

The Role of Mobile Banking in Microfinance Institutions (An Study of the Impact of Mobile Banking on Microfinance Institutions)

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Abstract

Microfinance Industry in Sindh, Pakistan, has been evolving for past ten years due to the advent of new Mobile and Telecommunication solutions. Mobile Banking is an innovative solution to the modern banking aspects of the Microfinance Industry. This research aims at the impact of the Mobile Banking on the Microfinance Institutions by assessing the essential factors effecting the sustainability of Mobile Banking in Microfinance Industry. This research work included the input of the work force placed in the Microfinance Institutions, who contributed to generate an output, which depicted the impact of Mobile Banking in Microfinance Institutions. The results shown that, there is a potential and prospects of sustainability of Mobile Banking in Microfinance Industry. Based on the previous work done in the area of Mobile Banking and Microfinance, it was assumed that, there is still lack of technological solutions to the modern Microfinance banking. Positive results of the impact of Mobile Banking on Microfinance Institutions shows that, there is strong capacity to adapt newer technological solutions by the Microfinance Industry. Four Microfinance Banks having branches in Hyderabad and Karachi were chosen to gather the data for purpose of quantitative analysis. Microfinance Industry is adapting various technological solutions aiming to improve financial inclusion in Sindh, Pakistan. This research aimed at the perspective of Microfinance Institutions using Mobile Technologies to improve financial inclusion by increasing its efficiency and outreach among unbanked population of Sindh, Pakistan.

Keywords: Microfinance, Fintech, Innovation, Mobile Banking, Financial Inclusion

I. INTRODUCTION

BACKGROUND:

Technology has been the part of Finance Industry for long time. Automated Teller Machines (ATMs) and credit cards and debit cards have been utilized in Banking and Finance sector for more than a decade now in Pakistan.

The monetary administrations of Microfinance banks are the main thrust of the financial improvement of destitute individuals and neediness decrease. The monetary administrations of microfinance were by and large known as the free security credits, settlements, saying stores installment and reimbursement administrations. As indicated by Odongo (2014), advance was the principle result of the microfinance foundations which alluded to modest quantity of credit given to destitute individuals at a thoughtful loan fee for producing pay through independent work. The conditions of given credit were significant determinants to the customer's prosperity.

Additionally, the adaptability of advance reimbursement strategy which included reimbursement period and loan cost were all basic components for deciding the job of microfinance administrations and miniature and little business visionaries' prosperity. Nonetheless, having analyzed the various duties of Microfinance banks, the money foundations used to confront a limitations in conveying miniature credits to miniature proprietors, which had influenced generally speaking execution of the bank regarding low liquidity, expanding inactive assets and waning profits from financing cost (Obedayi, Ogbeide, & Akande, 2020)

MOBILE BANKING AND MICROFINANCE INSTITUTIONS:

Monetary Inclusion has become a huge worry for business analysts, government and scientists as there is association between the level of monetary incorporation and financial development. A sound monetary framework with an effective asset stream will quickly track financial development. A country's economy creates through monetary administrations, which help individuals battle neediness by empowering business, wellbeing and schooling ventures. Since formal monetary administrations are blocked off, numerous individuals, particularly destitute individuals around the world, do their business with money rather than monetary administrations, which can be security and the executives worry for them. That is the reason monetary incorporation has become a significant concern these days (Aker, *et al.*, 2016).

Monetary Inclusion is an exertion is a push to turn out low-revenue and recognized gatherings with a financial assistance at a sensible least expense. Arising nations ought to think about monetary consideration as business openings and social obligations. Monetary Inclusion improves expectations for everyday comforts for oppressed ranchers, undertakings, and other distraught gatherings. Monetary consideration isn't just a thought of making and guaranteeing monetary administrations available when required yet in addition guaranteeing that they are feasible with reasonableness and straightforwardness at a moderate expense. The monetary consideration idea is created on the possibility of accessibility, use, and openness of monetary administrations. (Akter, *et al.*, 2021)

Pakistan is an emerging economy leveling its financial inclusion infrastructure to fill the gap between financial products and public in a shape of innovation and social entrepreneurship. Being a part of third world country, Pakistan has several challenges to its community development and Economic stability.

Micro Finance Institutions have emerged in Pakistan as a solution to provide financial service solution to the small business owners as well as individual who are thriving to establish their business for earning substantial income for their households.

Mobile Banking in Pakistan started in 2005/2006 when the SBP determined to provoke the idea. An important step was the training and acceptance of the Mobile Banking Regulations in 2008. These have been reviewed in 2011 to allow an operational method to Know Your Customer (KYC) necessities, which prepared Pakistan the first state to have delivered such rules. The Mobile Banking rules motivated a variety of company simulations. The foremost such business, Easypaisa was once launched in 2009. Since then, substantial tendencies have taken place in mobile banking in Pakistan, inclusive of the latest presentation of the National Financial Inclusion Strategy (NFIS) and Straight2Bank wallet cell application. (Rizvi, Naqvi and Tanveer, 2017)

Through digital stations instead of physical branches intensely decreases fees for carriers and rises comfort for consumers, giving entry to financial activity for consumers at all profit expectations and in far-flung rural areas. For business, financial services providers, and governments, digital payments and digital monetary services can reduce large inefficiencies and liberate sizeable production gains. (McKinsey & Company, 2016)

Cellular banking serves as possible approach for effective financial inclusion, given the massive infiltration of mobile technology and the feasibility of linking information in a safe and affordable way. The use of cell phones related to banking products aids the enlargement of commercial enterprise fashions offering monetary services to consumers who would in any other case have been omitted from the formal financial system. Additionally, cellular infiltration donates to economic increase thru the approach of output and development, occupation generation, accelerated efficiency, decrease operation prices, better operative markets and monetary inclusion main to scarceness mitigation. (Rizvi, Naqvi and Tanveer, 2017)

The rural areas and towns are also coming under the umbrella of technological advancement via Mobile Phones and Mobile Internet, which is filling the gap for the financial inclusion in the rural areas and towns.

