



# A partial least squares approach to digital finance adoption

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## Abstract

In present times, the adoption and adaption of technology have become empirical. This paper helps in determining the factors of perceived risk and perceived benefits in order to understand the willingness or hesitance of people to adopt digital finance. An attempt is made to study the influence of perceived risk and benefit as the determinants of digital finance adoption. The data were collected from individuals of Northern India through a structured questionnaire. The study collected data from 411 respondents through a structured questionnaire. Partial Least Square Structural Equation Modelling has been adopted to analyze the data through SmartPLSv2. For better understanding, perceived risk constituted three constructs—Security risk, financial risk and performance risk, and perceived benefit included seamless transaction, economic benefit and convenience. The research concluded that both perceived risk and benefits influence the adoption of digital finance. Perceived benefit has more impact on digital finance adoption than perceived risk. The findings of the paper are beneficial for digital finance service providers and marketers to enhance the awareness and advantages of digital finance according to the needs of consumers. The present study adds value to the existing literature on the relationship between perceived risk, perceived benefit and adoption of digital finance.

**Keywords** Perceived risk · Perceived benefit · Digital finance adoption

## Introduction

Information technology has led to a great amount of development and expansion in the field of Finance. Digital Finance has gained importance in the past few years and is attracting the attention of researchers and industrialists. In the era of industrial and economic growth, adoption and adaption of technology have become of paramount importance (Fu 2014). The availability of financial services online was first referred to as financial technology in the 1990s, whereas, in the 2000s, it was referred to as digital finance or e-finance (Razzaque et al. 2020). Evolution of Fintech from automated teller machines, credit cards to mobiles and app services have been remarkable in the financial sector (Gomber et al. 2017).

Demonetisation in India in 2016 led to the acceleration of the adoption of digital payments due to the low circulation of cash in the economy (Frakman 2020). The penetration of digitization in the financial industry was further backed by the Covid-19 (Arner et al. 2020). The 2008 crisis was a financial crisis, whereas the Covid-19 pandemic is a health crisis that impacts the financial sector and, therefore, the economy. Digital financial services, mainly digital wallets, can quickly and accurately send funds to those in need (Arner et al. 2020). The covid-19 pandemic has brought attention to digital financial services due to the increasing pressure of social distancing (Agur et al. 2020). Fu and Mishra (2020) documented the spurt of digitization in the financial sector by considering the early impact of Covid-19 spread on fintech adoption globally. Therefore, the study has included the adoption behaviour of individuals post the early stage of covid-19 in digital finance.

In the present times, consumers require a convenient and cost-effective way to access financial services. As the young generation is more inclined to use technology, including the internet and digital platforms, consumers are moving towards digital finance. However, consumers are still reluctant to disclose their personal information as well as

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financial information on online platforms. According to Agarwal et al. (2017), two factors will determine the successful implementation of digitalization. First, the adoption of digital solutions by the low-income segment group, which are governed by access and usage of mobiles, credit, banking services and digital literacy. Second, the willingness of users to adopt digital finance continuously for financial transactions, given awareness of all the options available. One of the key components of determining the country's growth is the acceptance and adoption of technology by its citizens. With the Innovation and advancement in the technology sector, finance technology has become the new normal.

There has been a significant increase in the per cent of adoption of Fintech by consumers from 16% in 2015, 33% in 2017, to 64% in 2019. Awareness of Fintech is relatively high among the consumers, including the non-adopters. Fintech has evolved in a manner where consumer expectations have become significant (Ernest & Young, 2019). Although financial technology has attracted a great number of users, the continuance usage of digital finance is still a question. Some users are doubtful in continuing the use of digital finance due to considerable risks. Users want to determine if the usage of digital financial services will be more beneficial or will it cause more risks. A consumer will only adopt digital finance if its benefits outweigh the risks involved. In order to determine the continuous usage of digital finance, it is empirical to identify the factors that will boost the use of digital finance. According to McKinsey Global Institute (MGI) report, mobile phones will facilitate as a game-changer in digital finance. The cost of financial services can be reduced up to 80–90% with the help of mobile payments (Thomas and Hedrick-Wong 2019).

