

**Competition, Collaborations And Innovation In The Payment System:
Building A Consolidated Digital Payment Platform**

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ABSTRACT

The real time frauds occurring in the digital payment systems shows the laggings of older legacy measures for the prevention of frauds in the India's digital payment systems (Sharma, S 2019). This requires new strategies and plans to address the challenge and the need for innovation, competition and collaborations to build a consolidated platform on which the users can rely (RBI 2019). Keeping this in mind the present paper aims to know how Innovation, competition and collaborations in the digital payment systems are helping in building a Consolidated Digital Payment System. Data collection for the present study has been done from 375 respondents from the urban as well as rural areas of Amritsar, Jalandhar and Ludhiana district of the State of Punjab. The data was analyzed using statistical tools like mean, standard deviation, cronbach's alpha, EFA with SPSS 20.0. The outcome of the study identified revealed the suitability of 21 item scale for the conduct of study in Punjab. The outcome of study identified three factors which were competition (variance explained 23.851), collaboration (variance explained 18.402) and innovation (variance explained 14.465). The results of this study directs the participants in the digital payment systems and

the policy makers towards building a consolidated DPS that will be more secure and helps in gaining the trust of users.

Keywords: *Competition, Collaboration & Innovation (CCI), Digital Payment System (DPS), Exploratory Factor Analysis (EFA), Punjab.*

1. INTRODUCTION

The regulatory measure taken by government to promote the digital payments is taking the digital payments in India to the new heights. First, the lead taken by government through setting up of various committees viz committee on medium term path for financial inclusion, committee of Chief Minister on digital payments, committee to review framework related to digital payments, and steering committee on Fintech related issues etc to deepen the digital payments in India. Second, the availability of distinct payment modes such as UPI, Aadhaar Pay, QR code based payments, and e-wallets etc. (Chandnani, D 2019). Third, this has been further upgraded by varying projects like direct transfer of benefits to the Aadhar linked accounts, online booking and reservation of rail tickets, bhoomi project etc introduced by state and central government during the past one decade (Deloitte and CCI 2016). Finally, the new wave of upsurge to the digital payments in India was Visa Everywhere Initiative (VEI) i.e. the collaboration between American Payments major Visa with the local Fintech firm to address their problems and provide them a solution for the same (Visa group 2019). Innovations are the new face of digital payment ecosystem in India to address a huge share in the consumer's wallet. This requires the digital payment service providers to promote varying technological innovations viz user generated content (UGC) platforms with non-english internet users, debit card transformation in to contactless cards, one-click payments etc (Ramachandran TR 2019). Moreover the payment system innovations are important in India at this stage, as the users are new to the digital payment industry and any failure will reduce the consumers trust in the DPS and it will be a setback to cash system. This decline in consumer's acceptance of DPS happens because of two main reasons i.e. technical decline resulting from system issues and business decline happens because of user error taking this in account payment operators and participants in the system are trying to bring this decline down by 25% every year (High level committee on deepening digital payments 2019).

1.1.PROMOTION OF DIGITAL PAYMENT INNOVATIONS IN INDIA

1.1. A. THE ROLE OF GOVERNMENT

The government has to play an important role in bringing digital transformation this involves providing support to early adopters of digital payments, searching new technologies or adapting already existing technologies that matches local consumer needs and market requirements, engaging various ministries, states, cities and municipalities in promoting adoption of innovation, playing role of catalyst in promoting Open data and big data, and last but not the least government has to take both supply side and demand side measures to promote digital payment ecosystem (Hanna, N 2018). The government of India is also assisting in promotion of digital payment systems by introducing new policies shaping payment ecosystem in India, carrying out research and development efforts, engaging Telecom regulatory authority of India in providing secure and affordable internet, investment in human capital for bright future of digital payments, generating awareness amongst consumers to motivate them to shift to digital payments; and engaging industry in the digital transformation process and setting a virtuous cycle of innovation and prosperity in payment landscape (IDRBT 2016). The high level committee on deepening digital payments in India recommended collaboration between bank (having trust of consumers) and non-bank payment service providers, where the non-bank payment service providers would help in strengthening technology and doing consumer centric innovations. This regulatory architecture will help in a balancing safety and innovation further removing the chances for platform monopoly (High level committee on deepening digital payments 2019). The RBI through the report of working group has further released appropriate framework for regulatory sandbox to encourage innovations by either absence of governing regulations, easing of regulation on temporary basis for providing enabling ground for innovation, and promise of easy and effective delivery of financial services (Department of banking regulation banking policy division 2019). Apart a lot of initiatives have been taken by RBI in technology enabled banking space viz in-principle approval for payment banks, entry of non bank payment operators and technology service providers, Bharat bill payment system introduced, and in-principle approval for electric toll collection project etc.