The Government of Pakistan and its controlling establishments are concentrating the novelty of solutions for the countrywide outreach of Microfinance banking. Microfinance institutions in Pakistan are face with the need for greater backing in direction to grow and combine with economic markets, even though they enjoy power to amplify outreach. Current flaws of the monetary region should help as a chance for digital monetary offerings to offer options to the problem of outreach. (Rizvi, Naqvi and Tanveer, 2018).

In growing states, financial services being furnished by way of cellular provider whilst in developed states by using non-banking companies. The future approach is to investigate the function of such services in the success and performance of cellular provider. Cellular networks group's should be interesting and the evaluation of Mobile Banking in advanced and producing countries can extend understanding for acceptance, competence, presentation and have confidence in it. (Abbasi and Weigand, 2017)

High transaction prices can have an effect on each provider willingness to serve the negative and client willingness to use economic services. Historically, financial institutions branches are few and far between and formal financial institution bills frequently got here with additional transaction expenses such as acquiring formal identification documents, lengthy wait timings, poor service, high withdrawal expenses and high required minimum balances. Intermediary surveys in eight countries show the poor frequently cite time, fee and challenge of organizing their identity in order to open account as important barriers to access. (Karlan, et al., 2016)

II. METHODOLOGY

This study focuses on the implications of the mobile banking on the Microfinance Institutions. To study the impact of the Mobile Banking on the Micro finance Institutions the three variables were chosen: Product and Services, Benefits and Challenges which can have impact on the Microfinance Institutions. The study was conducted with survey questionnaire and focused interviews from the associate to manager level of employees working in four microfinance institutions in city of Hyderabad.

SAMPLING:

In this study there is a targeted population four Micro Finance banks having regional branches in Hyderabad. The method of sampling in this research study is Cluster Sampling. There were 53 respondents in the survey which participated through an structured questionnaire. There were four operational managers of the microfinance institutions which participated in the focus interviews and expressed their thoughts on the impact of Mobile Banking on Microfinance Institutions. (Nabahat, 2014)

POPULATION:

The population of this study consisted the employees of four targeted microfinance banks in Hyderabad, where almost 60 of the employees were in capacity of Associate level to Manager Level. Population of the sample were variable at each Bank or Microfinance Institution, since some Microfinance Institute has limited number of employees in their Mobile Banking division. Where the number of employees were limited, the other branches were contact for the purpose of contribution in the data gathering (Nabahat, 2014).

Targeted Microfinance Institutions:

1. First Microfinance Bank
2. Khushhali Bank
3. Mobilink Microfinance Bank
4. Telenor Microfinance Bank

RESEARCH DESIGN:

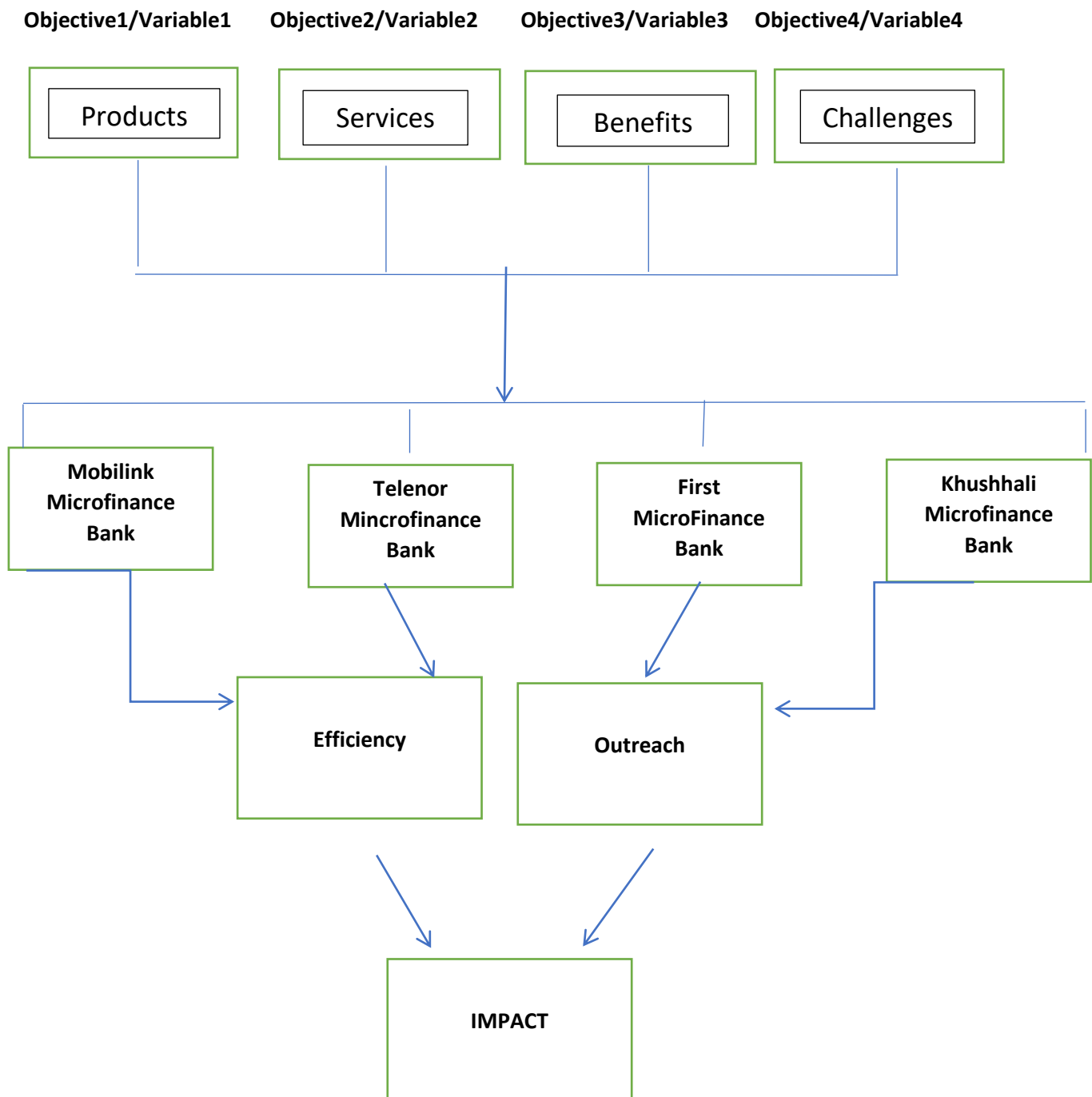
The data of the this research study is primary data. Secondary data was also used from various websites and articles for the support to proper data and interpretation. The questionnaire was distributed among four targeted banks and data was analyzed after collection from 53 respondents. The data which was gathered was later analyzed in the SPSS. Formulation of Multiple Regression Analysis technique was carefully

