4.61
Food	156	60
Health	60	23.0
Education	23	8.84
Social Events	9	3.4
Total	260	100

Source: Study Survey (2014-15)

This table shows a spending pattern of female respondent whatever the income she earns from different sources have to utilize on food health and for education of children. The highest percentage of income spent on food items that is about 60 percentage.

CONCLUSION

Women are forced to endure the severe helpless condition in rural areas of Sindh, which can establish discernment in every part of life. Since the ancient time due to the social factors women always considered inferior in our society. She has to restrict household task and spend take 8 to 11 hours in a day, such as food preparation, house cleaning, washing clothes and dishes, taking care of families, as well as field and animal husbandry, all these tasks are not considered economically significant. When we simply see that women contribute significantly to good health, food and nutrition.

It has been found in this research that volunteer labor has the significant value that could not be objectively understood or internalized. Women do not

only care for their families through unpaid work, but also be responsible for producing subsistence food. They are actively involved in the development activity in agriculture, but they are known as an unpaid helper to their kin.

Research also analyzes the income support provided by women from the different sources to run household expenses. Approximately 71.9 percent of the male in animal husbandry contributes invisibly to the economy of 10,000-50,000 compared with 71.9 per cent. Even women contribute invisibly in agriculture whose economic value equals 10,000-50,000,000 per year. Males only engage in wood cutting or water fetching tasks in the household sector. About 80.5 percent of male respondents spent less than 10,000,000 households a year in unpaid jobs compare to 84.1 percent of the female respondents investing 5 to 7 hours per year, whose economic value is equivalent to 50,000 to 100,000 households per year.

Whatever the work she carried out, including housework, cooking, washing, laundry or dishes, if the midwife was hired to carry out all those duties, 400-500 rupees for every task would have to be paid by her family. He predicted 4,000 rupees in an urban area equal to Pak per month for one household. 48,000 rupees a year, or 800 dollars. The figure is Rs 25,800 per year, equivalent to US$ 430 for a rural household Pkr 2,150/month.

By this research realize the that without the support of women, any development either social or economical of the country could not be possible. They are effectively engaged with the farming sector part along with performing revenue producing activities. What's more, further prescribes that so as to increase the ability of human capital and financial development of women's participation must be coordinated, should be given fair access to and power over the land, monetary assets.

By this study, women make a contribution and conclude that rural development in developing countries would not be possible without the active involvement of women. They play an active role in agriculture, carry out household tasks and make a financial contribution by carrying out income generating activities. It also recommends to improve the ability of human capital and financial development of nation's ladies' commitment must be incorporated should be given impartial access to and command over the land, monetary assets.

RECOMMENDATION

It is also recommended that states regulate funds to poor houses and care

services which may reduce the workload of women in societies. Finally, acknowledgment of the economic participation of voluntary household activities needs to be estimated by applying the time-estimation method in various Europen and south Asian countries and embedding time-use modules within household surveys. Within rural areas, a particular organization, child care and treatment of elderly people can provide a greater right to use public services at community level, encouraging women to live a better life within employment. To order to ensure that women working in unpaid activities are properly recognized and that their contributions to the informal economy are decreased, the government must consentrate in alternative policies and the employer should be given social security benefits.

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CONTRIBUTING AGENTS FOR FOREST MANAGEMENT OF RURAL AREAS- AN ANALYSIS THROUGH SMART PLS METHODS

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ABSTRACT

Three main areas of focus were: strategic-level management, local-level management, and communication level-management. To provide a better way of confidence and to measure factors affecting sustainable forest management, this study applied the SEM approach and built a model that explained and identified the critical factors affecting sustainable forest management. A quantitative approach via smart-PLS version 3.2.8 was used for analysis. The aim was to find out the relationship between strategic level management, local level management and communication level management for sustainable forest management. The findings of the study discovered that the R^2 value of the model was scored at 0.653, which meant that the three exogenous latent constructs collectively explained 65.3% of the variance in sustainable forest management. In this study, the Goodness-of-Fit of the model was 0.431. The strategic level management factor was the most important of the three variables.

***Keywords**: Sustainable Forest Management; Sustainable Forestry; Public Awareness; Strategic Level Forest Management; PLS-SEM.*

INTRODUCTION

The sustainable management of forestry is a worldwide concern (Berg & Lindholm, 2005). Community involvement in proper forest management has been deemed crucial (Buchy & Hoverman, 2000; Shackleton et al., 2002). Governments develop different policies to manage their countries' forests for a sustainable ecosystem (Shrivastava, 1995). Public involvement is considered an important part of improved forest management (Leach, Mearns, & Scoones, 1999). Local residents may see forestry as an important source of income and yet may use it without proper management: as a result, deforestation can quickly become unsustainable (Tanz, & Howard, 1991). Improper management of forest resources is a key issue in developing

countries, posing a significant threat of damage to land and other natural resources (Pearce, Barbier, & Markandya, 2013). The impact of improper forest management is not only limited to directly affected countries but at length spreads to the whole world (Rametsteiner & Simula, 2003). A survey was conducted in areas of Gilgit-Baltistan, Pakistan and the views of various residents of mountainous regions were collected and analyzed. The outcomes of this research are not only beneficial for the local public, but it is also instructive for forest management study in this general socio-economic and natural setting. In light of the results and recommendations of this study, local as well as central governments can formulate policies regarding proper forest management for better natural resource utilization.