1.1. B. BANK LED DIGITAL PAYMENT SYSTEMS AND NON-BANK DIGITAL PLATFORMS

As per RBI discussion paper on guidelines for payment gateways and payment aggregators (2019) in an online transaction the banks provides payment gateway services and the non

bank payment aggregators of merchant and payment options provides supporting technology services to the payment gateways. However in order to safeguard the interest of consumers RBI in its extant regulations 2009 has made it compulsory for these intermediaries to have a nodal account in the form of internal account of a bank and further these payment gateways and payment aggregators have to be authorized under the Payment and Settlement Systems Act, 2007 (PSSA) .Wherepayment gateways and payment aggregators engaged by banks provides bill payment and card payment services through its banking channels by using cards and bank accounts. While the payment gateways and payment aggregators engaged by non-banks entities i.e. merchant and biller facilitates payment through various payment modes like online transaction processing across various banks and card gateways.

2. LITERATURE REVIEW

2.1.LITERATURE ON INNOVATION AND COLLABORATION

Tidd et al. (2006) reviewed thatthere are different types of innovation network and each network has different issue to solve. Zone one encompasses tactical innovations enabling the network to share information, disclose information develop trust and transparency, zone two is concerned with exploring and creating new products and processes by forming strategic alliances or sector consortium for new innovationsand, zone three and zone four are inclined towards multi-company innovation network in complex product systems and formation of regional clusters to manage best practices and these zones are exposed to high risk and requires proactive management. Edquist, C and Hommen, L (1999) in their work titled system of Innovation: theory and policy for demand side has shown that system oriented perspective of innovations has nine characteristics viz the focus on innovation and learning process, holistic and interdisciplinary in nature, influenced by many factors and feedback processes, carrying out difference between existing systems, emphasizes on interdependence and interaction with established organizations, includes both technological innovation and organizational innovations, emphasizes the role played by norms, rules, laws etc, transform from conceptual pluralism to core concepts, and emphasizes on appreciative theory. Satell, G (2016) has revealed nine paths of innovation such as innovation is never a single event, innovation is combination, depends on problem definition and domain definition, it doesn't depends upon size of firm, collaborations helps in bringing competitive advantage etc. As per him a more collaborative approach is required to solve toughest of the toughest problems

where people from the different talents would be united to work towards defined problem to provide best solutions. Chandra, S and mudria, M (2014) reviewed that bringing innovation in the existing technology is significant to widen the existing customer base. The banks must adopt e-CRM customer centric approach as customer being at the priority, devising products as per them is mandatory.

2.2.LITERATURE ON COMPETITION IN DIGITAL PAYMENT SYSTEMS

Shroff, C & Kakkar, A (2019) in their article India: Abuse of Dominance reviewed that competition law has been framed to have in place anti-competitive conduct, abuse dominance and unilateral conduct, and combinations. In contravention of any of the above said principle Competition Commission of India (CCI) under section 4 of the act is empowered to put a penalty of up to 10 percent of average turnover of the enterprise for the preceding three financial year. Parsheera, S & et al. (2017) reviewed that the presence of multiple online platform it will help generate more value to the users of the platform, it helps in promoting natural oligopolies, it helps in knowing relative efficiencies of the players as their win or loss is decided by market forces of demand and supply. Further it was suggested that fairness of the competition can be judged through various approaches firstly, by knowing the existing market share of the firms on online platform the discount and incentives they offer and primary goals of network expansion, secondly assessing the recoupment effect i.e. knowing whether the discount given by the online operators in short run will be beneficial for them in long run or not, and thirdly competition is required for ensuring interoperability between technology companies to ensure open access to networking effects. Bhattacharjea, A & et al. (2018) reviewed that in the virtual platform the competition can have vertical segmentation where different platforms serve to fulfill the needs different consumers' vice-versa these platform can have horizontal segmentation also having specialization in different locations, tastes and needs example websites specializing in different type of product and services. Acharya, N (2019) in her article reviewed that Reserve Bank of India has allowed on-tap authorization to three payment systems viz Bharat Bill Payment Operating Unit (BBPOU) for repetitive bill payments currently covering five segments Direct to Home (DTH), electricity, gas, telcom and water bills, Trade Receivables Discounting System (TReDS) to facilitate financing of invoices and bills, and White Label ATM Operators (WLAO) operated by non bank entities.