adapted to predict the findings based on the pre-determined variables, based on the research question and research objectives. (Nabahat, 2014).

DATA ANALYSIS:

The results of this research are described from the employees' perspective. The findings are based on responses from the managers or associate level of employees of the mobile banking unit of sample microfinance banks. The responses were analysed through SPSS software in which the model of Multiple Regression Analysis technique was used. The findings are elaborated based on results and interpreted accordingly. Furthermore, descriptive and visual graphs and charts are used to give an appropriate picture of data analysis. (Bakri, 2020).

Conceptual framework



III. FINDINGS AND RESULTS

Data analysis and its interpretation based on the data which was primary gathered from the four targeted Microfinance Banks in Hyderabad and Karachi regions. The data was gathered and divided in to four sections based on the three independent variables and one dependent variables. Before applying the multiple regression model, the assumptions were carefully determined out i.e. Reliability and Validity. The questionnaire contained 53 responses from associate to manager level employees of the four targeted microfinance institutions:

1. Khushhali Bank, Hyderabad
 2. Mobilink Microfinance, Hyderabad
 3. First Microfinance Bank, Hyderabad
 4. Telenor Microfinance Bank, Hyderabad and Karachi
1. To study how the mobile banking products effecting microfinance institutions.
 2. To study how the mobile banking services effecting microfinance institutions
 3. To asses the effect of the benefits of mobile banking in microfinance institutions.
 4. To analyze the challenges for mobile banking for microfinance institutions.

Impact Analysis:

Table 4.1 Reliability Statistics

Cronbach's Alpha	N of Items
.798	5

To analyze the correlation between the independent variables and dependent variable the assumption of reliability is calculated via Cronbach's Alpha Reliability Test, which gave the result of 0.7 and the test determined that the data for the multiple regression analysis is reliable. (Lavrakas, 2008)

Table 4.2 Descriptive Statistics

	Mean	Std. Deviation	N
Impact	2.3019	.28443	53
Product	2.1572	.34346	53
Services	2.4151	.67749	53
Benefits	2.2868	.36482	53
Challenges	2.1321	.40609	53

In the descriptive analysis, the variables are measured in terms of Mean and Standard Deviation which is 2.3019 and 0.28443 for dependent variable respectively based on the total number of 53 responses in the primary Data gathered in survey questionnaire.. (Frost, 2021).

Table 4.3 Correlations

		Impact	Product	Services	Benefits	Challenges
Pearson Correlation	Impact	1.000	-.065	.014	.126	.370
	Product	-.065	1.000	.072	-.172	-.060
	Services	.014	.072	1.000	-.180	.007
	Benefits	.126	-.172	-.180	1.000	-.001
	Challenges	.370	-.060	.007	-.001	1.000
Sig. (1-tailed)	Impact	.	.322	.462	.185	.003
	Product	.322	.	.304	.109	.335
	Services	.462	.304	.	.099	.481
	Benefits	.185	.109	.099	.	.497
	Challenges	.003	.335	.481	.497	.
N	Impact	53	53	53	53	53
	Product	53	53	53	53	53
	Services	53	53	53	53	53
	Benefits	53	53	53	53	53
	Challenges	53	53	53	53	53

Since Pearson correlation is a number between -1 and +1 that indicates to what extent 2 quantitative variables are linearly related. The correlation between independent variables an Impact is between -1 and +1 in the above table. (Frost, 2021).

4.4 Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics				Sig. F Change	Durbin-Watson
						F Change	df1	df2			
1	.393 ^a	.154	.084	.27226	.154	2.188	4	48		.084	1.425

a. Predictors: (Constant), Challenges, Benefits, Services, Product

b. Dependent Variable: Impact

In the table, Model Summary shows the R is the square base of R-Squared and is the association with the saw and expected assessments of ward variable which is .393 and R Square as .154.

As markers are added to the model, each pointer will explain a bit of the adjustment of the dependent variable basically due to plausibility. One could continue adding markers to the model which would continue improving the limit of the pointers to explain the dependent variable, though a segment of this augmentation in R-square would be essentially a direct result of chance assortment in that particular model. The changed R-square undertakings to yield a more genuine worth to assess the R-squared for the general population. The assessment of R-square was .154, while the assessment of Adjusted R-square was .084 (Frost 2021).

Table 4.5 ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.649	4	.162	2.188	.084 ^b
	Residual	3.558	48	.074		
	Total	4.207	52			

a. Dependent Variable: Impact

b. Predictors: (Constant), Challenges, Benefits, Services, Product

This is the wellspring of distinction, Regression, Residual and Total. The Total fluctuation is allocated into the distinction which can be explained by the free factors (Regression) and the change which isn't explained by the self-sufficient components (Residual, a portion of the time called Error). Note that the Sums of Squares for the Regression and Residual add up to the Total, reflecting how the Total is allocated into Regression and Residual variance. (Frost, 2021).

Table 4.6 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.529	.460		3.325	.002
	Product	.019	.112	.023	.174	.002
	Services	.015	.057	.036	.266	.003
	Benefits	.100	.107	.128	.939	.009
	Challenges	.258	.093	.368	2.768	.007

a. Dependent Variable: Impact

The significance of the variable and its relationship with the dependent variable is shown in this table. The significant relationship of Product is 0.02 and services is 0.02, benefits is 0.09 and of challenges, it is .007. Based on the value of alpha which 0.7, it shows that, there is strong correlation between independent and dependent variables.(Frost, 2021).

