DIGITAL PAYMENT AS A KEY ENABLER OF E-GOVERNMENT SERVICES: A CASE STUDY OF CHANDIGARH CITY (INDIA)

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Abstract

Going digital has been one of the primary priorities of Govt. of India. The study is limited to Chandigarh City. The research is primarily focussed on evaluating citizens awareness, perception and concerns about the adoption of digital payment system in the domain of e-government services. Primary data is collected and empirically tested. The study also focussed on role of govt in reinforcing digital modes by Chandigarh citizens It has been observed that digital payment space is been increasingly occupied by non-traditional players offering next generation products and services. Citizens services are focussed in the research. The study found that e-sampark centers are very active in city. Study found that people prefer digital payments over traditional ways because of convenience primarily. M-Sampark needs to be strengthened. Connectivity of mobile phones and other related infrastructure need to be worked upon for smooth implementation of digital payments. Study found that city has lot of potential for successful implementation of Digital payment and receipt platform being availability of more young and educated population in the city. The study concluded that age, education and profession have significant impact over awareness and usage of digital payment platform in Chandigarh City.

Keywords: Digital Payments; Information & Communication Technology (ICT); Multi Service-Single Window; Electronic Payments and Receipts' (EPR); pre-paid instruments (PPI); Digital Wallets

1. Introduction

Rapid strides in Information and Communication Technologies (ICTs) have impacted Digital Payment ecosystem world over. These changes are providing citizens with convenience, speed and savings.

It has been observed that digital payment space is been increasingly occupied by non-traditional players offering next generation products and services. Mobile payment devices are becoming popular. Smartphones are becoming commerce enablers, apart from being communication devices.

The Ministry of Electronics and Information Technology (MeitY) launched in 2015,'Digital India' programme with a vision to transform India into a digitally empowered society and knowledge economy. One major part of this larger programme is a special focus on digital payments ecosystem. Provision of seamlessly integrated online citizen services with facilities for cashless payments and receipts has been a top priority. Hence, government has taken various steps to create conducive environment in the country for facilitating the shift towards to less- cash economy. For its own financial dealings, The MeitY issued 'Guidelines for Adoption of Electronic Payments and Receipts' (EPR). These guidelines are applicable to all Ministries and Departments of the Govt.

2. Changing Digital Payments landscape in India

Digital Payment ecosystem of Indian has gained strength during recent years. Initiatives like allowing non-bank entities to offer pre-paid instruments (PPI), mobile and digital wallets, introduction of National Unified Platform have helped moving towards to less- cash economy.

There has been a dramatic surge in data connectivity in india. As shown in Table 1, Cost of data has fallen drastically in recent years, making it one of the cheapest globally. Similarly cost of smartphones has also gone down heavily . These low costs have driven an eight fold increase in data consumption thereby giving a big boost to digital payment transactions.

Table : 1 Massive Data Connectivity shifts in india

	2015	**2018**
Reducing data cost—average cost/GB data (Rs.)	250	15
Decreasing Smartphone cost (4GB), Average price (Rs.)	16250	11000
Increasing mobile data consumption –per capita per month	800 MB	6.5 GB

Source :Credit Disrupted Digital MSME lending in india 2018, omidyar network, Boston Consulting Group

The 'Economist Intelligence Unit' of the Economist Group, publisher of The Economist has been assessing Governments efforts to enable e-payment adoption and based on that preparing a global Index. The 2018 Global Index has put India on 28th position amongst 73 countries surveyed. Last survey done in 2011, India was on 28th position.

As per the report by Swiss financial services holding company, Credit Suisse,

An unprecedented growth of five fold is expected in digital payments by 2023 and reach 1 trillion US dollars.

Chandigarh's Digital Journey
An overview

'City Beautiful' Chandigarh was planned by the famous French architect, Le Corbusier. Le Corbusier conceived the master plan of Chandigarh as analogous to human body. Head - Capital Complex and administration offices, Heart - city center, Lungs - Leisure valley and open spaces, Intellect - cultural and education institutes, circulatory system being network of roads which follows a grid pattern making planning of infrastructure a significant strength.The basic planning unit of the city is a 'sector' and presently there are 58 sectors.

A Government compound located in the sector-1 of the city called the Chandigarh Capitol Complex, has been declared as a UNESCO World Heritage Site since 2016. The excellent social infrastructure, large green spaces, and its compact size, makes Chandigarh an ideal work destination. Chandigarh's administrative structure as a union territory facilitates single point decision making which is critical towards implementation of development agenda. With a total area of 114 sq.Km., Chandigarh has population of about 11 lakhs.

