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# **IMPACT OF DIGITALIZATION ON SUPPLY CHAIN MANAGEMENT: AN EMPIRICAL STUDY ON BANKING INDUSTRY**

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“In the name of ALLAH, the Most Gracious and the Most Merciful”

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## **ABSTRACT**

Several technologies drive digital trends and bring about change in Supply Chain Management. Supply chain managers need to shift their attention from cutting costs to enabling new processes, and make corporations more connected and agile to create value across the enterprise. They include robotics, cloud computing technology, 3D printing, advanced analytics, block chain, RFID, IoT, BDA and cloud technology. These technologies are changing the face of the industry, transforming many aspects of business models, supply chains, products, sales, and services. In the current world of globalization digitization is not a choice but an imperative for all businesses across all industries. New digital technologies that are emerging everyday are on their way to disrupt nearly all the areas of traditional business processes. The key business priority of almost every industry will find itself in the center of this upcoming digital era. The process of digitization affects almost everything in today's organizations, including supply chain management and puts huge pressure on organizations to change Manufacturing processes and work, business model, products and services are the main targets of digitization. This paper conducts a literature review that aims to identify current research and directions in terms of how these technologies can enable or enhance digital supply chain (DSC) performance.

**Keywords:** Supply chain management, Digitalization, Big data analytics, cloud computing technology, Radio frequency identification, banking industry

# CHAPTER 1

## INTRODUCTION

### 1.1. Background of Study

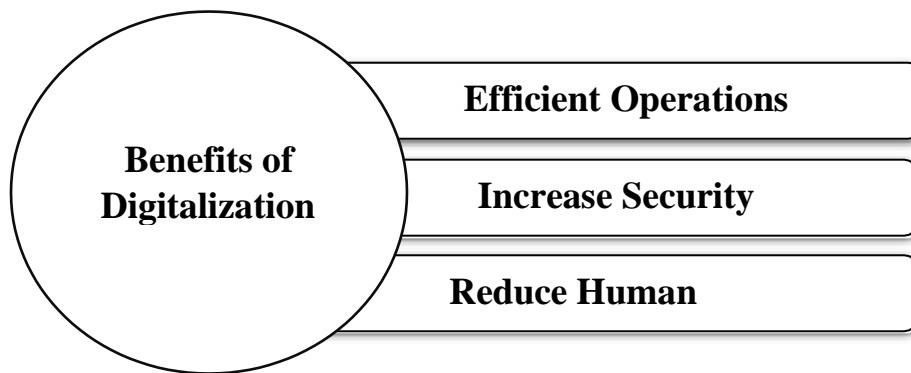
In this topical period, organizations are more intensive on improvement of the supply chain performance. For this the organizations are dependent on the digitalization. Digitalization is a crucial player in the competitive environment (Dolgui *et al.*, 2020). As per the research of Gupta *et al.* (2020), the US manufacturers are more focused towards the digitalization and has adopted the digitalization practices in supply chain to improve the efficiency, decrease the lead period of distribution and to reduce cycle time. The organizations could increase the performance of supply chain process by introducing digitalization the organization while storing and developing data of the marker, supplier and customers.

With the help of digitalization, the business entities could reinforce the ties of remote supply chain boost the operations of the organization. It will also support in connecting the organization with the customers. In this digitalization technologies, the management of real time transparency has become very important for the supply chain specially when there is a need to interlink the supplier, customer and business partner in order to create value in supply chain. For this, the organizations use the digitalization tools of supply chain management which provides a better way to digitalize the process. With the help of digitalization, the organization can increase the visibility and traceability of the products. The digitalization tools and techniques will include the big data analytics which ultimately increases the performance of the supply chain and make it added stretchy and strengthened (Hazen *et al.*, 2018).

It has been highlighted by Kache & Seuring (2017) that the digitalization in the organization has given the benefit to the organization and gained attention of the companies in the world. For instance, the financial institutions of the world are investing to digitize their business processes which makes it more transparent, reliable and flexible. The supply chain process of the business increases its delivery capacity with the adoption of digitalization and hence increases the operational, strategic and tactical performance of the firm. The digitalization does not only include the technology but also include digital images of analog physical object such as extracting data from digital files to make the process automated, photographs, microfilm images, paper documents

etc. It does not only mean that the traditional system has been replaced but it means that it digitizes the data in a way that it changes the company operations, its business model and activities. Digitalization also refers to the adoption of digital advancement and its working in digital workplace (Dolgui *et al.*, 2020).