Mathematically expressed as:

$$I = \beta_0 + aP_1 + bS_2 + cB_3 + dC_4 + ET$$

Where,

I= Impact on Microfinance Institutions

β_0 = Constant

P= Products

S= Services

B= Benefits of Mobile banking

C= Challenges of Mobile banking

ET= Error term

And the a, b, c, ... are the regression coefficient (beta) of the independent variables .

Since,

$$I = \beta_0 + aP_1 + bS_2 + cB_3 + dC_4 + ET$$

Equation (4.1)

Then,

$$I = 1.529 + 0.23(0.19) + 0.036(.015) + 0.128(.100) + .368(0.258) + 3.55$$

$$= 1.529 + 0.0437 + 0.00054 + 0.0128 + 0.094944 + 3.55$$

$$= 5.230984$$

Chart 4.1

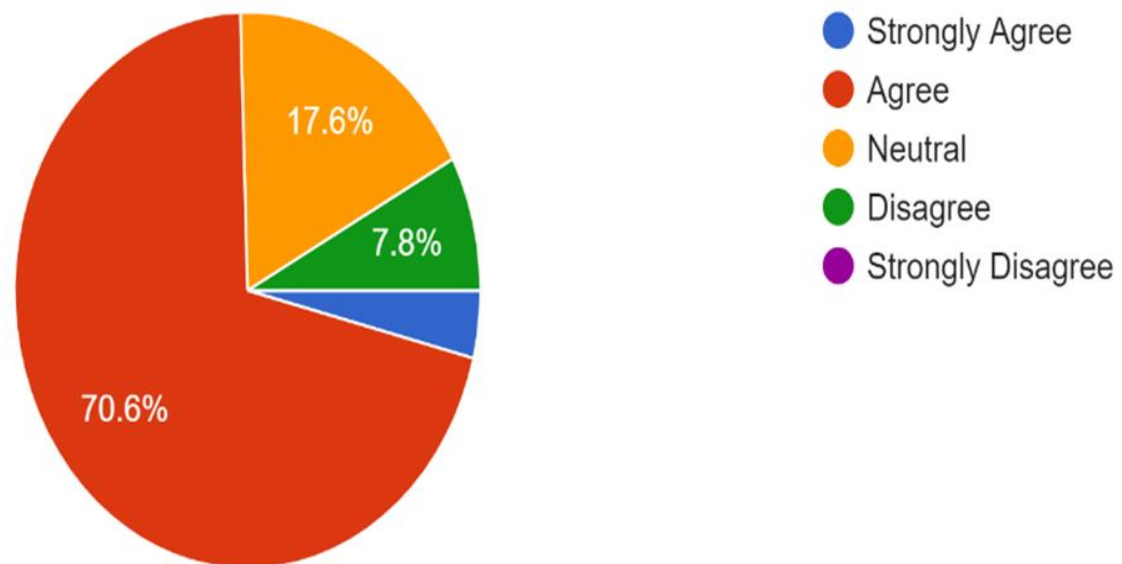
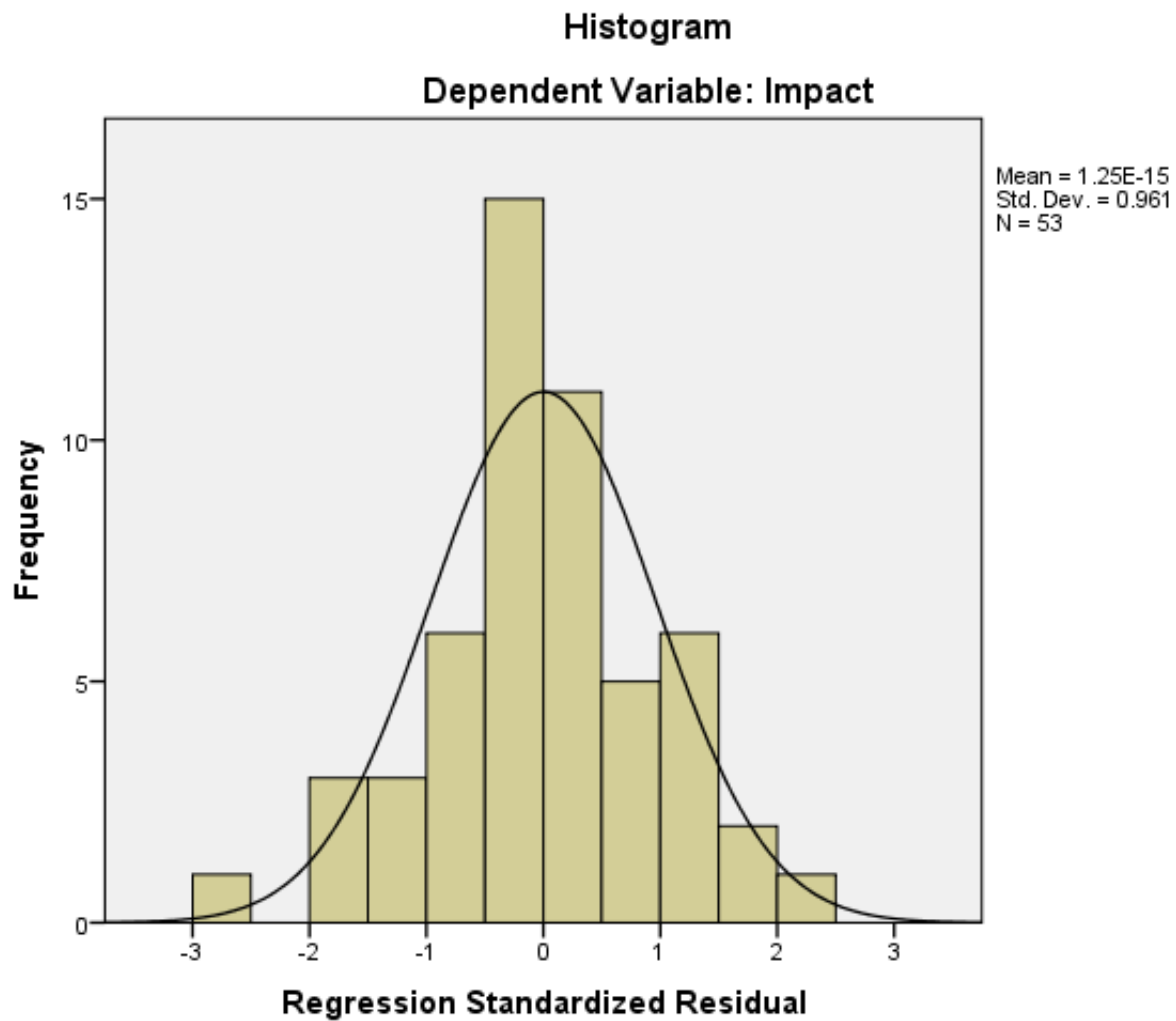
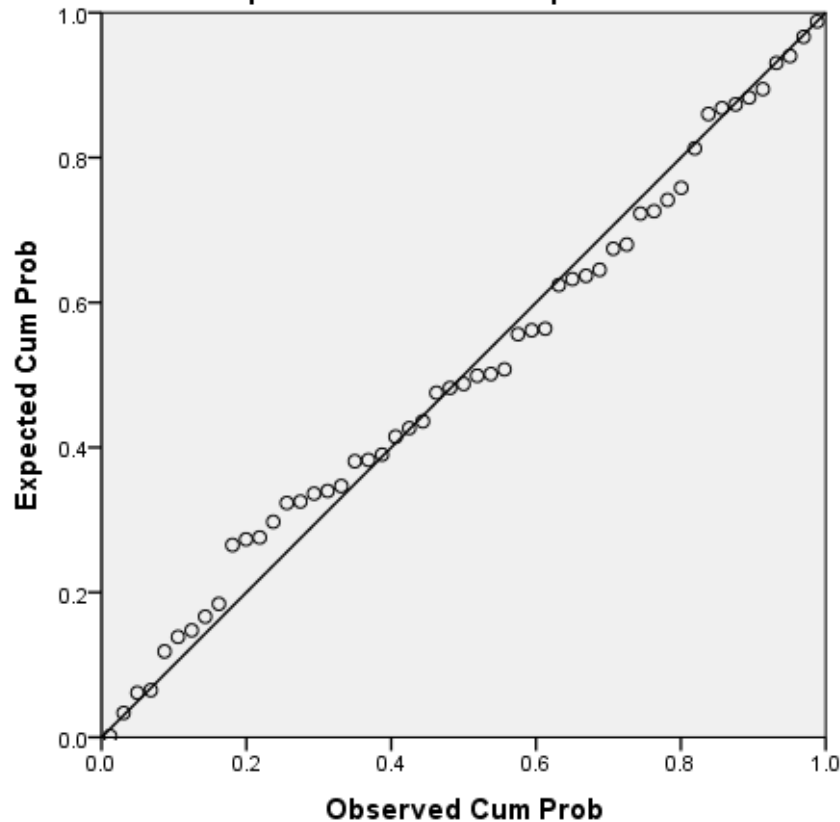