LITERATURE REVIEW

In the literature, forest management is considered a branch of forestry due to the administrative issues, economic concerns, and social impacts of forestry within and without scientific experiments, as well as regarding the regulations of forest policies (Davis & Johnson, 1987; Johnson, & Curtis, 2001). Forest management is a broader concept where different researchers include the management of aesthetics, fishery, recreational resources, urban values and outputs, water management, wildlife resources, wood products, forest genetic resources, etc. (Pritchett, 1980; Burton et al., 2003). Some other researchers believe that forest management may consider the conservation and economic forest management or a combination of conservation and economic output (Lindenmayer, Margules, & Botkin, 2000; Sheppard, & Meitner, 2005. Researchers indicated that forest management is a technical field which includes timber extraction, the planting of forestry and replanting of various species within a specific context, to look after the cutting roads and pathways within the forests, and so on (Jandl et al., 2007; Siitonen, 2001; Veríssimo et al., 1992). Some researchers argued that forest management includes all the techniques necessary for sustainable forest management and forest recycling (Bergsten et al., 1996; Von Gadow, Pukkala, & Tomé, 2012).

Public Sharing in Sustainable Forest Management

The role of the public and the local community is considered a key backbone for better forest management (Sheppard & Meitner, 2005; Kangas, 1994). Most research work on community forestry management suggests that local community people usually play a key role in better forest management (Beckley, Parkins, & Sheppard, 2006; Shindler, Steel, & List, 1996).

Reserachers believe that locals, who are basically the main benificieries of the forest, usually are the main cause of damage to natural resources such as forests (Davis & Johnson, 1987; Wells, Tigert, & Activities, 1971). Prior research shows two levels of forest management for public control, local level management and central government policy (Murray, 2007). The local level management consists of local community-based policies where people take part in policy formulation for the betterment of the forest and eco-enviromental protection (Nygren, 2005; Agrawal, & Bauer, 2005).

Government Sharing in Sustainable Forest Management

In previous studies, it was indicated that central and local governments are also fully responsible for better forest management by making policies and with the implementaion of regulations (Agrawal, & Bauer, 2005; Pagdee, Kim, & Daugherty, 2006). The public government sharing and communication of the forest policies to the public is also considered a key role of governments for the betterment of forest management (Klooster & Masera, 2000; Kumar, 2002). Previous studies showed that proper forest management for the longrun livelihood is considered the main goal of enviromental departments of the governments (Grieg-Gran, Porras, & Wunder, 2005). Governments use different channels to give more information to the public about forest management (Lewis & Sheppard, 2006). In any case, whether a pubic-private partnership or pure government policies for forest management, it is important to link forest management for sustainable and longrun management. Researchers described different views about sustainable forest management in different seetings. Here some recent and very famous studies are analyzed.

Sustainable Forest Management

In literature, sustainable forest management examines the main principles of sustainable development (Davis, & Johnson, 1987; Kates, 2018). Sustainable management is directly related to sustainable development (Whitmore, Laurance, & Bierregaard, 1997; Paluš et al., 2018). In other research it is also mentioned that sustainable forest management is the name of keeping balance among three areas, named; ecology, economy and socio-cultural settings (Wolfslehner & Vacik, 2008; Wu, Olson, & Birge, 2013). Sustainable forest management has a direct impact on the livelihood of the people by providing clean air, protecting the ecosystem, reducing rural poverty, and mitigating the effects of climate change (Jandl et al., 2007; Cao et al., 2018).

In the charter of the United Nations, proper forest management was considered a main obligation of governments at all levels: local, regional, and

global (Spector, Sjöstedt, & Zartman, 1994). Keeping in view of the United Nations policies regarding forest managemnt, different countries are trying to protect the livelihood of the forest with some solid steps like formulating policies for cutting timber and using the forest for commercial purposes like renewable energy projects, etc. (Johansson et al., 1993; Sombroek, & Sims, 1995).

A universally accepted definition of sustainable forest management (Stupak et al., 2007) was provided as:

"The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems."

Current Forest Management Situation in Gilgit-Baltistan, Pakistan

Current forest management in Gilgit-Baltistan, Pakistan is not satisfactory (Akbar et al., 2014). Neither has remarkable research been done nor have steps been taken to know the current issues and problems for local forest management (Rizwan, 2018). The record shows that nearly 5.36% of Pakistan's total landmass is covered by forests of its total land with 15.7 (GNP), 0.2% (GDP) share on average per annum, according to 2010 calculations (Rizwan, 2018). While some other reports like FAO (Food and Agriculture Organization) statistics for 2009 show that the forest cover in Pakistan is hardly touching figures of 6%, with 2% natural forest and 4% covered by plantations and human-made gardens (Rizwan, 2018). The area of Gilgit-Baltistan, Pakistan encompasses an area of 7,040,000 hectares. With a forest-covered area of 950,000 hectares (13.4%) of its total area with province-wise Pakistan forest cover share of estimated 9% (Rizwan, 2018). The proper management of forestry also appears necessary from global scale data, where research showed that 12-15 million hectares of forest are lost each year (Siry, Cubbage, & Ahmed, 2010). Some studies have forecast that the deforestation rate in Pakistan is 0.2 percent to 0.5 percent annually, which is highest worldwide (Rizwan, 2018).