The organizations that are using the digital supply chain has the ability to manage the large set of data easily and allow other partners of supply chain to coordinatetogether by using these digital platforms (Choe *et al.*, 2018). It is a process where the digital technologies have broughtthe change in the business process by using the BDA, IOT's, 3D printing, CCT etc. These will addvalue to the product and whole value chain in the competitive market. It has contributed in providing the new business model by using the innovative and powerful technology. The digitalization is the process of using the advanced technology to transform the data into digital format. By this, the customers can be provided service easily with the less time period. Digitalization will reduce the human errors and increase the trust the client by digitalization



### **1.1.1. Big Data Analytic (BDA)**

As per the study conducted by Song *et al.* (2017), the BDA has converted a topic of attention for the researchers as there is a significant effect of the big data analysis on improving the performance of the business. By implementing the big data analytics and improving its skills, the organization could optimize its products and services. Not only this, it will also help in expanding into the new market, increasing the profit and improve the customer service practices which provide better customer experience. The organizational improvement relies on the big data tools in the current era as it provides a significant benefit to the organization. The organizations could achieve excellence in their operations by drawing its attention towards two key considerations. Firstly, the

big data for the external environment and business itself. This big data has fast and large processing data which could provide the benefit to the organization as compared to the traditional data processing system. Secondly, the business analytics usage as it helps in making the right decision regarding the business operations (Gunasekaran *et al.*, 2017)

### 1.1.2. Radio Frequency Identification (RFID)

As per the study of Schoenherr & Speier-Pero (2015), RFID stands for radio frequency identification is a first application used by the banks to build a healthy relationship with its customers. This was done by linking the RFID with cheque books and bank cards. This helps in identifying the customers when they revisit the banks. Here, two of the major concerns for the supply chain process includes timeliness and accuracy in the operations. RFID could provide the real time control to the product in the value chain process. These products could be finished product, work in process or raw material. This will help to automate the process and enhances the transparency and visibility in the process and reduce the error chances in the supply chain process.

### 1.1.3. Cloud Computing Technology (CCT)

The cloud computing is the internet-based technology which is used to store the data into the server and can be retrieved when it is required for the customer. This will not only save the allocated space but it will also reduce the cost. It helps in gaining the competitive advantage by providing the effective product delivery and reducing the consumption of power. The cloud computing technology is a cheap way to reduce the risk associated in the SC (Giannakis *et al.*, 2019).

**RFID**

**Less human error, improve data accuracy, Time saving, Track assets/ managing Inventory**

**Real time data availability, Detect fraud signals, better visibility into daily operations**

**BDA**

**CCT**

**High data security, Efficiency & cost reduction, Automatic software updates, unlimited storage capacity**

It has been highlighted in the study of Govindan *et al.* (2018) the transforming the old SC into the cardinal supply chain will help in gaining the competitive edge in the market. By adopting digitalization, the businesses could bring the talent skills, technology, strategy, coordination, collaboration and supply chain integration in the business. It has been found from the study of that the organizations could get the operational excellence if they adopt digitalization in vendor assessment and manage the demand accordingly. The organization could also adopt the internet of things for the gaining excellence in the businesses. This is mainly because it increases the transparency, customer satisfaction and it will also save the time. The idea of this research is to help the BDA user to offer the information to the supply chain industry to add value in the business by using the big data. The prior study did not focus on the new opportunities in the supply chain practice which could make it excel in the industry. Therefore, this study will focus on the benefits of the digitalization in order to add value in the operations of the business.

One of the articles written by Ivanov *et al.* (2019) has stated that the 4-business uprising has brought the digital revolution in the supply chain industry. The study has highlighted those new technologies in the supply chain process has an optimistic influence on the business performance. This study has also provided the framework for the future studies that the study has not highlighted the impact of technology on different supply chain processes but has discussed the barriers, motives and bibliometric analysis. Therefore, this paper will fill out the gap with the implementation of supply chain management in the business 4.0 by using complete theoretical framework. The study will highlight the impact of radio frequency identification, cloud computing technology and big data analysis on digital supply chain operations. This will help in increasing the use of digitalization in the organization. Here the additional factor which is used is the cloud computing technology which helps in connecting the supply chain together.

## **1.2. Objectives of Study**

- i. To evaluate the effect of Radio frequency identification on supply chain managing
- ii. To examine the impression of big data analysis on supply chain organization
- iii. To study the influence of cloud computing technology on supply chain administration

### **1.3. Limitations**

The research only concerned Karachi for the period of 4 months and only took Banking industry into the consideration.

### **1.4. Significance of Study**

Companies can use digital supply chains to better understand what their customers need and want. It features data visualization that allows the company to easily and clearly describe what is happening in the company in different departments. By analyzing this data, administrators can identify areas where performance needs to be improved and made more efficient.