Chart 4.2



The Bell-shaped histogram shows the normal distribution of the frequency and Residual relationship. The mean of the dependent variable of Impact is 3.68 and Standard deviation is 0.971.(Frost 2021).

Chart 4.5

Normal P-P Plot of Regression Standardized Residual**Dependent Variable: Impact**

The above analysis shows that there is a positive relation of independent variable and dependent variables. The positive results show the positive impact of the product and services, benefits and challenges on the mobile banking operations of the microfinance institutions. At first the analysis was done individually with one independent variable with dependent variable, which also produced positive results. It expresses that the products and services are very helpful in terms of efficiency and outreach. It also shows the mobile banking is benefiting both the customers and the microfinance institutions all together for the improvement of the services provide by the microfinance Institutions. There are some challenges in the operations of mobile banking in the microfinance institutions but they don't have such negative effect over the performance of the mobile banking in the microfinance institutions. In the normality test shown in this Probability Plot the points are following the line, which expresses the normal distribution of the dependent variable of the Impact. (Ifham, 2019).

IV. CONCLUSION

The purpose of the study was to understand the factors of products and services, benefits and challenges in terms of influencing factors which may have impact on the Mobile Banking services of the Microfinance Institutions of the Hyderabad and Karachi region These factors were shaped as variables and objectives to determine the impact on the Mobile Banking on the Microfinance Institutions.

The objectives of this study were to find out the impact of product and services, which have adopted the technological platform, which is quite different and alien to consumers in Hyderabad, Sindh as compare traditional brick and mortar system of banking services. The technological platform started long ago in

shape of Automated Teller Machines (ATMs) to Alternative Delivery Channels such as internet banking, ATMs and Debit/Credit Cards.

Hyderabad, Pakistan is a city with close areas of the sub-urban infrastructure. The sub-urban areas has low literacy rate as compared to main city areas of the Hyderabad city. This study was mainly focused on Hyderabad city. The purpose of the study was to measure the impact of Mobile Banking on Microfinance Institutions which are designed to accommodate to lower-income population and most of the lower income population is less educated. And it might be challenge for them to develop trust and adopt the mobile services.

The targeted Microfinance Institutions had different models or organizational structure. Two of the targeted Microfinance Institutions has the Telecom-led model which turned out the very effective in terms of outreach.

Finally in the chapter the of Data Analysis and interpretation, the findings were summarized to meet the required outcome of the developed objectives of products and services, benefits and challenges in terms of efficiency and outreach. The research question was intended to answer the impact of the Mobile Banking on Microfinance Institutions. The results were analyzed and interpreted according to the principles of data analysis using the statistical package of SPSS.