Various e-Governance Initiatives by Chandigah Adminstration

For the convenience of Chandigarh Citizens, a single window service platform is created by the name of e-sampark in year 2014. Services of all government departments are being offered under one name

102

at one place for all the citizens in order to avoid delays, reduce wastage of time due to long queues, avoid multiple visits and increase in transparency. Twelve departments under chandigarh adminstartion which also includes corporation/boards and private companies joined hands with Department of Information Technology (DIT) to make services available to all chandigarh residents through e-sampark. These sampark centers due to there prominent location in and around chandigarh are providing services to urban as well as rural residents.

Project e-Samaprk provides employment to around 141 executives and each center is managed by a team of 4-5 executives. More than 45 services are offered through 43 centers. Not all the services require exchange of money as some of these are informational services. Table 2 shows services involving payments/receipts.

Table 2: List of services involving receipts/ payments of money (2017-18)

Name of the service	
Payment of taxes	All deposits for dwelling Units of CHB
VAT/CST	Issuance of Dependent Certificate
Issue of Bus Passes	Issuance of Character Certificate
Issue of Senior Citizen Card	Issuance of Income Certificate (for Students)
Enrollment for availing pension for old age persons, widows and disabled persons.	Issuance of Residence Certificate
Payment of Electricity Bill	a. Counter signing of documents

Source: Sampark portal (December, 2018), *Project Sampark*, Retrieved from
http://sampark.chd.nic.in/

Need for the study
Researcher of this study has reviewed relevant literature and found that considerable pioneering work has been done by various individual researchers and organizations in the domain of digital payment ecosystem. There are studies both at international and national levels, highlighting how e-Governance projects including digital payment system have helped governments achieve goals of good governance. In India several studies have been conducted in various states/UTs with the aim of assessing the progress towards digital economy. These studies have provided valuable inputs to the planners at state as well as national levels. Over the last decade various steps have been taken by Chandigarh Administration to improve quality of life through various e-Governance. There have been Chandigarh-focused research studies relating to working and impact of e-governance projects undertaken by Chandigarh Administration. There is hardly any research relating to digital payment ecosystem with a focus on government's payment and receipts for citizen services. Present study proposes to fill that gap.

3. Objective and Hypotheses
The study aims to evaluate citizens awareness, perception and concerns about the acceptance of digital payment system in the domain of e-government services. Role of Govt. in reinforcing digital modes will be evaluated.
Following hypotheses were formulated for testing awareness about Digital payment system
H1: There is no significant relationship between age and mode of digital payment of the respondents.
H2: There is no significant relationship between gender and mode of digital payment of the respondents.
H3: There is no significant relationship between education and mode of digital payment of the respondents.

H4: There is no significant relationship between employment and mode of digital payment of the respondents.

4. Research Methodology

This empirical study is mainly based on primary data. An in depth exploratory level research was carried through out through an exhaustive questionnaire. The questionnaire included both close-ended and open-ended questions on modes of payment used for availing those services requiring exchange of money. The survey sought to understand the factors influencing their preferences about various modes of payment and also pain areas.

The targeted relevant population segment comprises those respondent citizens of chandigarh who have availed of services provided under e-governance initiative of chandigarh administration. Citizens are free to visit any service center for availing offered services. Stratified random sampling technique has been used for selecting respondents. Each center offering services was visited and randomly three citizens visiting the centers were requested to respond. The respondents were given approximately fifteen minutes to complete the questionnaire. The questionnaire was filled in many cases by the respondents, however in few cases it was filled by the researcher based on the information given verbally by the respondent. Participation in the survey was voluntary and respondents were assured of full confidentiality.

Following constructs were measured through the questionnaire regarding citizens :
   (1) Citizens' awareness about digital payment modes
   (2) Citizens' preferred payment modes
   (3) Hindrance faced and suggestions regarding improvements

The data gathered through the field visits was analysed in order to discern the perceptions, awareness and expectations on digital payment system. Interpretation of the data was done using simple tables, charts, and graphs. Detailed interactions with the staff members deployed in sampark centers were held so as understand the feed back given by the citizens. The secondary data used for the study has been compiled from relevant websites and various survey reports.