### **1.5. Outline of Study**

This study is divided into 5 sections. The first part contains an introduction to research topics, problems, and research objectives, and the second part is based on literature research, hypotheses, and theoretical frameworks of earlier and existing scientific papers. The third part contains methodologies that include: the survey design and sampling method, and the fourth part show the execution of statistical tests to answer the study questions, and the fifth part is based on the discussions and conclusions from the survey.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1. Digital Supply Chain**

Supply Chain Digitalization is one of the most discussed topics in the industry, however retailers, manufacturers, vendors and other logistics agencies handle their operations while being highly focused on the inventories throughout all the vendors' channels that includes the coordination effect on. Agrawal & Narain, (2021) factors out that if the certain studies present the roadmap for the implementation in the industry with inside the production industry as well, it will add the great price to the applicable literature. The researcher also supported with the aid of using different studies in the supply chain control, massive information, cloud computing. We've known 07 digital technology trends that are social media, prognosticative analytics, net of things, 3d printing (Jaya Krishnan *et al.*, 2020).

Therefore, a number of the analysis tools have been asked by participants; however, they understand the impact of those technology trends on the provided chain performance & organization. Supply Chain Digitalization have provided cost-effective results and adds the worth to the value chain for several stakeholders within the ecosystem, together with the firms and their supplier, workers and the customers (Kim & Lee, 2021). In addition, Agrawal and Narain (2021) believes that digital provide chains that have subsequent benefits, inflated transparency, low inventory levels, clear inventory visibility, decentralized warehouses, quicker delivery times, improve understandings of the clients' requirements, improve sales and profitability, improve supply chain elasticity, higher choice making and keeping the modest advantage.

Kittipanya- Ngam, & Tan, (2020) has highlighted that the theory of Business Logistics and management relevancy within the semester helps to higher perceive the conception of integration. However, proof of correct implementation remains limited. This is often as a result they are doing while notto have a transparent considerate of the thought of Supply Chain Integration (SCI). Kittipanya- Ngam, & Tan, (2020) has found that the term is still unknown because chain literature ignores suredefinitions of integration.



The study conjointly uses data comparable to corporate networks, neutral involvement, and demand generation, new product or service development. The study conducted the primary scientific study on supply chain management on predictive analytics that known the key edges and obstacles of supply chain management analytics. Similarly, the study conjointly provided extra data concerning completely different user teams in an endeavor to clarify this state of information provided in chain management. The researcher has surveyed supply chain management within the production and services sector, discussing current problems and future prospects (Hallikas *et al.*, 2021).

The researcher's results show that the factory-made corporation are a lot of seemingly to use each "fixed" and versatile processed automation solutions that non-repetitive producing companies. The degree of reliability in a very production setting has been shown to be an element influencing relevancy, demonstrating that a production environment is additionally involving conversion and therefore the applicability of digital technologies (Herold *et al.*, 2021).

As it was mentioned in the previous studies that have self-addressed these problems by acquiring different tactics for the production designing and control, technology application and improvement programs in numerous production environment, although there is no single approach. By a comprehensive analysis of existing research, conversion facet of non-repetitive production, particularly natural event production has been found to be an under researched area.

### **2.1.1. Big Data Analytics**

The use of massive knowledge analytics isn't new within the areas of provide chain management and inventory, however it absolutely was developed as a pioneer in competitive advantage. A collective study of recreation, optimization, & prosecuting attorney has been investigated by combining results from 2 isolated domains. Management of the influence of conversion on supply chain management and also the consequence outcomes on Supply Chain (De Giovanni, 2021). Later that year, Annosi *et al.* (2021), conducted a simulation-based study to analyze the connection between the spillover effect and the bullwhip effect. Digital supply chains are represented as intellectual, system-integrated, internationally networked data-driven mechanisms.

This instrument uses innovative technology to produce 5 additional accessible and reasonable merchandise and services. In addition, a prosperous digital supply chain management

implementation has several benefits, together with speed, flexibility, global connectivity, intelligence, transparency, and quant ability (Sarkis *et al.*, 2020).

Big knowledge offers economic edges to sensible producing as a result of its property within the market. With increasing attention to huge data analytics, business 4.0 and smart manufacturing have become additional and more important to fashionable industrial and economic progress. Smart manufacturing will be seen as a crucial perspective for each analysis and applications, because it adds price to a range of merchandise and systems by applying advanced technology to ancient manufacturing and repair products (Nasiri *et al.*, 2020).

The researcher deliberating variance-primarily based totally structural equation modeling, 205 samples from Indian producers had been used to take a look at the effect of huge information Analytics and analytical analytics on common and ecological overall performance. Huge information analytics famous hidden and different beneficial records this is one of the maximum crucial technologies for sensible production and might play a crucial position for selection makers in some exceptionally aggressive commercial enterprise surroundings can do. The manufacturing surroundings is understood to have an effect on many elements of manufacturing control. numerous researches have investigated the significance of the manufacturing surroundings to cloth making plans strategies or manufacturing manipulate structures and feature determined that the applicability of numerous strategies and structures is suffering from the manufacturing surroundings investigated the strategic suitability among numerous aggressive techniques and production technology (Papadopoulos *et al.*, 2021).