The Hypothesis of the Study

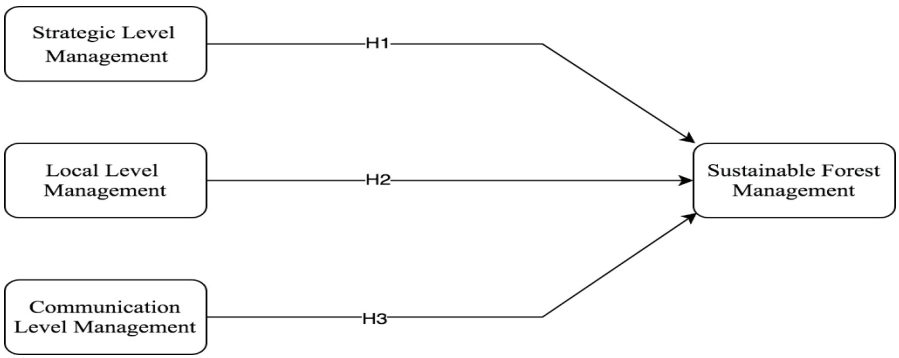
The study hypotheses are as follows:

$\mathbf{H_1}$: Strategic level management factor has a significant and positive effect on sustainable forest management.

H_2: Local Level management factor has a significant and positive effect on sustainable forest management.

H_3: Communication level management factor has a significant and positive effect on sustainable forest management.

Figure 1. Conceptual model.



METHODS

This study was undertaken in the area of Gilgit-Baltistan, Pakistan. A quantitative survey was conducted to know the views and practices of the locals about sustainable forest management of the region. There were a total of 255 respondents from different regions of Gilgit Baltistan, Pakistan. Figure 2 shows the districts of Gilgit-Baltistan where the study was conducted.

The area of Gilgit-Baltistan is totally natural, and forests are situated everywhere [50]. The study sample encompasses the eight districts of Gilgit-Baltistan, Pakistan: Gilgit, Skardu, Astore, Kharmang, Ghizer, Ghanchi, Hunza, and Nager. A probability cluster sampling method was used to collect the data. The whole province was divided into districts/clusters, and the data collected accordingly.

Preliminary List of Factors

To know the main factors affecting sustainable forest management researchers did a comprehensive and critical literature review and found three types of factors which are supposed to be the main factors affecting sustainable forest management. The questionnaire was divided into two sections; section one consisted of the demographics of the study and section two comprised the main variables for sustainable forest management. For better analysis and understanding section two was categorized into four sub-groups in accordance with the nature of the factors: The codes for variables were as: Strategic level management factor (STM_L), local level management factor (LOCL_M), Communication level management factor (COM_L) and sustainable forest management factor (FOR_M). Table 1 shows the constructs for the main dependent and independent variables of the study.

Table 1: The preliminary list of factors affecting sustainable forest management.

Code	Factors
	Strategic Level Management Factor (STM_L)
STM_L1	Central legislation
STM_L2	Check and control
STM_L3	Professional forestry planning
STM_L4	Protected forestry areas
STM_L5	Input opportunities and policy implementation
STM_L6	Protect aesthetic values
STM_L7	Security for forestry companies
STM_L8	Attention on timber resources
	Local Level Management Factor (LOCL_L**)**
LOCL_L1	Responsive to public concerns
LOCL_L2	The direct benefit for the local community
LOCL_L3	Instant economic benefit from forest
LOCL_L4	A fair share of locally generated government income
LOCL_L5	Environment sensitive initiatives for locals
LOCL_L6	Useful infrastructure for local forestry

	Communication Level Management Factor (COM_L**)**
COM_L1	Get information about the forest through media
COM_L2	Aware of current situations of the forest through local government bodies
COM_L3	Trusted information among forest managers and local people
COM_L4	Can post any problem with forest situation
COM_L5	Available a good information way toward misuse of forest resources
COM_L6	Take necessary actions on the news posted in mass media about any forest management issue
COM_L7	Available a good communication channel between central and local government for forest management
	Sustainable Forest Management Factor (FOR_M)
FOR_M1	Available a sustainable way of getting information about forest management
FOR_M2	A strong role of local community participation
FOR_M3	Seen long-term planning for sustainable forest management
FOR_M4	Overall seen a better and sustainable forest management problem solving techniques

Pilot Study and Questionnaire Design

To know the feasibility of the study and to test the relationship of the pre-study variables, a pilot study was conducted. The questionnaires were administered by the researchers to obtain instructions on the factors affecting sustainable forest management from the experts. Based on the significant pilot test results the final questionnaire was designed, and the study was conducted accordingly.