Despite, the socio-economic structure of the Hyderabad city, there were substantial contributions of the Microfinance Institutions. The adaptation of the Mobile platform is inevitable; however it needs continuous growth and sustainability. It is a matter of time that the Mobile platforms in terms of financial service will keep its growth in line.

The research design of this study consisted the gathering of data, which was primary in nature and secondary data was also used in support the pre-determined objectives of the study, which was conducted and later analyzed using statistical package i.e. SPSS. In the chapter of Data Analysis and Interpretation, the data was coded and the required assumptions of Reliability and Validity were tested with the help statistical package. Furthermore the it was assumed that, the variables which were analyzed, which were based on the objectives of this study resulted in positive results.

Mathematically, the equation of Multiple Regression Analysis was expressed as:

$$I = \beta_0 + aP1 + bB2 + cC3 + ET$$

which was resulted in positive result, i.e. : $I = 5.230984$. The positive result shows the correlation of the independent variables with dependent variable. The validity of the results was shown the charts, where it shows the normal distribution and points follow the line and the shape of the histogram which is in bell shape. The positive results also express the positive impact of the Mobile Banking on the Microfinance Institutions.

The independent variables of the study were individually measured and later measured in a cumulative manner. These results expressed that, Mobile Banking platforms are sustainable in the Microfinance Industry of Pakistan. Hyderabad city has good geographical position for the measurement of the sustainability, since it is the second biggest city of Sindh and it consists various sub-urban settings divided as Talukas of the Hyderabad administration. The sub-urban areas are center to the Microfinance Institutions, which targets the low income population of the Pakistan and its cities. The products and services are digitized based on the needs of the customers of the cities of Sindh. The benefits of the Mobile Banking include the outreach and efficiency of the Mobile Banking product and services.

Hypotheses Testing

Independent Variable	P Value	Results
Products	.002	Accepted H1
Services	.003	Accepted H2
Benefits	.009	Accepted H3
Challenges	.007	Accepted H4

Hypothesis Testing Results represent that there is a moderate and positive relation between the entirety of the free factors with independent variable dependent on the outcome that considered critical where $p < 0.05$. Hence, it very well may be viewed as that every one of the free factors has a critical, moderate and positive relationship with client acknowledgment towards utilizing portable financial assistance. Thus, the invalid theory (H_0) of every autonomous variable is dismissed while the option hypothesis (H_1) of every free factor is acknowledged.

The challenges faced by the Mobile Banking platform in the Microfinance Institutions is maximize its domain to the unbanked population of the cities of Sindh, Pakistan. As much as the technology is advancing, the Microfinance Institutions are adapting different models to meet the needs of the banked and unbanked population. Sindh Pakistan is the agriculture economy, thus the Microfinance Institutions were playing vital role in the advancement of the important economic sector of Sindh Pakistan, along with small businesses and enterprises. The small business and enterprises, which intended to get credit and financial services are adapting Mobile Banking platform of the Microfinance Institutions in order to get along with the modern solutions of Banking and Finance. The unbanked populations are advancing towards the platform of Mobile Banking since it is way more efficient and easy to avail as compared to traditional brick and mortar banking system.

Microfinance Institutions are either powered by the mother companies or they are in collaboration with third party platform to perform more efficiently in the role of financial inclusion.

LIMITATIONS OF THE STUDY:

This research study focused on the financial institutions and the financial institutions are very much reluctant to share a general opinion due to sensitivity and nature of their financial institutions. Modern technology has definitely made efficient and secure, but on the other hand it has also make it vulnerable to the data theft and insecurity. During the data collection phase of this research study, the Microfinance Institutions were assured for the confidentiality of the provided data. The reluctance to provide relative opinion, information and data made is harder to rely on the accuracy of the data.

FUTURE RESEARCH DIRECTIONS:

Future directions for the researchers would be to study adaptation of new technologies and regulation of the digital and cryptocurrency in the perspective of Microfinance Institutions and their collaboration with third party financial technology companies, which have potential to accommodate with newest technologies and security solutions.

Microfinance Institutions and Banks are playing major in financial inclusion. The improvement in financial inclusion will help in economic growth and other socio-economic aspect of Sindh, Pakistan.

References:

- i Aker, J. C, Boumnijel, R and McClelland, A and Tierney, N., (2016), *Payment Mechanisms and Anti-Poverty Programs: Evidence from Mobile Money Cash Transfer Experiment in Niger*, *Economic Development and Cultural Change* [Online] 65 (1), 1-51. Available from: DOI: 10.1086/687578 [Accessed on 17th May, 2021]
- ii Akter, U., Anwar, S. M.R. and Mustafa, R. and Ali, Z., (2021). *Revisiting the Impact of Mobile Banking in Financial Inclusion Among the Developing Countries* .*International Journal of Financial Research*, [Online] 12 (2), 62-74. Available from: doi:10.5430/ijfr.v12n2p62 [Accessed on 5 May, 2021]
- iii Abbasi, T. and Weigand, H. (2017) “*The Impact of Digital Financial Services On Firms’ Performance: A Literature Review*”, *General Finance* [Online] 1-15. Available from: arXiv:1705.10294 [Accessed on 6th May, 2021]
- iv Afshan, S.and Sharif, A., (2016), *Acceptance of Mobile Banking Framework in Pakistan*, *Telematics and Informatics*, [Online] 33 (2), 370-387. Available from: <https://doi.org/10.1016/j.tele.2015.09.005> [Accessed on 6th May, 2021]
- v Abbas, A., Khan, R., & Kanwal, S., (2019), *Factors Affecting the Adoption of Mobile Banking in Pakistan*, *Global Scientific Journals*, [Online] 7 (7) 425-436. Available from: <https://www.globalscientificjournal.com/> [Accessed on 3rd May, 2021]
- vi Abbas, S.K., Hassan, H.A., Asif, J., Junaid, H.M., & Zainab, F., (2018), *What Are the Key Determinants of Mobile Banking Adoption in Pakistan?* *International Journal of Scientific and Engineering Research*, [Online] (2229-5518), 841-848. Available from: 10.14299/ijser.2018.02.012 [Accessed on 5th Nov 2020]
- vii Bakri, M.H., (2020), *Factors of Acceptance of Mobile Banking in Malaysia*, *International Journal of Human and Technology Interaction*, [Online] 4 (2) 13-21. Available from: <https://journal.utem.edu.my/> [Accessed on 14th April, 2021]
- viii Chohan, M.A., Ramakrishnan, S., & Butt, S., (2017), *An Economic Analysis of Mobile Banking in Pakistan*, *Journal of Applied Economics and Business Studies*, [Online] 1 (1), 31-38. Available from: 10.34260/jaeb.114 [Accessed on 7th, May, 2021]
- ix De Reuver, M.,Verschuur, E., Nikayin, F., Narciso C., & Harry B., (2014), *Collective Actions for Mobile Payment Platforms: A Case Study on Collaboration Issues Between Banks and Telecom Operators*, *Electronic Commerce Research and Applications* [Online] 14 (5), 331-344. Available from: <https://doi.org/10.1016/j.elerap.2014.08.004>, [Accessed on 3rd, April, 2021]
- x De Barros Ahrens, R., Lirani, L.S. and Francisco, A.C., (2020). *Construct Validity and Reliability of the Work Environment Assessment Instrument WE-10*. *International Journal of Environment Research and Public Health* [Online] 17 (7364) 1-12 Available from: <https://doi.org/10.3390/ijerph17207364> [Accessed on 8th May, 2021]
- xi Frost, J. (2021) *Statistics by Jim: Making Statistics Intuitive: STATISTICSBYJIM* Available from: <https://statisticsbyjim.com/> [Accessed 21st April 2021]
- xii Feroze, A., and Basharat, A., (2011), *Security Analysis of Mobile Banking Services in Pakistan*, *Asian Transactions on Fundamentals of Electronics, Communication and Multimedia*, [Online] 1 (3), 13-17. Available from: <https://www.researchgate.net/> [Accessed on 3rd April, 2021]
- xiii Farah, M.F., Hasni, M.J.S., & Abbas, A.K., (2018), *Mobile-banking adoption: empirical evidence from the banking sector of Pakistan*, *International Journal of Bank Marketing*, [Online] (0265-2323) Available from: 10.1108/IJBM-10-2017-0215 [Accessed on 7th May 2021]
- xiv Federal Reserve Bank of Boston. (2016), *Mobile Banking and Payment Survey of New England Financial Institutions*, *New England Mobile Banking and Payments Survey Results Report*, www.bostonfed.org
- xv Hossain, M.A., and Ahmed, M.F. (2014), “*Evaluating the impact of Mobile Banking Deployment for Microfinance Institutions*”, *D.U. Journal of Marketing* [Online] 15, 144-157 Available from: <https://www.semanticscholar.org/> [Accessed on 3rd Mar, 2021]
- xvi Haider, M.J., Changchun, G., Akram, T., & Hussain, S.T., (2018), *Exploring Gender Effects in Intention to Islamic Mobile Banking Adoption: An Empirical Study*, *Arab Economic and Business*

- Journal, [Online] 25-38. Available from <http://dx.doi.org/10.1016/j.aebj.2018.01.002> [Accessed on 9th May, 2021]
- xvii Harelimana, J.B. (2017), *Impact of Mobile Banking on Financial Performance of Unguka Microfinance Bank Ltd, Rwanda*, *Global Journal of Management and Business Research: C Finance* [Online] 17 (6) 44-56 Available from: <https://globaljournals.org/> [Accessed on 6th Feb, 2020]
- xviii Ifham, A. (2019), *How to do Normality Test using SPSS: MEDIUM* [Online] Available from: <https://medium.com/> [Accessed 21st April 2021]
- xix Iman, N., (2018), *Is Mobile Payment Still Relevant in Fintech Era? Electronic Commerce and Research Applications*, [Online] 30, 72-82. Available from: <https://doi.org/10.1016/j.elerap.2018.05.009> [Accessed on 2nd Jan, 2021]
- xx Ibrahim, M., Shahid, M.K., & Ahmad, S.F., (2015), *the Impact of Innovations on Adoption of Mobile Banking in Pakistan*, *Fire Journal of Engineering and Technology*, [Online] 1 (1), 14-24. Available from: www.firepubs.com [Accessed on 1 Jan, 2021]
- xxi Ibrahim et, al., (2018), *The Development of Technology Acceptance Model for Adoption of Mobile Banking in Pakistan*, *MAGNT Research Report*, [Online] 3 (4), 97-109 Available from: [10.51380/gujr-36-02-06](https://doi.org/10.51380/gujr-36-02-06) [Accessed on 5 Feb, 2021]
- xxii Karlan, D., Kendall, J. and Mann, R., Pande, R., Suri, T. and Zinman, J. (2016), “*Research and Impact of Digital Finance*”, *National Bureau of Economic Research* [Online] 1-8. Available from: [10.3386/w22633](https://doi.org/10.3386/w22633) [Accessed on 3rd Dec, 2020]
- xxiii Kadhlwal, S., & Usman, M.A., (2007), *Analysis of Mobile Payment Security Measures and Different Standards, Computer Frauds and Security*, [Online] 2007 (6) 12-16 Available from: [https://doi.org/10.1016/S1361-3723\(07\)70077-5](https://doi.org/10.1016/S1361-3723(07)70077-5) [Accessed on 4th Feb, 2020]
- xxiv Kanungo, R.P., & Gupta S., (2021), *Financial Inclusion through Digitalization of Services for Well-being, Technological Forecasting and Social Change*, [Online] 167 1-11, Available from: <https://doi.org/10.1016/j.techfore.2021.120721> [Accessed on 7th, May, 2021]
- xxv Karsen, M., Chandra, Y.U., and Juwitasary, H., (2019), *Technological Factors of Mobile Payment: A Systematic Literature Review*, 4th International Conference on Computer Science and Computational Intelligence 2019 (ICCSCI) 12–13 September 2019 Yogyakarta, Indonesia, *Procedia Computer Science* pp 489-498
- xxvi Lavrakas, P.J. (2008) *Encyclopedia of survey research methods*. [Online] Sage Publications, Inc., Thousand Oaks (Vols. 1-0) Available from: <https://dx.doi.org/10.4135/9781412963947> [Accessed on 2nd Feb, 2021]
- xxvii Loaba, S. (2021), *the Impact of Mobile Banking Services on Saving Behavior in West Africa*, *Global Finance Journal*, [Online] 1-11 Available from: <https://doi.org/10.1016/j.gfj.2021.100620> [Accessed on 7th, May, 2021]
- xxviii Mckinsey & Company, (2016) “*Digital Finance for All: Powering Inclusive Growth in Emerging Economies*” Executive Summary Report www.mckinsey.com
- xxix Miao, M. and Jayakar, K. (2016), “*Mobile Payments in Japan, South Korea and China: Cross-Border convergence or divergence of business models?*”, *Telecommunication Policy* 40 (2-3), 182-196 [Online] Available from: <https://doi.org/10.1016/j.telpol.2015.11.011> [Accessed on 6th Nov, 2020]
- xxx Mishra, V. & Bisht, S.S., (2013), *Mobile Banking in Developing Economy: A Customer-Centric Model for Policy Formulation*, *Telecommunication Policy*, [Online] 37 503-514, Available from: <http://dx.doi.org/10.1016/j.telpol.2012.10.004> [Accessed on 7th, May, 2021]
- xxxi Malaquias, R.F., & Silva, A.F., (2020) *Understanding the Use of Mobile Banking in Rural Areas of Brazil, Technology in Society*, [Online] 62 1-9 Available from: <https://doi.org/10.1016/j.techsoc.2020.101260> [Accessed on 7th, May, 2021]
- xxxii Pakistan Microfinance Review (2016), “*Pakistan Microfinance Review 2016*” Annual Assessment of Microfinance Industry <https://pmn.org.pk/>
- xxxiii N’dri, L.M., & Kakinaka, M., (2020), *Financial Inclusion, Mobile Money, and Individual Welfare: The Case of Burkia Faso*, *Telecommunication Policy*, [Online] 44 3 1-16, Available from: <https://doi.org/10.1016/j.telpol.2020.101926> [Accessed on 9th May, 2021]