3. THEORETICAL FRAMEWORK

To motivate the users to shift to DPS need of the hour is to create a healthy environment, the more the number of payments service providers entering the digital payment space the more will be chances of collaborations and innovations. As the competing payment service providers will pull up their socks to grab more and more market share (RBI 2019). The collaborations between payment service providers (Bank led DPS; Non Bank led DPS and Fintechs) will impact the online payments and clearing and settlement. Further it will lead to the emergence of central bank digital currencies to replace cash (Thakor, A, V 2019). Keeping this in mind the government of India has allowed the regulatory existence of sandboxes to promote competition and efficiencies in the financial service markets through innovations (Lauer, I.J.K, 2017)

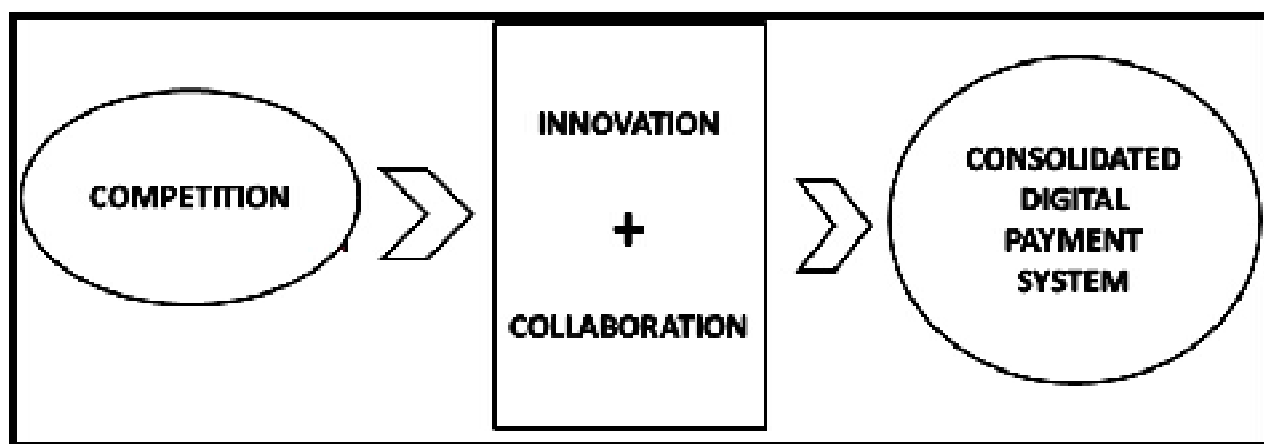


Figure 1: The conceptual framework and model for study

The Fintech is expected to give highest return on investment and foster innovation and faster technological adoption. These collaborations will further help in making digital payments simpler, omnipresent merchant networks, frictionless on demand payment options, customer friendly easy on-boarding and off-boarding provisions and reduction in cost (DSCI and PayPal 2019).

4. RESEARCH METHODOLOGY

4.1.OBJECTIVES OF THE STUDY

1. To study the innovations, competition and collaboration taking place in payment system; and
2. To know how Innovation, competition and collaborations in the digital payment systems are helping in building a Consolidated Digital Payment System.