After conducting a pilot survey, certain minor adjustments were made to the questionnaire. The final questionnaire was split into two key sections for better questionnaire management. Section one contained the respondents' demographic profile such as educational qualification, income range, and material status, etc. Section two of the questionnaire consisted of the final list of the questions on a five-point Likert scale ranging from 1 to 5. The questionnaires were presented to the respondents in the field and data was collected accordingly.

Respondents' Demographics

Table 2 shows the demographic information of the respondents. The respondents were selected from a wide range of local community living in Gilgit-Baltistan. Table 2 shows different demographic segmentations.

Table 2: Demographic information of respondents on average.

Age	Percentage
Less 10	0.9
10-18	39.6
19-30	39.6
31-45	14.2
above 45	5.7
Total	100.0
Education level	
Under 10th Grade	22.6
10th Grade	10.4
12th Grade	17.9
Bachelors	22.6
Masters	25.5
PhD	0.9
Total	100.0
Income level	
less 8000	39.6
8001-15000	18.9
15001-30000	12.3
30001-45000	18.9
45001- and above	10.4
Total	100.0
Gender	
Male	46.2
Female	53.8
Total	100.0
Material status	
Married	30.2
Unmarried	68.9
Divorced	0.9
Total	100.0

Sampling and Data Collection

The data were collected through team members consisting of the researchers and forest experts. The sample unit was selected from different

districts of Gilgit-Baltistan Pakistan. The sample was based on the list of the respondents living in Gilgit-Baltistan and actively involved in the factors related to social issues. The data was considered enough for analysis as the main variables were chosen from literature and the results area also relate to the main theme of the research. There was a total of 300 respondents who were supposed to be the sample for this study; among them, 255 responses were collected. The respondents had enough experience to understand the importance of the study conducting in the field.

RESULTS

The simulation work in calculating the effect of the observed variables and their latent constructs on sustainable forest management was drawn in smart-PLS version 3.2.8 (Ringle & Becker, 2015). Majority of the researchers use PLS-SEM for theory development in exploratory research (Bamgbade et al., 2018). Major applications of SEM contain path analysis, second-order factor analysis, confirmatory factor analysis, regression models, correlation structure models and covariance structure models (Lin & Jeng, 2017). Furthermore, the structural equation modeling technique permits the examination of the linear connections between the latent constructs and manifest variables. SEM has the ability to create accessible parameter estimates for the relationships between unobserved variables in the model. A collective data analysis facility is also available in a single model with various relationships instead of examining each relationship separately. The hypothesized model in Figure 1 for sustainable forest management was analyzed using Smart-PLS version 3.2.8 which has advantages over regression-based methods in evaluating several latent constructs with various manifest variables for sustainable forest management (Gefen, Straub, & Boudreau, 2000). Smart-PLS consists of a two-step procedure as recommended by Henseler et al. (Gefen, Straub, & Boudreau, 2000), which contains the evaluation of the outer measurement model and evaluation of the inner structural model. Furthermore, PLS-SEM is currently known and selected within social sciences studies as a technique that is the best appropriate method for multivariate analysis, like in the current study (Hair, Ringle, & Sarstedt, 2013; Peng & Lai, 2012).

At the end of the study, the appendix A shows a comprehensive explanation of the descriptive statistics of the study such as mean, standard deviation, kurtosis, and skewness, etc. The results of kurtosis and skewness (values lie between -1 and +1) results showed that the data were normally distributed to measure the sustianbel forest managemnt.

Evaluation of Outer Measurement Model

The outer measurement model is designed to calculate the reliability, validity and internal consistency of the observed variables, calculated through the survey method, together with unobserved variables (Ho, 2013). The consistency evaluations are based on construct reliability tests, and single observed while convergent and discriminant validity are used for the measurement of validity (Hair et al., 2012). In this model, a single observed variable reliability concludes the variance of an individual observed comparatively to an unobserved variable by evaluating the standardized outer loadings of the observed variables (Götz, Liehr-Gobbers, & Krafft, 2010). Researchers noted that observed variables with an outer loading of 0.7 or greater are to be greatly acceptable for predictions and model evaluations (Hair et al., 2012), whereas the outer loading with a value less than 0.7 is considered to be discarded (Chin, 1998). Nevertheless, for the current study, the cut-off value accepted for the outer loading was considered as, 0.7. Table 3 shows the outer loadings ranged between 0.759 and 0.909. For internal consistency checking, Composite Reliability (CR) and Cronbach's alpha were used in the construct reliability. Some researchers believe that composite reliability (CR) is a better way for measurement of internal consistency as compare to Cronbach's alpha because it maintains the standardized loadings of the observed variables in the model (Fornell, 1981). The results in this study show the values of Cronbach's alpha (COM_L=0.896, LOCL_M=0.910, STM=0.951, FOR=0.861) and composite reliability (COM=0.918, LOCL=0.931, STM_L=0.959, FOR_M=0.906) which indicates that the composite reliability and Cronbach's alpha values are greater than the minimum requirement of 0.70. For the measurement and verification of the convergent validity of the variables, the latent construct's Average Variance Extracted were measured [(Fornell, 1981). Previous studies show that the lowest 50% of the variance from the observed variable should be measured by the latent constructs in the study model and the AVE for all constructs should be more than 0.5. In this study, the results in Table 3 shows that all of the AVE values (COM=0.615, LOCL=0.691, STM=0.744, FOR=0.706) are more than 0.5 and valid for convergent validity measurement. The results also supported the argument that there are good values for convergent validity and good internal consistency for the measurement model of this study.