Table 3 : Demographic Profile of the Respondents (N=129)

	Demographics	No. of Respondents	%
Age(in years)	upto 30	48	37.21
	31- 40	34	26.36
	41 - 50	13	10.08
	51 - 60	16	12.40
	61 -70	17	13.18
	71 -80	1	0.78
Gender	Female	47	36.43
	Male	82	63.57
Educational/ Professional	Under Matric	5	3.88
Qualifications	High School- 10th Class	8	6.20
	Graduation-BA, BSc, BCom, etc.	42	32.56
	Post Graduation- MA, M.Sc, M.com	57	44.19

	Professional Education	10	7.75
	Any other	7	5.43
Profession/ Occupation	Non working/ Unemployed	6	4.65
	Academic/ Teaching	30	23.26
	Private Service	27	20.93
	Government/Bureaucrat/PSU Service	26	20.16
	Retired	20	15.50
	Defence/ Police Personnel	1	0.78
	Industrialist/Manufacturer/SME/Entrep reneur	3	2.33
	Politician	0	0.00
	Trader/Businessman	1	0.78
	Technical Professional/Engineer/Doctor/IT/Archit ect etc.	4	3.10
	Self-employed/Entrepreneur/Worker	8	6.20
	Business Professional/Lawyer/CA/Management Consultant/Income Tax etc	3	2.33

Demographic profile of respondent citizens as shown in Table 3 depicts that around 3/4th of the respondents are in the age groups of upto 30 , 31to 40 and 41 to 50 years. Almost one-forth in the age group of 51-70 years. More than 1/3rd are females and more than seventy five percent are possessing graduation and post graduation degrees. Little less than one-fourth of the respondents represent academic/teaching--both school and college/university levels.

5. Data Analysis
Trends in usage of services and payment modes
The trends have been analysed from secondary sources such as reports, press notes, gazettes, magazines and various other related documents published by UT administration. Web portals were also checked for collecting data.

It is found that e-smapark has done significant progress since 2004 with transactions close to 26 lakhs in year 2017-18. The number of centres as well as number of services offered have also grown in the recent years as as depicted by Table 4.

Table 4 : Growth of Project e-Sampark since inception.

e-Sampark Project		
Year	2004-2005	2017-18
No. of Transactions	189333	2599715
Revenue Collected(Rs in Lakhs)	2512.86	144571.49
No of Centres	5	43

105

No of services	11	45

Though Project e-Sampark is presently offering more than forty five services but only a handful of these services have been contributing to the bulk of volume and value as shown in the following Table. 5.

Table 5 : Top 5 most popular services in terms of volume & value (2017-18)

S.No.	Service Name	No. of Transaction	Amount (Rs.)	No. of transactions %	Amount %
1	Electricity	1162024	10727438686	43.04	74.25
2	Water	768525	757146970	28.46	5.24
3	BSNL	140042	120785217	5.19	0.84
4	Issue of Bus Pass	83927	36772070	3.11	0.25
5	Vat & CST	68154	1922181248	2.52	13.31

These five services represent more than 80% of volume and more than 90% of the value of total transactions handled by project e-Sampark.

Cash to non-cash ratio inverting in e-Sampark Project :
Innovation in digital payment system has been facilited through advancement of ICT. It was found that mobile penetration and low data charges played great role in promoting digital payments. With the city achieving 100% Aadhaar enrolment and with the opening of large scale bank accounts in the city are also facilitating a shift in the modes of payment used by citizens of Chandigarh.
Citizens are showing tremendous affinity to digital technologies. Like rest of the country, the pace of shift to the digital payment has increased during recent years. The Shift from cash mode to non cash modes of payments can be observed from Figure 1.
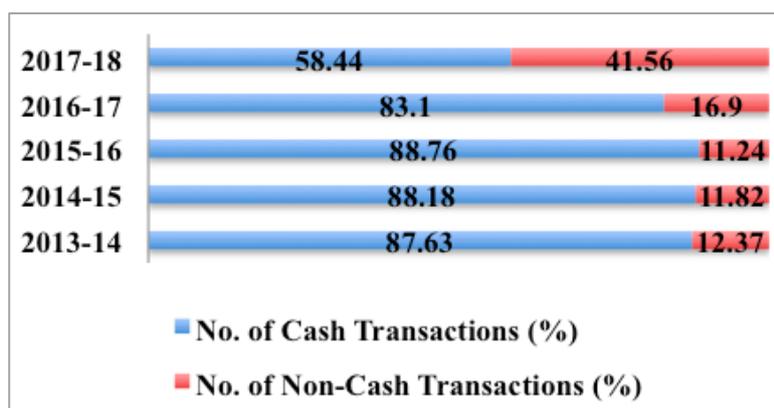

Figure 1: Cash to non-cash ratio inverting in e-Sampark Project over the years (2013 to 2018)

Figure 2, Indicates break-up of digital transactions over the years. Share of digital transactions made up of debit cards, credit cards and Internet Banking, in volume terms has grown tremendously. Popularity of debit cards and Internet Banking as modes of payment particularly during last two years

106

has been very significant. More than 17 lakh debit card have been issued in Chandigarh against a population of around 11 lakh.