In order to enhance and improve the understanding of behaviour behind the adoption of digital finance, it is empirical to investigate the determinants that influence the adoption of new technology in order to understand the technological changes (Bergek et al. 2008). The following research questions have been framed:

1. Does the user's perception of risk influence the adoption of digital finance?
2. Does the user's perception of benefit influence the adoption of digital finance?
3. What factors specifically influence the user's intention to adopt digital finance?

Earlier studies have recognized the factors of behavioural intention in the adoption of various financial services (Meyliana et al. 2019; Yang et al. 2015; Gerlach and Lutz 2019; Tiong 2020). However, very few studies include both factors, i.e., perceived benefits and perceived risks, to determine the adoption of digital finance. There are a limited number of studies that explore the adoption of digital finance.

Therefore, this study also focuses on overcoming this research gap. This paper will focus on bridging the research gaps, where the impact of both perceived benefits (positives) and perceived risks (negatives) will be determined on the adoption of digital finance.

The following are the additions to the literature that this study intends to make. The research aims to broaden the scope of the adoption decision by explicitly incorporating both positive (perceived benefit) and negative (perceived risk) elements at the same time by addressing early stage covid-19 impact in adoption behaviour as the data was collected after the early stage of covid-19 pandemic. Second, using the net valence framework, this research can assist practitioners to better understand benefit and risk perceptions, which can be utilized to build benefit-increasing and risk-reducing methods to boost digital finance adoption. Finally, our findings give Fintech companies useful insight into which issues should be addressed or avoided when providing digital financial services to their customers. The remaining part of the paper is followed by the literature review, hypothesis formulation, research methodology, results, analysis and conclusion.

## Literature review and hypotheses formulation

### Literature review

#### Risk–benefit framework

Judgements of Risk and Benefits are inversely related. The higher the value of perceived risk, the lower is the value of the perceived benefit and vice versa (Alhakami and Slovic 1994). While making a decision, a consumer is faced with uncertainties and hesitation (Kim et al. 2008). Therefore, risk perception is an important factor in analyzing adoption behaviour. Perceived benefit also has a significant role in analyzing adoption behaviour (Wilkie and Pessemier 1973). The researcher emphasized that the consumers will have both negative and positive outlooks while considering adopting new technology. Thus, (Peter & Tarpey, 1975) postulated a net-valence framework. The framework assumes that consumers will only adopt a new service/ product when it is most beneficial or desirable. The present research combines TRA theory with the net-valence framework. The Theory of Reasoned Action (TRA) theory postulates that people can execute their behaviour as they have reasons or opportunities to control their behaviour (Ajzen and Fishbein 1977; Staats 2004). According to the theory, individuals could also govern their behaviour if given specific causes or incentives (Staats 2004). Perception is vital in determining an individual's intention to embrace or use digital financial



services. Risks and advantages, in particular, may be considered behavioural elements in defining a person's behaviour intention (Jurison 1995). There are few studies that have studied the factors or the benefit-risk framework that have an impact on the adoption of E-finance services (Ryu 2018; Abramova and Böhme 2016; Liu et al. 2012; Lee 2009). Every study has explained perceived risk and perceived benefits as multidimensional factors.

Ryu (2018) studied willingness and hesitance of users in the adoption of financial technology. It explained perceived benefits by categorizing it into three factors—economic benefit, seamless transaction and convenience. Perceived risks were classified into four factors—legal risk, financial risk, security risk and operational risk. Further, the study also included how user type can impact the adoption of financial technology. The research highlighted that legal risk is a dominant factor in influencing the continuous intention of Fintech. While convenience is a consistent factor that plays a significant role in influencing perceived benefit. It was also concluded that differences between perceived benefit and risk influence early and late adopters. Abramova and Böhme (2016) researched the determinants and drivers for the adoption of Bitcoin. The researchers integrated perceived risks and perceived benefits with the technology acceptance model. The factors of perceived benefits included—seamless transaction, security and control, and decentralization and components of perceived risks included—financial losses, legal risk, operational risk, and adoption risk.