Further measurements were related to the discriminant validity of the latent variables. The discriminant validity describes that the manifest variable in any model is unique from other variables in the path model and its cross-

loading value in the latent variable is more than that in any other variable (Hair Jr. et al., 2014). Some researchers used the tests like Fornell and Larcker criterion and cross-loadings to measure the discriminant validity (Fornell, 1981). Researchers suggested a standard for variables that a construct must not contain the same variance as any other construct that is more than its AVE value (Hair Jr. et al., 2014). Table 4 describes the Fornell and Larcker standard test of the study model where the squared correlations were compared with the correlations from other latent variables. Table 4 shows satisfactory discriminant validity that all of the correlations were smaller relative to the squared root of average variance exerted along the diagonals. These results also indicate that the observed variables in every construct show the given latent variable confirming the discriminant validity of the study model, while, Table 5 shows that the cross-loading of all observed variables was more than the inter-correlations of the variables of all the other observed variables in the study model.

Based on the study results it is confirmed that the cross-loadings measurements standards and show an acceptable validation for the discriminant validity of the measurement model. Over all the study results supports for an acceptable model with confirmation of adequate reliability, convergent validity, and discriminant validity and the verification of the research model for further implementations.

Table 3: Construct reliability and validity.

Main Constructs	Items	Loadings	Cronbach's Alpha	CR	AVE
Communication Level Management	COM_L1	0.770	0.896	0.918	0.615
	COM_L2	0.784			
	COM_L3	0.853			
	COM_L4	0.785			
	COM_L5	0.759			
	COM_L6	0.774			
	COM_L7	0.762			
Local Level Management	LOCL_M1	0.812	0.910	0.931	0.691
	LOCL_M2	0.810			
	LOCL_M3	0.815			
	LOCL_M4	0.860			
	LOCL_M5	0.880			
	LOCL_M6	0.808			

Strategic Level Management	STM_L1	0.837	0.951	0.959	0.744
	STM_L2	0.879			
	STM_L3	0.850			
	STM_L4	0.909			
	STM_L5	0.868			
	STM_L6	0.855			
	STM_L7	0.808			
	STM_L8	0.882			
Sustainable Forest Management	FOR_M1	0.825	0.861	0.906	0.706
	FOR_M2	0.815			
	FOR_M3	0.876			
	FOR_M4	0.844			

Table 4: Fornell–Larcker Criterion Test.

	COM	**FOR**	**LOCL**	**STM**
Communication Level Management (COM)	**0.784**			
Sustainable Forest Management (FOR)	0.554	**0.840**		
Local Level Management (LOCL)	0.243	0.559	**0.832**	
Strategic Level Management (STM)	0.204	0.582	0.256	**0.863**

Table 5: Cross-Loadings.

	COM	**FOR**	**LOCL**	**STM**
COM_L1	**0.770**	0.395	0.170	0.178
COM_L2	**0.784**	0.439	0.194	0.162
COM_L3	**0.853**	0.498	0.195	0.232
COM_L4	**0.785**	0.443	0.211	0.103
COM_L5	**0.759**	0.406	0.224	0.148
COM_L6	**0.774**	0.412	0.202	0.140
COM_L7	**0.762**	0.436	0.141	0.147
FOR_M1	0.472	**0.825**	0.459	0.457
FOR_M2	0.470	**0.815**	0.446	0.493
FOR_M3	0.474	**0.876**	0.484	0.501
FOR_M4	0.445	**0.844**	0.489	0.503
LOCL_M1	0.257	0.475	**0.812**	0.210

LOCL_M2	0.163	0.471	**0.810**	0.224
LOCL_M3	0.229	0.478	**0.815**	0.193
LOCL_M4	0.165	0.432	**0.860**	0.226
LOCL_M5	0.172	0.457	**0.880**	0.226
LOCL_M6	0.219	0.470	**0.808**	0.196
STM_L1	0.196	0.517	0.215	**0.879**
STM_L2	0.140	0.467	0.194	**0.850**
STM_L3	0.210	0.546	0.245	**0.909**
STM_L4	0.191	0.570	0.232	**0.868**
STM_L5	0.137	0.483	0.196	**0.855**
STM_L6	0.149	0.445	0.236	**0.808**
STM_L7	0.201	0.511	0.243	**0.882**
STM_L8	0.170	0.456	0.199	**0.847**

Evaluation of the Inner Structural Model

Previous results confirmed that the measurement model was valid and reliable for further analysis. After validation of the data and model, the next aim of the analysis was to measure the Inner Structural Model outcomes for this study. The purpose of this measurement is to observe the model's predictive relevancy and the relationships among the variables. The coefficient of determination (R^2), Path coefficient (β value) and T-statistic value, the Predictive relevance of the model (Q^2), Effect size (f^2), and Goodness-of-Fit (GOF) index are the key standards for evaluating the inner structural model.