Percentage wise break up of Non Cash Transactions

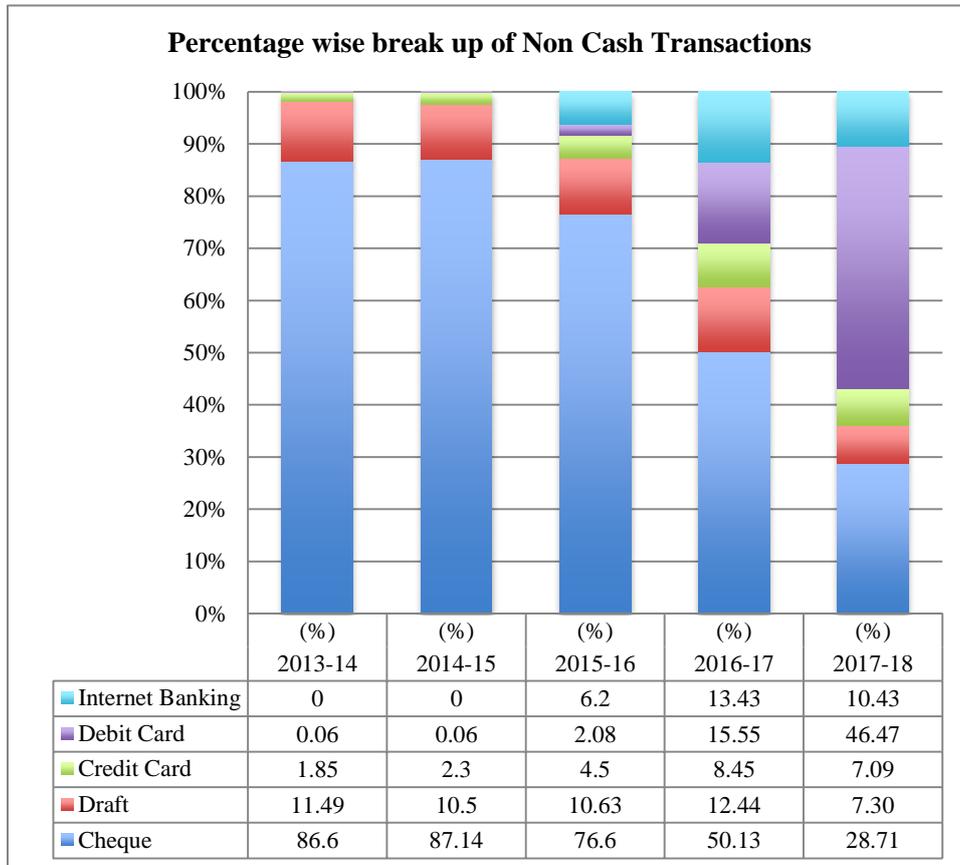|	(%) 2013-14	(%) 2014-15	(%) 2015-16	(%) 2016-17	(%) 2017-18
Internet Banking	0	0	6.2	13.43	10.43
Debit Card	0.06	0.06	2.08	15.55	46.47
Credit Card	1.85	2.3	4.5	8.45	7.09
Draft	11.49	10.5	10.63	12.44	7.30
Cheque	86.6	87.14	76.6	50.13	28.71

Figure 2: Trends in Modes : Non- Cash Payments (2012-13 to 2017-18)

Figure 3, highlights relative proportions of cash and non-cash volume of transactions as percentage along with break up of different non cash modes used by citizens during 2017-2018.
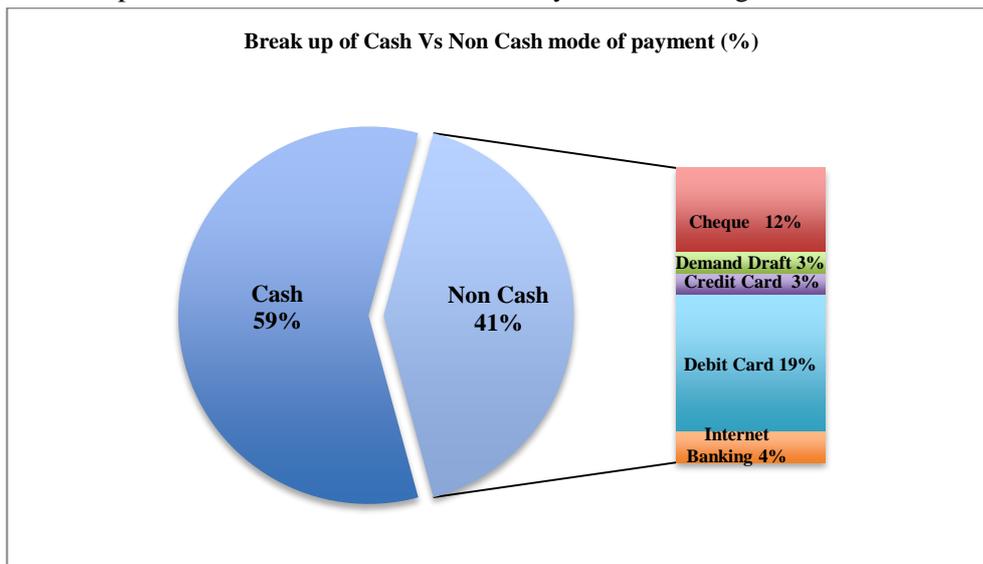
Break up of Cash Vs Non Cash mode of payment (%)