4.2. DATA COLLECTION

Primary as well as secondary data has been collected for the purpose of this study. Secondary data was collected through various journals, news papers, and government websites etc. The primary data has been collected through closed ended structured questionnaire. The data for this study was collected during the time interval of 1st March, 2019 to 1st November, 2019. The research has been conducted in three representative cities of three districts of Punjab State viz Amritsar (Majha Region), Jalandhar (Doaba Region), and Ludhiana (Malwa Region).

4.3. SAMPLE DESIGN

The universe of this study was people residing in the urban and rural area of selected regions of Punjab State. Moreover the respondents for the present study were selected on the basis of age criterion of 18 years and above. The data was collected from users viz consumers and retailers who have carried out more than 10 transactions using any DPS in the last one year. The proposed sample of 425 was chosen from the above mentioned cities using random sampling. However for fulfilling the objective of study the incomplete and ambiguous questionnaires were rejected. Actual sample of 375 responses was considered. Prior to the collection of data the respondents were explained the reason for data collection and their consent was taken. Each statement of the scale was explained in Punjabi (local language of Punjab) to participants to ensure better understanding.

4.4. RESEARCH TOOLS

The research schedule was prepared based on the empirical literature reviews in the digital payment systems. The schedule of this study consists of two parts. First part includes questions regarding DPS related variables perceived innovation status, need for innovation and reported reasons for innovation. Second part of the schedule contained 21 statements of competition, collaboration and innovation adopted from System of Innovation theories and Innovation models (Tidd et al. 2006). Statements were evaluated on a five point likert-type-scale ranging from 1 (strongly agree) to 5 (strongly disagree). As stated by Edquist and Hommen (1999) non linear and interdependence are significant aspects in this approach

which emphasis for a demand side instrument. Little modification in the scale was done following previously conducted studies by Maccormack, A et al. (2007), Hanna, N (2018) and Karsen, M et al. (2019) to make it suitable to the objective. Statistical techniques like mean, standard deviation, cronbach's alpha were applied to check reliability of data. An exploratory factor analysis (EFA) was performed using SPSS 20.0 to identify various factors leading to completion, collaboration and innovation in DPS.

A Pilot study was conducted before proceeding with final data collection in the month of Feb, 2019. It was done to check the feasibility of 21 item scale in the context of Punjab. A sample size of 30 was taken for this purpose (Malhotra 2008).

5. RESULTS AND DISCUSSIONS

In this section the findings of the research are discussed. In the first section the *Innovation* related variables are discussed, it was followed by factors leading to competition, collaborations and Innovations in the DPS.

5.1. DPS CONSOLIDATION RELATED VARIABLES

DPS related variables are demonstrated in table 1 based on perceived consolidation status, need for consolidation and reported reasons for consolidation is as follows:

Table 1: DPS Related Characteristics

SR.No	Profile	Category	Digital System	Payment
			Count	%
1	Perceived Consolidation status	Good	330	88%
		Poor/bad	45	12%
	Total		375	100.00%
2	Need of Consolidation	Improving and simplifying financial operations	49	13%
		Building products around consumers experience	45	12%
		Faster Payments	168	45%
		Point POS sale capabilities	45	12%
		Cash Digitization	19	5%
		Leveraging virtual channels/ self service	49	13%

		tools		
	Total		375	100.00%
3	Reported reason for Consolidation	Enhanced user experience	214	57%
		Technology Change	161	43%
	Total		375	100.00%

Source: Author's Calculation Based on Primary Data.

Note 1: Primary Data has been obtained from three Districts of Punjab (Amritsar, Jalandhar, and Ludhiana)

Note 2: % = percentage of total

Out of 375 respondents, 88 percent (n=330) perceived that consolidation in the DPS to be good and only 12 percent (n=45) perceived it to be bad. With regard to need for consolidation 13 percent (n=49) were of the view that it will help in Improving and simplifying financial operations, another 13 percent (n=49) said it will leverage self service tools, 12 percent (n=45) were of the opinion that innovations help in transforming DPS product and services and per consumers requirement, another 12 percent (n=45) said it will generated point of sale capabilities, where majority i.e. 45 percent (n=168) and minority 5 percent (n=19) said DPS innovations will yield a faster payment platform and lead to cash digitalization. Regarding the reported reason for consolidation 57 percent (n=214) reported that innovations are resulted from enhanced consumer experience and rest 43 percent (n=161) reported technology change to be the reason behind innovation of DPS.