Liu et al. (2012) explained three variables, i.e., perceived benefits, perceived risks and the perceived value that influence the adoption of mobile payment technology. Perceived risk constituted factors, namely -financial risk, privacy risk and psychological risk, whereas perceived benefits and perceived value were taken as single dimension factors. The study emphasized that financial risk is the most influential variable of perceived risk to influence the adoption of mobile payments. Lee (2009) proposed an integrated model to explain the user's intention to adopt internet banking. The researcher studied perceived risk and benefit and integrated them with both the technology acceptance model and the theory of planned behaviour. Perceived risk consisted of five factors—financial, security/privacy, performance, social and time risk, while perceived benefit was taken as a single construct. Security Risk has been revealed as the most important indicator to influence the adoption of online banking, whereas the perceived benefit has been concluded to be the most positive influencing inhibitor on intention to use online banking.

### Perceived risk and its determinants

Perceived risk refers to negative outcomes or uncertainty for the usage of any service or product (Featherman and Pavlou

2003). It has been outlined as “a combination of uncertainty plus seriousness of outcome involved” (Bauer 1967). There are a few studies that examined perceived risk to adopt e-finance or e-services (Alalwan et al. 2018; Martins et al. 2014; Safeena et al. 2011).

Fernando (2019) researched the impact of trust and risk on the adoption of fintech services. It has been concluded by the researcher that trust positively influences the adoption of Fintech. In contrast, the risk does not impact the adoption of Fintech, which further does not influence the attitude of users. Yang et al. (2015) discussed that uncertainties about financial transactions and risk towards them have caused resistance among consumers to adopt online payments. The research explored perceived risk and trust as the two major contributors that could impact online payment adoption. The researcher bifurcated perceived risk into systematic perceived risk and transactional perceived risk. It was concluded that systematic risk has a positive impact on trust, whereas transactional risk negatively influences trust. Im et al. (2008) explored four moderating variables, i.e., perceived risk, user experience, gender and technology type, to examine their impact on behavioural intention. The researcher concluded that all four variables were significant as moderating factors.

Further, perceived risks have been categorized into six items, i.e., financial risk, performance risk, safety risk, social risk, psychological risk and time risk. Cunningham (1967). While transferring these risks to the current study and based on the literature review, three types of perceived risks have been developed—1. Financial risk, 2. Security Risk and 3. Performance Risk. Financial Risk refers to financial loss due to financial transaction error or misuse of the bank account (Kuisma et al. 2007; Forsythe et al. 2006). Security Risk is defined as the monetary loss that can be caused due to fraud or hacking the protection or security of the financial transaction. In addition to fraud and hacking, consumers are also concerned about identity theft and privacy intrusions (Lee 2009). Performance Risk refers to any glitch in the functioning of the servers that cause a delay in financial transactions and lead to financial losses (Kuisma et al. 2007).

### Perceived benefits and its determinants

Perceived benefits refer to positive outcomes in reaction to threats (Chandon et al. 2000). Zhao and Bacao (2021) aimed at examining mental and technological factors that will impact the intention of consumers in adopting M-payment during the Covid-19 pandemic in China. The research highlighted that constructs like perceived benefits, social influence, performance expectancy, perceived security, and trust significantly influence users' adoption of M-payment. The study focussed on antecedents of m-payment and concluded that there existed a causal relationship between trust, social



influence determining perceived benefits. Further, trust and effort expectancy influenced performance expectancy. Wong et al. (2021) investigated the impact of perceived benefits and harms of the Covid-19 pandemic on the well-being of the family and their connotation on sociodemographic aspects in adults. The study highlighted that the influence of both perceived benefits and harm were under control, after the two waves of Covid-19, on family well-being. The difference in Sociodemographic aspects were more in perceived benefits than harms. Okazaki and Mendez (2013) examined perceived convenience, extrinsic variables (speed, simultaneity and speed), intrinsic variables (interface design and portability) and ease of use to determine their impact on the adoption of mobile commerce. The study also included gender as the moderating factor. Ease of use and interface design motivated females more than men to adopt mobile commerce.