Cash 59%   Non Cash 41%

Cheque 12%
Demand Draft 3%
Credit Card 3%
Debit Card 19%
Internet Banking 4%

Figure 3: Volume of Transaction for Project e-Sampark (2017-18)

Citizen's preferred modes of digital payment for availing a service at Sampark Center:

Presenlty, the only modes of Digital payments available at Sampark center are – Debit cards, Credit cards. However, citizens can avail a service through eSampark Portal by using Internet banking mode. Respondents were asked about their preferred mode of Digital Payment while availing services from e Sampark Center. As mentioned above only modes available at centers are Debit & Credit Cards. Between these two, debits cards are the most preferred mode used by the respondents as compared to credit cards as shown in Figure 4.
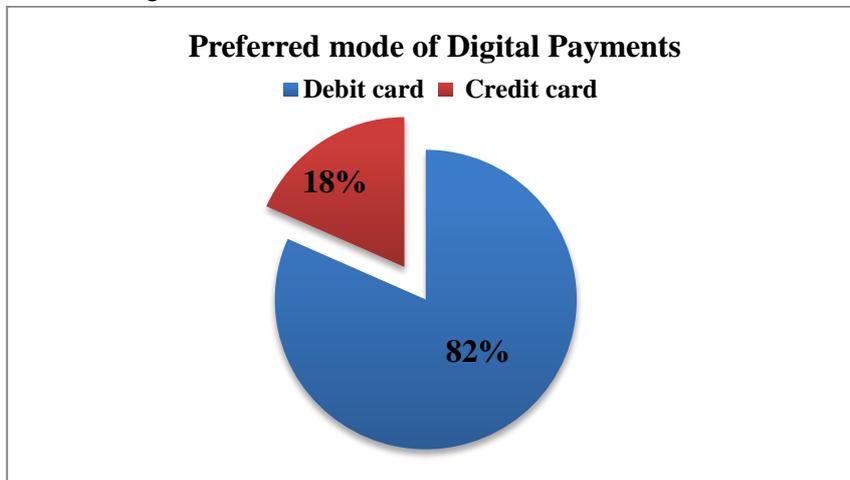

Figure 4: Two most preferred modes of Digital Payments

The respondents making payments via Digital mode stated that convenience followed by trust are two critical factors out of three factors which motivated them to choose digital payments over traditional mode of payment as shown in Figure 5.
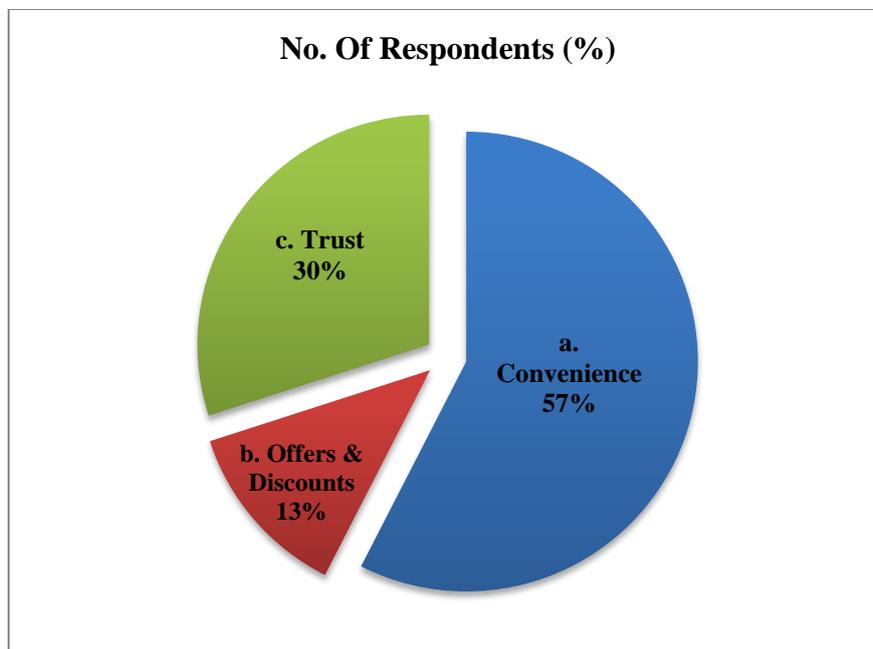