***Value* of R^2**

For the overall effect size, the coefficient of determination is used, and variance explained in the endogenous construct for the structural model, and it uses a model's predictive accuracy for the study. In the current analysis, the inner path model was 0.653 as shown in Figure 3 for the endogenous latent variable such as sustainable forest management. These results show that the three independent variables such as strategic level management factor, local level management factor and communication level management factor substantially explain 65.3% of the variance in the quality measurement, it further concluded that about 65.3% of the change in sustainable forest management was due to three latent variables in the model. Some researchers suggested that a value of R^2 0.75 is substantial, the R^2 value of 0.50 is

considered as moderate, and R^2 value of 0.26 is nominated as weak value for model prediction. In this study, the R^2 value (0.653) is more than the required value and hence considered as moderate.

Assessment of Path Coefficients (β) and T-statistics

The results indicate that the path coefficients in the Smart-PLS and the standardized β coefficient in the regression analysis seemed the same. The purpose of measurement of the β is to know the expected variation in the dependent variable for a unit variation in the independent variable. In this analysis, the β values of every path in the hypothesized model were measured. The studies show that the more the β value, the best the substantial effect on the endogenous latent variable. Moreover, the T-statistics test is considered compulsory for the verification of the β value significance. The bootstrapping procedure was used to evaluate the significance of the hypothesis. To test the significance of the path coefficient and T-statistics values a bootstrapping procedure using 5000 subsamples with no sign changes was carried out for this study as presented in Table 6.

Table 6: Path Coefficient and T-Statistics.

Hypothesized Path	Standardized Beta	T-Statistics	*p* Values
Communication > Forest Management	0.382	10.870	0.000
Local > Forest Management	0.361	9.668	0.000
Strategic> Forest Management	0.412	10.737	0.000

For H1, the prediction was about the strategic level management factor, and it was supposed that the strategic level management factor is significantly and positively influence sustainable forest management. The values in Table 6 and Figure 3 confirmed that the strategic level management factor significantly influenced sustainable forest management ($\beta = 0.412$, $T = 10.737$, $p < 0.000$). Hence, H1 was strongly supported for this study. To check the influence of local level management for sustainable forest management (H2), the findings from Table 6 and Figure 3 shows that the local level management factor positively influenced sustainable forest management ($\beta = 0.361$, $T = 9.668$, $p < 0.000$). The influence of the communication level factor on sustainable forest management was also positive and significant ($\beta = 0.382$, $T = 10.870$, $p < 0.000$), with providing supportive evidence for H3. Moreover, Figure 4 shows the graphical representation of the path coefficient.

Figure 3: Assessment of the Structural Equation Model

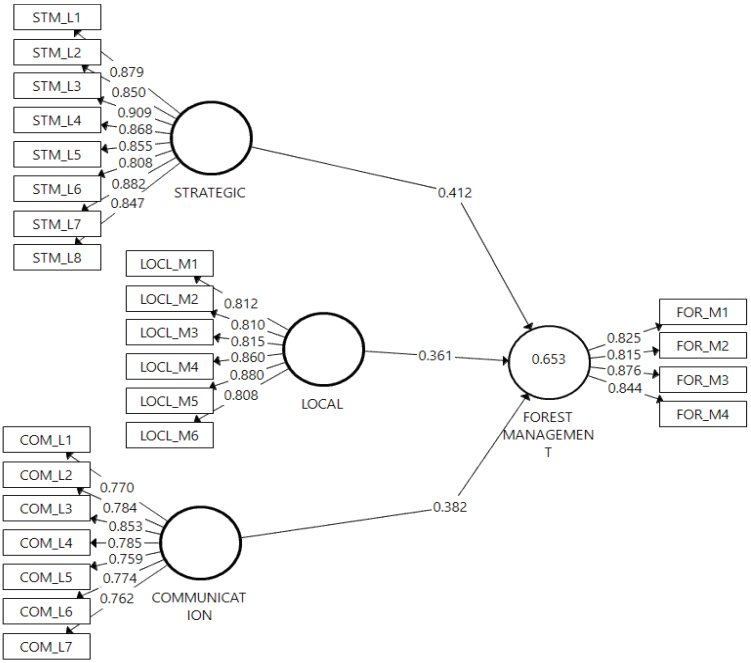


Figure 4: Graphical Representation of the Path Coefficient.

Measuring the Effect Size (f^2)

To know the single independent variable effect on the dependent variable, f^2 was used, it is the degree of the impact of each exogenous latent construct on the endogenous latent variables. To know the effect size of variables, there is need to remove latent exogenous variables and run the tests to check the changes in the value of the coefficient of determination (R^2) and defines whether the removed latent exogenous construct has a significant influence on the value of the latent endogenous variable or not. If the value of f^2 were 0.35 (strong effect), 0.15 (moderate effect), and 0.02 (weak effect) (Cohen, 1988). Table 7 shows the f^2 from the Structural Equation Model calculations.