### **2.1.2. Radio Frequency Identification**

Radio frequency identification systems mix numerous information technologies resembling management systems, pc networks, and firewalls to supply automatic, secure, and convenient time period management systems. One can increase the amount of automation, scale back the possibility of fault, and greatly progress the transparency of your supply chain. Oftenest identification systems combine a range of knowledge machineries such as DBMS, processer net & works and firewalls to deliver a programmed, safe and suitable real-time regulator structure. Oftenest identification-based systems are much better than ever before. Provides exactness barcode-based systems (Shahroz *et al.*, 2020).

Discovered that Radio frequency identification technology provides complete offer chain visibility. Oftenest identification helps businesses manage the ever-increasing quality of their supply chains by fast several comparatively inefficient activities, resembling vital supply chain improvements. Reportable that systems will sustenance client relationship management (CRM) and rise customer fulfilment and constancy (Zhu, 2021).

### **2.1.3. Cloud Computing Technology**

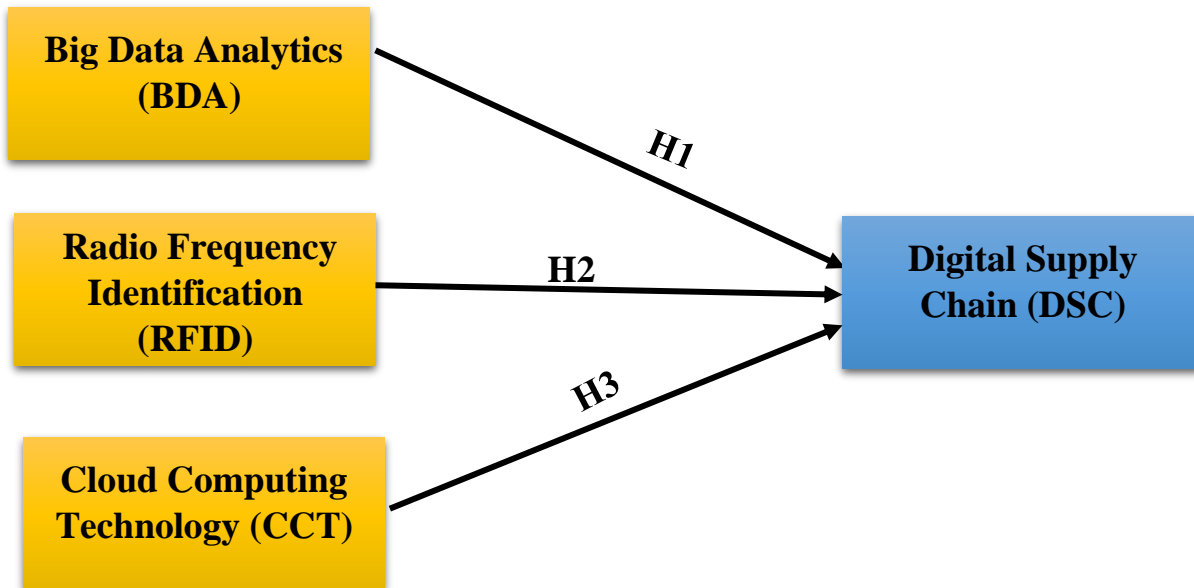
After considering the indirect impact of time-based performance, configuration integration incorporates a direct impact on company performance. Organizations contribute considerably to the country' gross domestic product (GDP). In terms of value benefits, cloud computing technology is much a lot of appropriate than alternative technologies akin to e-commerce, ERP, and data processing. Before investment in it, you wish to appear at coaching costs, fastened costs, and in operation costs. In most cases, the particular cost is beyond the calculable cost. Additionally, to high costs, risk is a very important issue that stops the trade from investment in or adopting new technologies (Taghipour *et al.*, 2020).

Customer-supplier integration needs internal integration provider and client integration extends the elimination of operational memory in internal integration to bridge structure boundaries. Four areas of external integration are verified: manufacture cost, on-time distribution, production flexibility, and products quality. These represent four zones of competitive business. Data division assistances grow new skills and funds to enhance product quality & value underneath high environmental issues (Mukherjee *et al.*, 2021).