5.2 DESCRIPTIVE STATISTICS AND RELIABILITY ANALYSIS

In this part of study, factors influencing leading to innovation, competition and collaboration were determined. Descriptive statistics of the scale were explained with mean and standard deviation. The mean scores for all dimensions (table 2) are as follows: competition (2.129), collaboration (2.413), and innovation (2.461).

Table 2: Descriptive Statistics and Reliability Analysis for Consolidated DPS

Code	Statements	Mean	S.D	Coefficient Alpha (α)
Competition		2.129	4.438	0.813
C1	Multiple DPS will help in Preventing from Unfair & Predatory Pricing	2.03	0.842	

C2	It Helps in determination of dominance	2.1	0.704	
C3	Presence of huge DPS providers will generated economies of scale	1.79	0.697	
C4	It will help in generating network effects	2.53	0.97	
C5	Multi-homing i.e. the consumers will be able to use different platforms for different services on payment of separate charges	2.02	0.878	
C6	Market segmentation will help in serving different classes of users	2.32	0.974	
C7	Due to presence of number o digital platforms no overcharging will be there	2.1	0.899	
C8	It will lead to price sensitivity as there will be greater elasticity o demand	2.13	0.718	
Collaboration		2.413	4.079	
CL1	It will help in sharing capabilities viz Technological know-how	2.27	.850	0.748
CL2	Help in integrating ICT in to new value chain opportunities	2.21	1.121	
CL3	Firms will generate competitive advantage	2.43	.948	
CL4	It leads to wider market access and deepening of trade relations	2.62	.921	
CL5	The cumulative experience and scaling up Lowers the cost of infrastructure	2.22	1.019	
CL6	The cumulative experience helps in gaining Cost Leadership	2.74	1.228	
Innovation		2.461	4.06	
I1	Regulatory sandboxes i.e. live testing of product and services	2.36	.951	0.715
I2	Innovations enables reduction of cyber crimes	2.63	.904	
I3	Easy and convenient Payment solutions	2.51	.918	
I4	System capability and scalability	2.25	.840	
I5	Contactless payments that used RFID & NFC	2.38	1.163	
I6	Setting up 24*7 consumer helpline for grievance redressal	2.74	1.230	
I7	Emergence of touch points giving an opportunity to purchaser to choose brand over another competitor	2.36	.951	
Overall scale				0.873

Source: Author's Calculation Based on Primary Data.

Note 1: Primary Data has been obtained from three Districts of Punjab (Amritsar, Jalandhar, and Ludhiana)

Note 2: % = percentage of total

All constructs have a standard deviation above 0.70, which is considered as good. Reliability analysis was performed to check the internal consistency of the scale (Cronbach, 1951). The alpha values for quality dimensions were as follows: competition ($\alpha=0.813$), collaboration

($\alpha=0.748$), and innovation ($\alpha=0.715$). The overall alpha value of service quality scale was ($\alpha=0.873$). Results state that, the cronbach alpha value of the present scale ranged from 0.715 to 0.813, indicating acceptable consistency among the items within each dimension and reliability of the scale (Nunnally, Bernstein, & Berge, 1967; Sekaran, 1996).

5.3 EXPLORATORY FACTOR ANALYSIS

As stated in table 2, over all KMO value was 0.805, and KMO value calculated individually for each item of scale (table VI) ranged from 0.606 to 0.846 indicating that data was appropriate for factor analysis (Kaiser and Rice, 1974 ; Hair, Black, Babin, Anderson, & Tatham, 2006). The Bartlett's test was also significant ($p < 0.001$) indicating correlation between the attributes and the matrix was not identity matrix. The determinant was .002 indicating there was no problem of multicollinearity in the data. To access the appropriateness of data for factors, communalities were reviewed (table VI). All of them were having value greater than 0.5, this stated the appropriateness of data (Stewart, 1981).