Figure 5: Three prominent factors driving digital payments adoption

Presently as mentioned earlier, citizens have a very limited choice about modes of digital payment at Sampark centers. Other modes will eventually come soon as per the plans of Chandigarh Administration. How ready citizens are to avail other modes, an attempt was made to understand their level of awareness. Lack of awareness on the part of users work as a significant barrier to increasing user opting for digital modes of payments. Proper promotion of government's initiatives therefore

108

should be a part of communication strategy. It has been observed that the extent of use of citizen services and use of digital modes depend on the type of users. The poorer, less educated, less skilled and more vulnerable citizens are the one who make greater demands on government, but also face much greater access barrier via both traditional and electronic channels of payments. However, government, unlike businesses, do not choose their clients and are obliged to serve everyone—regardless of who they are or where they are located.

Awareness about digital payment modes :

An attempt was made to analyse responses collected on citizen's awareness about eleven different digital modes of payments both at aggregated and disaggregated levels. Citizens were simply asked if they are aware about these modes.

Insights into the citizen's awareness can be discerned by responses to the questions testing their knowledge regarding different modes. It has been found that the level of awareness has varied quite a lot as shown in Figure 6.
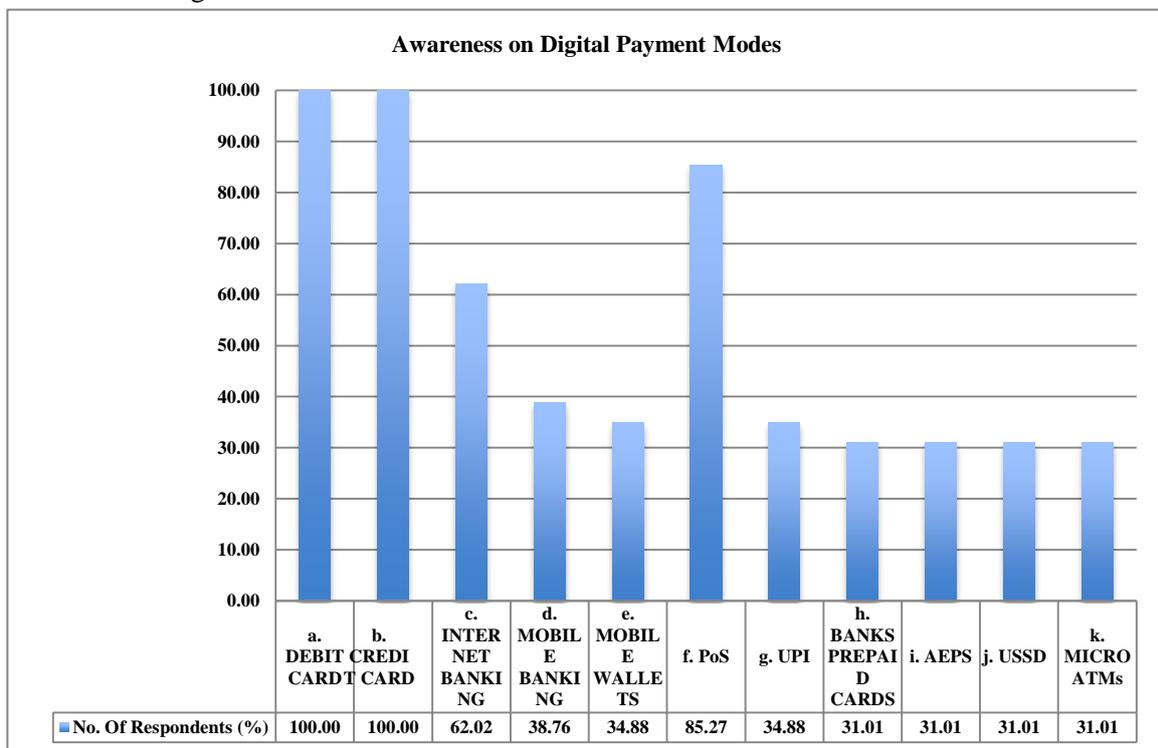

	a. DEBIT CARD T	b. CREDIT CARD	c. INTER NET BANKI NG	d. MOBIL E BANKI NG	e. MOBIL E WALLE TS	f. PoS	g. UPI	h. BANKS PREPAI D CARDS	i. AEPS	j. USSD	k. MICRO ATMs
No. Of Respondents (%)	100.00	100.00	62.02	38.76	34.88	85.27	34.88	31.01	31.01	31.01	31.01

Figure 6: Citizens' Awareness about various digital payment modes

All the respondent citizens are aware about Debit and Credit cards. All of them use ATMs where Debit cards work. More than 85% are familiar with PoS. Internet banking is another mode about which awareness is quite high. Awareness about rest of modes is quite low.