Ageron *et al.*, (2020) found that cloud computing and corporate performance are thought of interrelated. Competitive advantage at the enterprise level will be achieved through non-transferable, enterprise-specific enterprise capabilities. With the introduction of recent options and capabilities of the cloud service, the acceptance and use of the cloud in real-world use cases by people and organizations is increasing and changing. Therefore, scientists are showing a lot of interest in cloud analysis by implementing existing theoretical data and proposing new models. Research targeted on cloud adoption and analysis of the continued use of cloud services or tools for a spread of functions by specific user teams is widespread within the literature. Additionally,

to educational research on cloud computing, cloud technology is used in science for analysis as a result of it will simply deliver higher computing power than previous native server alternatives (Attaran, 2020)

### 2.3. Conceptual Framework



### 2.4. Hypothesis

H1: Big data analytics significant impact on supply chain management

H2: Radio frequency significant impact on supply chain management

H3: Cloud computing significant impact on supply chain management

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1. Research Approach**

The research approach is of two type one is inductive approach and second one is deductive approach. The deductive approach is the approach where the research focuses on specifying the concept whereas the inductive approach is the approach where the researcher move the concept from specific to general which means that with the inductive approach the research generalize the concept (Flick, 2015). This study has used the deductive technique to estimate the outcome of digitalization in the SC process as it will focus specifically on the banking sector.

#### **3.2. Research Design**

The research design could be explanatory, exploratory and descriptive. The descriptive research proposal is the research design where the study focuses on narrative description. The exploratory research design is conducted to find out the reason as it focuses on exploring new ideas. However, the explanatory research design is shown to estimate the cause and effect of the construct (Kunc *et al.* 2016). This paper has focused on assessing the effect of digitalization on SC which indicates that the study has opted for the explanatory research design.

#### **3.3. Research Methodology**

The research study could use the qualitative method, quantitative method or mix method. The qualitative method is the method where non numeric data is used and helps in gaining the insight about the topic in detail whereas the quantitative method is the method which use the numeric data for the analysis and can be helpful in using the large set of data (Snyder, 2019). However, the researcher could use both the method together and is known as mixed method. This study will adopt the quantitative analysis as it focuses on gaining the results from the large set of data which can be analyzed easily through quantitative analysis. With the help of quantitative analysis, the researcher will be able to get the accuracy in the results.

#### **3.4. Data Source**

The research could be conducted by using two kind of data sources which are secondary data and primary set of data. The main data is the data where the data is gathered directly by the research.

It is also called as primary indicator information. However, secondary data is the data which is already gathered for any other purpose and can be used again for the research. This type of data source is also known as second hand data (Kumar, 2018). This research was conducted from the employees of banking sector in Karachi at the managerial level. The participants were filled online questionnaires to gather main data for the research. This will be the primary set of data which will be evaluated in this research assess the influence of digitalization on supply chain management.

### **3.5. Sample Size**

The banking industry in Karachi are the target population for this research. The industry was selected as the study's percipient because the people who work there are more detailed than those who work elsewhere. The sample size for this study is 350 which will be collected by using survey questionnaire and the respondents for the study was the employees of a Karachi-based banking sector.

### **3.6. Instrument of the Study**

Due to the quantitative nature of this study, the numerical data has been gathered with the use of primary sources of information. In the questionnaire closed questions were asked from the respondents. In this regard, the data has been gathered from the employees and managers working in the banking sectors specifically in Karachi. Therefore, this data has been gathered through an online survey. There were around 20 questions in the questionnaire where each variable has five questions. The questionnaire is constructed on 5-point Likert scale.

### **3.7. Data Analysis Technique**

For the determination of responding the research queries, the researcher has used the Simple Linear Regression model for the purpose of analyzing the data which is done with the assistance of SPSS software. The reason for opting the SPSS is that the software will help to analyze the data statistically as it will provide the accurate result in less period of time.

# CHAPTER 4

## DATA ANALYSIS

This chapter includes data analysis tests applied to accept or reject the hypothesis. This selected test is applied on sample of 300 working individuals collected through probability sampling technique. The collected responses are examined through following three statistical tests in SPSS, as stated in early chapters.

- A) Measures Cronbach's Alpha Reliability Testing
- B) Demographic Frequency Analysis
- C) Descriptive Statistic Analysis
- D) Kaiser–Meyer–Olkin (KMO) & Bartlett's Test of Homogeneity of Variances
- E) Exploratory factor analysis (EFA)
- F) Regression Analysis
- G) Pearson Moment Correlation Testing

### 4.1. Measures Cronbach's Alpha Reliability

The most commonly practice in statistical test to authenticate the reliability of variables is 'Cronbach's Alpha'. It is the test that evaluate the validity of focused variables of study (Thomas, 2003). The results demonstrates that either variables are accurate to run the test or it may need to do some changes by researcher. Sekaran (2003) considered if values of less than 0.6 as poor and greater than 0.7 as excellently defined variable for a model. This research investigates relationship of 4 focus variables like BDA, RFID, and CCT & SCM. These variables are analyzed for accuracy and reliability for study.