As shown in Table 7, the effect size for strategic level management, local level management, and communication level management were 0.447, 0.337, and 0.387, respectively. Therefore, according to Cohen's findings, the f^2 of the communication level and strategic level exogenous latent variables on sustainable forest management had a strong effect, whereas local level management had a medium effect on the value of R^2. Furthermore, all the three independent latent variables in this study participated relatively to the greater R^2 value (65.3%) in the dependent variable (sustainable forest variable).

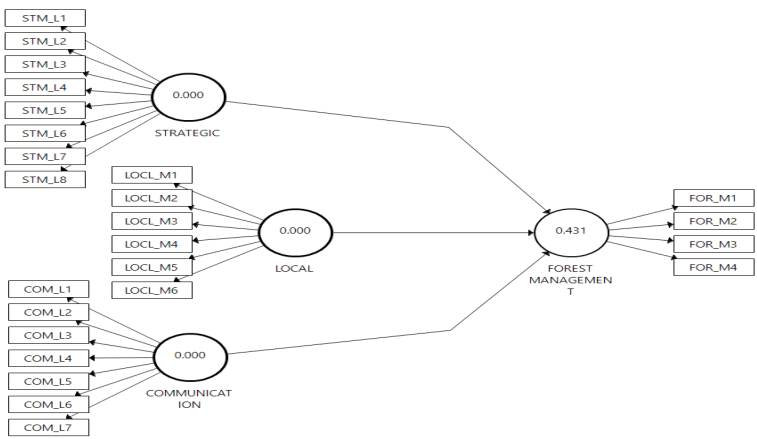
Table 7: Effect Size

Exogenous Latent Variables	Effect Size f^2	Total Effect
Communication Level Management	0.387	Strong effect
Local Level Management	0.337	Medium effect
Strategic Level Management	0.447	Strong effect

Predictive Relevance of the Model (Q^2)

Q^2 statistics are used to measure the quality of the PLS path model, which is calculated using blindfolding procedures (Tenenhaus, Esposito Vinzi, Chatelin, & Lauro, 2005) and cross-validated redundancy was performed. The Q^2 criterion recommends that the conceptual model can predict the endogenous latent constructs. In the SEM, the Q^2 values measured must be greater than zero for a particular endogenous latent construct. From Figure 5, it shows that the Q^2 values for this study model was equal to 0.431, which was higher than the threshold limit, and supports that the path model's predictive relevance was adequate for the endogenous construct.

Figure 5: Predictive Relevance of the Model.



Goodness-of-Fit Index

The Goodness-of-Fit (GOF) is used to check the complete model fit to know that the model sufficiently explains the empirical data in the study or not (Tenenhaus, Esposito Vinzi, Chatelin, & Lauro, 2005; Sheppard & Meitner, 2005). The Goodness-of-Fit- Index values which are between 0 and 1 are supposed to supportive, and the measurement values of 0.10 (small), 0.25 (medium), and 0.36 (large) indicate the global acceptance of the path model for the study. Researchers indicate that a good model fit recommended that a model is stingy and credible (Henseler, Hubona, & Ray, 2016). To measure the Goodness-of-Fit test geometric mean value of the average communality (AVE values) and the average R2 value(s) are used. The equation 1 is used to measure the Goodness-of-Fit test.

$$GOF = \sqrt{\text{Average AVE} * \text{Average } R^2} \qquad (1)$$

With the values in Table 8, the Goodness-of-Fit test was measured and was 0.670. The results show that empirical data of this study fit for the satisfactory model measurement and has substantial predictive power in comparison with standard values.

Table 8: Goodness-of-Fit Index Calculation

Construct	AVE	R^2
Communication Level Management	0.615	
Local Level Management	0.691	
Strategic Level Management	0.744	
Sustainable Forest Management	0.706	
Average Values	0.689	0.653
AVE × R^2	0.4499	
GOF = √(AVE × R^2)	**0.670**	

The Standardized Root Mean Square Residual (SRMR)

The Standardized Root Mean Square Residual is an index of the average of standardized residuals between the observed and the hypothesized covariance matrices in a study model. The Standardized Root Mean Square Residual is a measure of the estimated model fit for the study. Previous studies suggested that when SRMR = <0.08, then the study model has a good fit and acceptable (Veríssimo et al., 1992), with a lower Standardized Root Mean Square Residual is considered a better fit. The results in Table 9 show that this study

model's Standardized Root Mean Square Residual was 0.053, which shows that this study model had a good fit and applicable for further conclusions, on the other side the Chi-Square was equal to 1,486.720 and NFI equal to 0.740 was also measured, which also supports the study.