Table 3: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.805
Bartlett's Test of Sphericity	Approx. Chi-Square	3009.125
	Df	210
	Sig.	0.000

All the items in the scale were subjected to principal component analysis with varimax rotation and kaiser normalization. It was found that none of the statements had factor loading less than 0.5 else, they were to be eliminated (Hair et al., 2006). Results of factor analysis indicate that only five factors were having eigen values greater than one (3.361, 2.721, and 2.461 respectively for all factors). The total variance explained by factor 1, 2, and 3, were 23.185, 18.402, and 14.465 percent. The cumulative variance explained by all these factors was 56.051 percent.

5.4 Resulting Factors

The results specified three dimensions of DPS, which were as follows:

Factor one explained 23.185 percent variance and was named as competition. This factor include statements related to preventing from unfair & predatory pricing, determination of dominance, economies of scale, generating network effects, multi-homing, market segmentation, and price sensitivity. Factor two explained 18.402 percent variance and was named as collaboration. This factor include statements related to technological know-how, new value chain opportunities, Competitive advantage, wider market access, lowering cost of infrastructure and cost Leadership.

TABLE 4: FACTOR STRUCTURE FOR CONSOLIDATED DPS

Factor Dimensions	Code	Factor Loadings	Communalities	KMO	Eigen value	Explained Variance
COMPETITION (F1)	C8	0.935	.950	0.662	3.361	23.185
	C2	0.932	.938	0.649		
	C7	0.877	.809	0.606		
	C6	0.872	.796	0.659		
	C4	0.791	.714	0.726		
	C3	0.765	.655	0.621		
	C1	0.748	.776	0.846		
	C5	0.615	.620	0.731		
COLLABORATION (F2)	CL1	0.974	.962	0.729	2.721	18.402
	CL6	0.923	.868	0.788		
	CL4	0.848	.750	0.755		
	CL5	0.707	.584	0.802		
	CL2	0.692	.662	0.713		
	CL3	0.634	.724	0.703		
INNOVATION (F3)	I1	0.971	.968	0.697	2.461	14.465
	I2	0.971	.501	0.695		
	I4	0.862	.668	0.695		
	I6	0.816	.715	0.695		
	I7	0.813	.968	0.711		
	I5	0.791	.749	0.699		
	I3	0.512	.661	0.695		
Total Variance Explained						56.051

Source: Author's Calculation Based on Primary Data.

Note 1: Primary Data has been obtained from three Districts of Punjab (Amritsar, Jalandhar, and Ludhiana)

Note 2: % = percentage of total

Factor three accounts for 14.465 percent variance and was named as innovation. This factor includes statements relating to Regulatory sandboxes, Reduction of cyber crimes, Easy and convenient Payment solutions, System capability and scalability, contactless payments, contactless payments and Touch points in payment systems

6. CONCLUSION

The findings of the study illustrated some interesting facts about Competition, collaboration and innovation in DPS with regard to urban and rural area of Amritsar, Jalandhar and Ludhiana of the State of Punjab. Respondents from urban as well as rural areas of Punjab were using DPS. The outcome of the study indicates that now more and more people are taking keen interest in using digital payment platforms the reason behind this may be drastic improvement in the services provided by DPS. As indicated in the literature the service provided by these platforms has improved slowly and gradually with the constant support of the Government. Findings also stated that majority of respondent stated perceived consolidation status of DPS to be good. It could be make out that they were taking services due to availability of latest technology and better experience than ever before. If innovations like Regulatory sandboxes, Reduction of cyber crimes, Easy and convenient Payment solutions, System capability and scalability, contactless payments, contactless payments and Touch points in payment systems were done and competition and collaboration fosters we will definitely be able to work out for a consolidated platform providing wide array of services. The most important factor in building of consolidated platform was competition followed by collaboration and Innovation. The results states that this twenty one item scale is suitable to know competition, collaboration and innovations taking place in DPS in Punjab. Further, for future research, this scale could be verified using confirmatory factor analysis (CFA). The results of this study provide useful guidelines for digital payment service providers & policy makers in Punjab. Findings of this study could be taken as base for future as it indicates the areas where service providers need more attention. Further this will help in formulating valuable marketing strategy, which could help digital payment service providers in meeting and keeping up with changing demands of users with time. Moreover, that could

help in reducing marketing related cost as these strategies could help in increasing user base. This could further help in breaking the mundane in system by adding more value to the digital payments systems.

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