VARIABLES	CRONBACH'S ALPHA
BDA	.656
RFID	.731
CCT	.546
SCM	.632
Overall	.892

The above figure shows the reliability for all four variables. Alpha of big data analytics, radio frequency identification and supply chain are 0.656, 0.731 and 0.632 according to the interpretation of Sekaran (2003) the results are reliable around 70% and 73.1%. % while alpha values of ‘CCT are 0.546 are unable to fulfil base criteria of 70%.

Moreover, in this case reliability of all four variables together is more than 70% that are acceptable. The value of Cronbach’s alpha (from 1 dependent and 3 independent variables) that is based on 20 items is 0.892 i.e., almost 90% this shows the consistency of the items.

## 4.2. Demographics

<b>Gender</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Frequency</b>
Male	193	55%	193
Female	157	45%	350
<b>Total</b>	<b>350</b>	<b>100%</b>	100%

The respondents were asked about their gender on which it has been found that there were around 45% of the participants were Female which indicates that the majority of the participants are male. However, male respondents have also participated in the study and they were around 55% of the total participants. This indicates that the participants of both the gender have given the response for the study.

<b>Organizations</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative Frequency</b>
Meezan Bank	163	47%	163
Bank Islami	126	36%	289
Bank Al Habib	35	10%	324
Faisal Bank	26	7%	350
<b>Total</b>	<b>350</b>	<b>100%</b>	



Respondent working in 4 types of banks are included in the survey. Meezan bank respondent were 163, Bank Islami respondents were 126, Bank al Habib respondents were 35 and Faisal Bank respondents were 26.

### 4.3. Descriptive Statistics Test

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Big Data Analytics	350	1.40	5.00	3.5940	.65885
Radio Frequency	350	1.40	5.00	3.4287	.73378
Cloud Computing	350	2.20	5.00	3.6693	.60499
Digital Supply Chain	350	1.80	5.00	3.6153	.65134
Valid N (list-wise)	350				

The above-mentioned table indicates that the responses gathered for all the variables are within the range of 1 to 5 which means that the responses for the participants will be from strongly disagree to strongly agree. The mean of Big Data Analytics, Radio Frequency, Cloud Computing and supply chain indicates that the majority of the answers of the respondents are nearest to agree as the value for Big Data Analytics, Radio Frequency Identification, Cloud Computing Technology & Digital Supply Chain Management is found to be 3.59, 3.42, 3.66 & 3.61 the mean value is near to be 4 which indicates that all the responses are in favor of the statements asked from the participants.

### 4.4. Kaiser–Meyer–Olkin (KMO) & Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.586
Bartlett's Test of Sphericity	Approx. Chi-Square	1190.914
	Df	6
	Sig.	.000

This investigate sampling compatibility for individual variable of study as well as for an overall model Kaiser Meyer Olkin values ranges between 0.8 and 1.0 means sampling is adequate. On the other hand, Bartlett test defined as to measure homogeneity of variances. It analyzes the assumption of a null hypothesis stating equal variance across samples. If the consequence near is lesser than 0.05 reject null hypothesis & researcher can say they variance of at least one variable is different as compared to others.

In overhead figure shown, the esteem is 0.586 fulfilling the basic criteria as recommended (Kaiser, 1974) and considered as a great example. In other words, it successfully rejects a null hypothesis of equal variance between variables. Furthermore, Bartlett’s trial of Sphericity value of probability is 0.000 (which is under 0.05). It demonstrates the relationship between the things at the 5-percent level of importance is adequate and is satisfactory for further examination.

#### 4.5. Exploratory Factor Analysis (EFA)

It is a measurement model extracted to analyze dependent and independent variables assumed at the interval. According to Emory and Cooper (1991) claims that the factor analysis can help the scholars in determining the resources of the factors. Extracted initial loadings for each construct of a variable must be greater than 0.6 to accept the item for study.

<b>Variables</b>	<b>Big Data Analytics (BDA)</b>	<b>Radio Frequency Identification (RFID)</b>	<b>Cloud Computing Technology (CCT)</b>	<b>Digital Supply Chain (DSC)</b>
<b>BDA1</b>	.730			
<b>BDA2</b>	.995			
<b>BDA3</b>	.744			
<b>BDA4</b>	.873			
<b>BDA5</b>	.873			

<b>RFID1</b>		.559		
<b>RFID2</b>		.397		
<b>RFID3</b>		.873		
<b>RFID4</b>		.656		
<b>RFID5</b>		.984		
<b>CCT1</b>			.725	
<b>CCT2</b>			.995	
<b>CCT3</b>			.984	
<b>CCT4</b>			.530	
<b>CCT5</b>			.928	
<b>DSC1</b>				.928
<b>DSC2</b>				.984
<b>DSC3</b>				.725
<b>DSC4</b>				.995
<b>DSC5</b>				.995