Citizens' Awareness by Socio-Demographic Group

In this section findings about citizen's familiarity about digital modes of payment have been disaggregated with respect to: (i) age; (ii) gender; (iii) educational/professional qualifications; and (iv) profession/ occupation.

Hypothesis 1: There is no significant relationship between age and awareness about modes of digital payment of the respondents.

Table 6: Relationship between age and awareness about modes of digital payment of the respondents (Chi-square test)

	DEBIT CARD	CREDIT CARD	INTERNET BANKING	MOBILE BANKING	MOBILE WALLETS	POINT OF SALE	UPI	BANKS PREPAID CARDS	AEPS	USSD	MICRO ATMs
Df	99	99	97	99	97	97	97	97	97	97	97
Asymp. Sig. (2-sided)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

From Table 6 we can infer that the probability of rejecting null hypothesis is p=.000, is less than the alpha level of significance of 0.05. Hereby, the null hypothesis is rejected. This shows that different age groups have awareness about different mode of payments. Young people are more internet savvy and user friendly.

Hypothesis 2: There is no significant relationship between gender and awareness about different modes of digital payment of the respondents.

Table 7: Relationship between gender and awareness about modes of digital payment of the respondents(Chi-square test)

	DEBIT CARD	CREDIT CARD	INTERNET BANKING	MOBILE BANKING	MOBILE WALLETS	POINT OF SALE	UPI	BANKS PREPAID CARDS	AEPS	USSD	MICRO ATMs
Df	9	9	7	7	7	9	9	7	7	9	7
Asymp. Sig. (2-sided)	.512	.518	.568	.306	.365	.616	.518	.568	.306	.365	.616

From Table 7 we can infer that the probability of the chi-square was more than the alpha level of significance of 0.05 in all cases. Hereby, the null hypothesis is accepted. This shows that gender has no significant effect on the awareness about different modes of payment.

Hypothesis 3: There is no significant relationship between education and awareness about different modes of digital payment of the respondents.

Table 8: Relationship between education and mode of digital payment of the respondents (Chi-square test)

	DEBIT CARD	CREDIT CARD	INTERNET BANKING	MOBILE BANKING	MOBILE WALLETS	POINT OF SALE	UPI	BANKS PREPAID CARDS	AEPS	USSD	MICRO ATMs
Df	99	99	97	99	97	97	97	97	97	97	97
Asymp. Sig. (2-sided)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

From Table 8 we can infer that the probability of chi-square is p=.000, which is less than the alpha level of significance of 0.05. Thus the null hypothesis is rejected. This shows that level of education matters in awareness about different modes of digital payment. Matriculation and above respondents were found more keen to use digital way of payments.

Hypothesis 4: There is no significant relationship between type of profession and awareness about different modes of digital payment of the respondents.

Table 9: showing relationship between profession and awareness about modes of digital payment of the respondents. (Chi-square test)

	DEBIT CARD	CREDIT CARD	INTERNET BANKING	MOBILE BANKING	MOBILE WALLETS	POINT OF SALE	UPI	BANKS PREPAID CARDS	AEPS	USSD	MICRO ATMs
Df	99	99	97	99	97	97	97	97	97	97	97
Asymp. Sig. (2-sided)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

From Table 9 we can infer that the probability of chi-square is p=.000, less than the alpha level of significance of 0.05. Thus the null hypothesis is rejected. This shows that variation in profession has effect on awareness about different modes of digital payment.