Table 9: Model Fit Summary

	Estimated Model
SRMR	0.053
d_ULS	0.900
d_G	1.282
Chi-Square	1,486.720
NFI	0.740

Furthermore, HTMT ratio of correlations was also computed, which is proposed by Henseler et al. (2016) and Jandl et al. (2007) as a new instrument for evaluating the discriminant validity of constructs involved in measurement models. As a rule of thumb, an HTMT value of more than 0.85 shows a potential issue of discriminant validity (Hair et al., 2017). All the HTMT values in the current study were less the benchmark of 0.85, which signifies that there is no problem of discriminant validity.

Table 10: HTMT

Exogenous Latent Variables	(COM)	(FOR)	(LOCL)
Communication Level Management (COM)			
Sustainable Forest Management (FOR)	0.629		
Local Level Management (LOCL)	0.268	0.630	
Strategic Level Management (STM)	0.218	0.640	0.274

Correlation Coefficient of Latent Variables

The results in Table 11 helped the researchers to know the latent variable correlation coefficient which shows that there was a strong correlation between the latent independent variables and the latent dependent variables.

Table 11: Latent Variable Correlation.

	(COM)	(FOR)	(LOCL)	(STM)
Communication Level Management (COM)	1			
Sustainable Forest Management (FOR)	0.554			
Local Level Management (LOCL)	0.243	0.559		
Strategic Level Management (STM)	0.204	0.582	0.256	1

Following with the complete analysis of the measurement models and structural model for this study it was concluded that both models were confirmed and supposed to be supportive of this study. The three hypotheses for this study were statistically significant and were all accepted. The results of this study show an exact picture of the factors affecting sustainable forest management.

DISCUSSION AND RECOMMENDATIONS

The main contribution of this investigation was to empirically reveal the constructs that affect sustainable forest management by using the PLS-SEM technique. The data analysis helped authors to elicit some relevant discussion about the current situation of the forest and issues related to sustainable management. The evaluation technique used here, i.e., PLS-SEM is a very effective technique for developing and analysis of complex frameworks, and also fruitful for future predictions. In this study, the conceptual paths were tested using SEM based on the smart-PLS methods. For more understanding descriptive analysis like the mean value, standard deviation, skewness, and kurtosis values were measured and codded. To know the normality of the data the results of the kurtosis and skewness values of the measurement model were measured as between +1 and -1. These values show that the data is normally distributed and acceptable for further date analysis (Appendix 1). Moreover, the results of this study proved that the Strategic Level Management, Communication Level Management, and Local Level Management, had a significantly positive effect on Sustainable Forest Management ($R^2 = 0.653$, $p = 0.000$), predictive relevance ($Q^2 = 0.431$), and a substantial GOF (GOF = 0.670). The final SEM results revealed that Strategic Level Management had the highest path coefficient ($b = 0.447$) with the overall influencing Sustainable Forest Management.

There were asked many questions about three levels of forest management, i.e., strategic-level forest management, local-level forest management, and communication level for forestry management. The results of the study revealed that all hypotheses were supported and the sustainable forest management was highly affected by all three exogenous constructs, i.e., strategic level management, local level management, and communication level management. The results in Table 7, shows that the path between all three latent independent variables with a dependent latent construct (sustainable forest management) has a positive relationship and was statistically significant. Therefore all the hypotheses proposed in this study were accepted. The results in Figure 3 show that the most important factors at strategic level management for sustainable forest policy are considered as; professional forestry planning (0.909

F-loading) and Security for forestry companies (0.882 F-loading). The main sub-constructs for sustainable forest management at local level management were highlighted as Environment sensitive initiatives for locals (0.880 F-loading) and a fair share of locally generated government income (0.860 F-loading). The main variables for sustainable able forest management via communication level management were highlighted as: Trusted information among forest managers and local people (0.853 F-loading) and "post any problem about forest situation" (0.785 F-loading).

Figure 3 also shows responses relating to overall sustainable forest management. The responses query attitudes about different strategies and techniques of the central government and strategic-level forest management. The overall responses show factors necessary for strategic level forest management. Among the highlighted factors for this study, the residence of Gilgit-Baltistan thinks that the strategic level forest management has a more significant impact as compared to other variables (Beta Coefficient= 0.412). It further explained that for sustainable forest management the strategic level planning is more beneficent and useful for better sustainable forest management. Keeping in view the results in Figure 3 it is highly recommended to the central government that the central policy formation and implementation should be supplied for other bodies' related to sustainable forest management.

CONCLUSIONS

This study concludes that for sustainable forest management the valid factors are strategic level management, local level management, and communication level management. Among these three constructs, the main factor which has a high impact is considered as strategic level strategic-level issues. The results of this study were drawn from SEM techniques using Smart-PLS software version 3.2.8. The inferential statically results show that sustainable forest management is possible if all three levels are covered and maintained properly. Keeping in view the results of this research, central and local government can formulate better policies to boost the proper forest management for a sustainable life by focusing on the strategic, local and communication channels to supply the valid and important information to the local community. In this study, the target was only to know local resident views about sustainable forest management. It was very limited with a small sample size. Future research may include more variables and more data related to the forest- and land-related issues and can conduct the study worldwide.

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