This figure illustrates that the first factor is big data analytics, which has 5 items with the loadings i.e. big data analytics 1 is 0.0730, big data analytics 2 is 0.995, big data analytics 3 is 0.0744, big data analytics 4 is 0.873 and big data analytics 5 is 0.873. The second factor is radio frequency identification, which has 5 items with the loadings i.e. radio frequency identification 1 is 0.559, radio frequency identification 2 is 0.397, radio frequency identification 3 is 0.873, radio frequency identification 4 is 0.656, and radio frequency identification 5 is 0.984. The third factor is cloud computing technology, which has 5 items with the loadings i.e. cloud computing technology 1 is 0.725, cloud computing technology 2 is 0.995, cloud computing technology 3 is 0.984, cloud computing technology 4 is 0.530, and cloud computing technology 5 is 0.928. The fourth factor is supply chain management, which has 5 items with the loadings i.e. factor supply chain management 1 is 0.928, factor supply chain management 2 is 0.984, factor supply chain management 3 is 0.725, factor supply chain management 4 is 0.995, and factor supply chain management 5 is 0.995.

## 4.6. Regression Analysis

### 4.6.1. Beta Coefficient of Variables

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	R Square	.734	.34177			.000
	(Constant)	.614	.122		5.035	.000
	Cloud Computing	-.545	.105	-.500	-5.194	.000
	Radio Frequency	.655	.041	.730	15.831	.000
	Big Data Analytic	.756	.082	.747	9.251	.000

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

$$\text{Digital Supply Chain} = 0.614 + \text{Big Data Analytics (.756)} + \text{Radio Frequency (.655)} - \text{Cloud Computing (.545)} + \varepsilon$$

This table helps in providing complete information about the ability regression lines which becomes the reason for total variation in Dependent Variable. As indicated in above table R-square is 0.734 (73.4%) it means our Independent Variable's causes 0.734 change in Dependent Variable. It explains if the variance explained by Independent Variable & Dependent Variable are substantial or not. The significance of model is defined by P-value less than 0.05. Hence there is evidence that variance explained by independent is significant with P-value. Model is fit for the predicting change into the Dependent Variable. The above table also shows the coefficient result as indicated that the beta value is 0.500, 0.730, 0.747 its means that the change in big data analytics, radio frequency identification and cloud computing technology by .0614 unit will bring about the change in Dependent Variable. Furthermore, the positive beta value indicates the positive relationship between in big data analytics, radio frequency identification. In other meaning, when supply chain management increase by .010 unit, the big data analytics and radio frequency identification. Increase by 0.747 and 0.730. On other hand when digital supply chain management increases .010 unit the cloud computing technology decrease by .500

**4.7. Pearson Moment Correlation Testing**

4.7.1. Correlation Matrix (Supply Chain and Big Data Analytics)

		Supply chain	Big data analytics
Supply chain	Pearson Correlation	1	.689**
	Sig. (2-tailed)		.000
Big data analytics	Pearson Correlation	.689**	1
	Sig. (2-tailed)	.000	

Exists a noteworthy correlation between supply chain and big data at 0.689 at 95% confidence interval with 0.05 (2-tailed) significant alpha level between supply chain management as dependent variable and big data analytics as independent variable.

#### 4.7.2. Correlation Matrix (Supply Chain and Radio Frequency)

		Supply chain	Radiofrequency
Supply chain	Pearson Correlation	1	.548**
	Sig. (2-tailed)		.000
Radio Frequency	Pearson Correlation	.548**	1
	Sig. (2-tailed)	.000	

A noteworthy correlation at 0.548 at 95% confidence interval with 0.05 (2-tailed) significant alpha level between supply chain management as dependent variable and radio frequency as independent variable.

#### 4.7.3. Correlation Matrix (Supply Chain and Cloud Computing Technology)

		Supply chain	Cloud computing
Supply chain	Pearson Correlation	1	.916**
	Sig. (2-tailed)		.000
Cloud computing	Pearson Correlation	.916**	1
	Sig. (2-tailed)	.000	

Exists a noteworthy correlation at 0.916 at 95% confidence interval with 0.05 (2-tailed) significant alpha level between supply chain management as dependent variable and cloud computing as independent variable.

#### 4.8. HYPOTHESIS ASSESSMENT SUMMARY

The hypothesis assessment summary helps in highlighting the acceptance and rejection of the hypotheses tested in this study. The following table indicates the results in a summarized way.