- xxxiv Nabahat, S. (2014), *Impact of Microfinance on Women Empowerment: A Case Study of Selected Districts of Khyber Pakhtunkhwa* 1-162 [Online] Available from: <http://prer.hec.gov.pk/> [Accessed on 14 Feb 2020]
- xxxv Obadeyi, J.A. Ogbeide, S.O & Akande, A.A (2020). *Barriers of Microfinance Banks' Credit Delivery to Small Enterprises: An Empirical Analysis from South-Western Nigeria*. *The Romanian Economic Journal*, 78, 27-46
- xxxvi Ozili, P.K., (2018), *Impact of Digital Finance on Financial Inclusion and Stability*, *Borsa Istanbul Review*, [Online] 18 (4), 329-340 Available from: <https://doi.org/10.1016/j.bir.2017.12.003> [Accessed on 3rd Feb 2020]
- xxxvii Rizvi, S.K.A., Naqvi, B. e and Tanveer, F. (2017) "Mobile Banking: A Potential Catalyst for Financial Inclusion and Growth in Pakistan". *The Lahore Journal of Economics* [Online] 22 (Special Edition) 251-281 Available from: 10.35536/lje.2017.v22.isp.a11 [Accessed on 19th May, 2019]
- xxxviii Rizvi, S.K.A., Naqvi, B., and Tanveer, F. (2018) "Is Pakistan Ready to Embrace Fintech Innovation", *The Lahore Journal of Economics*, [Online] 23 (2) 151-182. Available from: DOI: 10.35536/lje.2018.v23.i2.A6 [Accessed on 6th May, 2019]
- xxxix Saravanani, S. and Dharani, M. (2020) *Development of a Frame Work for E-Banking Challenges In Rural India*, *Pramana Research Journal* [Online] 10 (2) 63-70 Available from: www.pramanaresearch.org [Accessed on 7th June 2020]
- xl Shaikh, A.A. and Karjaluoto, H. (2016), *Mobile Banking Adoption: A literature review*, *Telematics and Informatics*, [Online] 32 (1), 129-142 Available from: <https://doi.org/10.1016/j.tele.2014.05.003> [Accessed on 3rd Jan, 2020]
- xli Shaikh, A.A., Glavee-Geo, R. & Karjaluoto, H., (2017), *Exploring the Nexus between Financial Sector Reforms & the Emergence of Digital Banking Culture – Evidences from a Developing Country*, *Research in International Business and Finance*, [Online] 42, 1030-1039. Available from: <http://dx.doi.org/10.1016/j.ribaf.2017.07.039> [Accessed on 9th May, 2021]
- xlii Shen, Y. C., Huang, C.Y., Chu, C. H., and Hsu, C. T. (2010), *A benefit–cost perspective of the consumer adoption of the mobile banking system*, *Journal of Behaviour & Information Technology* [Online] Vol 29, Issue; 5 497-511. Available from: <https://doi.org/10.1080/01449290903490658> [Accessed on 4th April, 2021]
- xliii Yussaivi, M.A., Syarief, M.E., and Suhartanto, D., (2021), *Millennial Experience with Mobile Banking and Mobile Banking Artificial Intelligence: Evidence from Islamic Banking*, *International Journal of Applied Business Research* [Online] 3 (1), 39-53. Available from: DOI: 10.35313/ijabr.v3i1.121 [Accessed on 4th Feb, 2021]
- xliv Zhu, Q., Lyu, Z., Long, Y., & Wachenheim, C.J., (2021), *Adoption of Mobile Banking in Rural China: Impact of Information Dissemination Channel*, *Socio-Economic Planning Sciences*, [Online] 1-9. Available from: <https://doi.org/10.1016/j.seps.2021.101011> [Accessed 9th May, 2021].