Challenges faced by citizens in making digital payments :

Figure 7 shows factors cited by respondents as reasons for non use of various digital modes. From the responses received 91.84 % users believe that digital transactions take more time in processing as compared to cash. Citizens are still habituated to use cash payment, primarily due to its absolute ease of understanding even though it is not most convenient mode of payment. Lack of trust seems to be another factor according to 71.43% respondents. Citizens do not want to try digital payments at e-sampark centers as they are wary of technical issues during transactions. Non availability of relevant infrastructure with the centers and non availability of devices with the citizens are other factors.
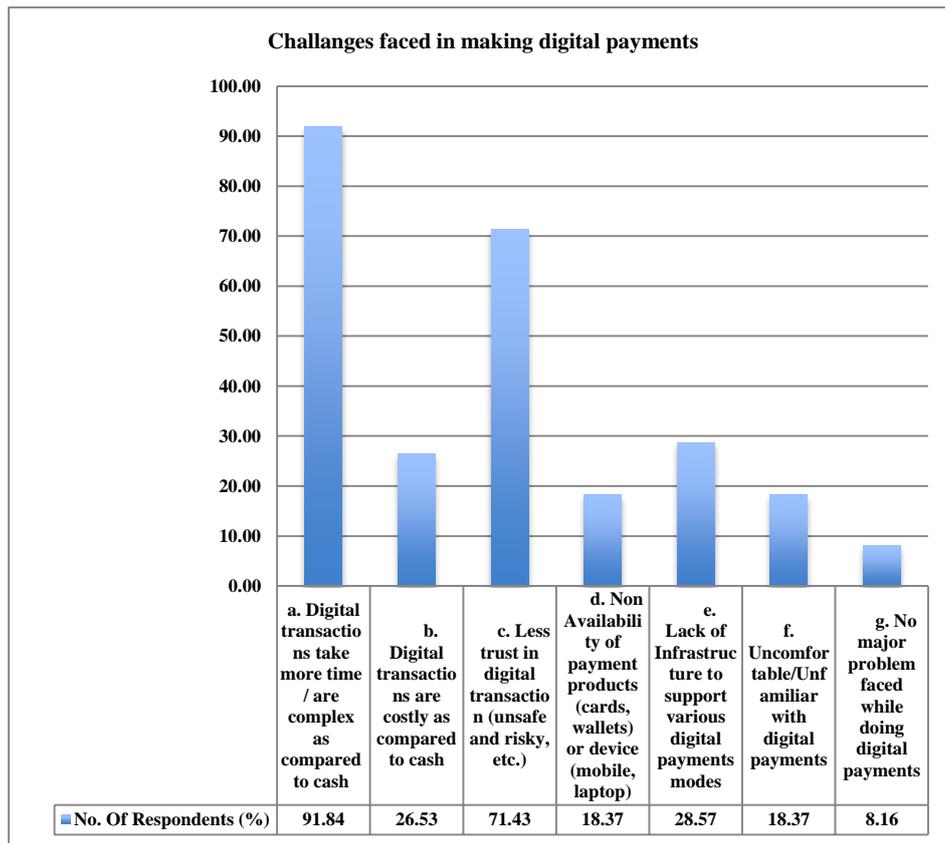
Challanges faced in making digital payments

	a. Digital transactions take more time / are complex as compared to cash	b. Digital transactions are costly as compared to cash	c. Less trust in digital transaction (unsafe and risky, etc.)	d. Non Availability of payment products (cards, wallets) or device (mobile, laptop)	e. Lack of Infrastructure to support various digital payments modes	f. Uncomfortable/Unfamiliar with digital payments	g. No major problem faced while doing digital payments
No. Of Respondents (%)	91.84	26.53	71.43	18.37	28.57	18.37	8.16

Figure 7: Challenges faced by citizens in making digital payments

6. Conclusion and Way Forward

Project e-Smapark has grown in terms of size and service. Now the key focus should be making the centers/services fully digital. In Chandigarh, like rest of the country, high frequency use cases include payment of utility bills in particular electricity bill payment are driving usage of digital payments. Few challenges that need to be addressed in the right manner include interoperable Infrastructure, which would definitely help in increasing the use of digital payments. Digital payment systems are dependent on use of smartphones with data, NFC, Bluetooth etc. dependable and cost effective data and connectivity has to be ensured.

The study suggested that the implementation of m-sampark due to high usage of mobile will be better alternative. Like other faciltiies of paying utility bills online in the city, other services can also be made online for convenience of residents in the city.

Present study has established that demographic factors like age and qualification have impact on awareness about different modes of digital payment. City is an established hub of education and has a high proportion of young population. Citizens willing to avail a transactional service, should a wide range of options about modes of digital payment.
Since Aadhar enrolment in the city is complete. Level of banking developments in city has been quite high, presently Chandigarh has 419 bank branches, 689 ATMs, more than17 lakh debit cards issued. City ranks quite high in the country in terms of per capta digital payment transactions. Per capta income has also been increasing over the years. Chandigarh citizens are showing tremendous affinity to digital technologies. Keeping in view these favourable developments coupled with great advancements in

112

mobile technology, immediate attention be given to make available complete range of digital payment modes in e-sampark centers.

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