<b>Hypothesis</b>	<b>Decision</b>
<i>H1</i> : Big data analytics significant impact on supply chain management	<b>Accepted</b>
<i>H2</i> : Radio frequency significant impact on supply chain management	<b>Accepted</b>
<i>H3</i> : Cloud computing significant impact on supply chain management	<b>Accepted</b>

## CHAPTER 5

### CONCLUSION AND RECOMMENDATIONS

#### 5.1. Findings

- The idea of this study is to assess the impact of digitalization on the supply chain as technological advancement has increased the need for technology in organizational operations. In order to address the research problem, the data has been gathered from the banking sector of Karachi to evaluate how they are utilizing the technology in their supply chain process.
- The variables that are used to evaluate the impact include radio frequency identification, big data analysis, and cloud computing technology.
- The reliability analysis is conducted and found that the reliability is found to be high for all the variables.
- The findings have revealed that there is a high impact of big data analysis, Cloud computing and radio frequency on digital supply chain management.
- The correlation between big data analysis, radiofrequency, Cloud Computing with the digital supply chain is found to be high.
- Thus, it can be stated that cloud computing has an impact on the digital supply chain management which indicates that the banking sector is working on cloud computing which does only improves the supply chain process but also the overall performance of the organization as they used the data-driven mechanism for the better results.

#### 5.2. Conclusion

The study aims to highlight the impact of digitalization on supply chain management as the current era is more focused on technological advancement and implementing the technology-based system in their organization to ease out the working process. The study has found that the organizations are emphasizing big data analysis for managing their inventory and order which makes the business more customer-centric. Further, it has been found that the emergence of big data has made



the business smarter with the application and implementation of advanced technology. Not only this, but the cloud computing technology is also adding value in the business as it helps in securing the data and managing it well that could easily be retrieved whenever required. Other than this, radio frequency identification is also an automatic system that offers a real-time control system that helps in identification.

In the banking system, this technology is used for the verification of the user of the account as it will help the bank to secure the data of the customers. It facilitates the whole supply chain process which helps in retaining the customers by making them loyal and satisfied. These concepts have been tested by evaluating them with the hypothesis's development. For this, the data has been gathered through surveys and collected the data from the people of the banking sector to specifically understand the importance of these technologies in the supply chain process of the banking sector. It has been found that radio frequency identification and big data analysis have an impact on supply chain management and cloud computing technology has a significant impact on the digital supply chain of the banking sector.

### **5.3. Future Research Recommendations**

The study has been conducted within a limited period due to which the researcher could not conduct the in-depth analysis. There were financial limitations as well due to which the study was conducted only in Karachi, not in Pakistan. These limitations restricted the researcher to conduct the qualitative analysis but the researcher has completed this study by conducting the quantitative analysis. Therefore, the following recommendations are provided for future researchers to expand their knowledge in digital supply chain management.

- A future study can be conducted on digital supply chain management by considering otherindependent variables that increase digitalization in supply chain management.
- The study could also include the moderation and mediation effect in the relationship between digitalization and supply chain management.
- The future study could be conducted by using the same hypothesis but by changing the sample size. The sample size could be increased to evaluate the digitalization impact on supply chain management.

- The current study was conducted in the banking sector but the future researcher could conduct the study in a different sector such as the manufacturing sector, logistics sector, or shipping sector this will help to understand the impact of digitalization on the supply chain in different sectors as well.
- Further, the future researcher could also conduct the qualitative analysis to have a better understanding of the topic by having an in-depth analysis.

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**APPENDIX – I**

**QUESTIONNAIRE**

Gender:

MALE

FEMALE

Prefer Not to Say

Name of the Organization \_\_\_\_\_

QUESTIONS	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. Same data stored in different databases across the SC is consistent.					
2. SC members work together in arriving at demand predictions.					
3. Account payable processes are mechanically triggered when we collect supplies from our suppliers. We use activity-based costing for key SC processes.					
4. Precise information of client buying patterns.					
5. Inventory holdings are minimized across the SC					
6. Inventory data are visible at all steps across the SC					
7. Automatic data capture systems are used across the SC					
8. Capital efficiency, working and fixed, is maximized across the SC					
9. Suppliers & logistics partners distribute goods and materials JIT					



10. SC wide inventory is jointly managed with suppliers and logistics partners.					
11. Strong and continuous bond with customers					
12. Productivity enhancements					
13. Production & delivery schedules are shared across SC					
14. Order fulfillment & shipment status are tracked at each step across the SC					
15. Firms' downstream partners share their actual sales data with Firms					
16. The assurance of privacy increases the CCT adoption rate					
17. A protected cloud service is more convenient for Industries.					
18. A Simpler Cloud is easy for sharing					
19. Cloud is a quite familiar term for association.					
20. Top management support creates a supportive climate by providing adequate resources for the adoption of new technology.					