The study, based on the literature review, proposes three perceived benefit factors, i.e., Seamless transaction, convenience and economic benefits. Seamless transactions refer to simple and speedy transactions while avoiding the traditional financial institution (banks) by the users (Chishti 2016). Convenience is driven by easy accessibility and is defined as flexibility in time and location, which is most important for the success of mobile and online services. Kim et al. (2010). The economic benefit helps in cost-effectiveness and financial gains (Ryu 2018).

### Digital finance

Digital Finance illustrates the digitalization of the finance industry. It is defined as financial services delivered via credit cards, electronic exchange systems, internet banking, home trading services, mobile payments, and online loans (Bank 2001; Li et al. 2019). Mobile phones, the internet and cards are a few ways through which financial services can be provided (Manyika et al. 2016). Digital finance comprehends not only financial products but also financial businesses, finance-related software. It further includes forms of customer communication and interaction, which is delivered by innovative financial service providers and FinTech companies (Gomber et al. 2017). To assess digital financial services, a user needs a few components—A digital platform, a retail agent and the device (CGAP 2015). Digital Finance users should have an existing bank account with sufficient balance to make a withdrawal or receive payments through mobile phones, computers or internet service (Ozili 2018).

Digital finance could be a useful instrument for getting resources to the people who need them the most swiftly and efficiently (Arner et al. 2020). Traditional crisis management objectives can now be achieved with greater potency and accuracy using digital financial technologies (Arner et al. 2016). Digital finance delivers vital technologies that can

be extremely useful, but it also introduces new types of risk (Buckley et al. 2020). The digital expansion increases the danger of crime, with digital crime being the fastest-growing type of crime. People have been obligated to use digital financial services and payment networks as part of the online commercial sector due to Covid-19 (Arner et al. 2020). Digital financial services have the potential to improve the share of the people engaging in the formal financial system in less developed nations, particularly among rural areas with limited access to banking and financial services (Finau et al. 2016). FinTech enterprises and creative financial service providers supply a slew of new financial products, financial businesses, finance-related software, and unique ways of client communication and interaction under the banner of digital finance. In light of this, financial and information systems research have begun to examine these shifts and the influence of digital advancements on the financial industry (Gomber and Koch 2017).

Digital Finance has some advantages. Such as, it leads to expansion of financial services to individuals and heads to financial inclusion. Second, Digital Finance provides convenient and affordable banking services to individuals. It can help in moving from a cash-based economy to digitalized economy. Third, it helps provide a varied range of financial products to individuals, which further helps in boosting the Gross Domestic Product of the country. Fourth, the adoption of digital finance can lead to a reduction in the circulation of fake money. Other benefits include quick financial decision making, control over personal financial records and receiving or making payments in a few seconds by the users of digital finance services. Digital Finance also has some disadvantages. For Instance, the user needs to have a digital device with an internet and bank account to take advantage of digital finance. In the digital finance, data can easily be breached, which further reduces the customer's trust to adopt digital finance platforms. Another disadvantage of digital finance is that it is fee-based. Therefore, the benefits of digital finance will be high in high and medium-income earners, whereas poor and low-income earners will not be able to afford the financial services (Ozili 2018).

Featherman and Pavlou (2003) explained how e-services have been increasingly gaining popularity amongst the consumers, and so the researcher analyzed the consumers potential to adopt these e-services. The study identified that performance-based risks are a major concern, while perceived ease of use helps in reducing these risks. Therefore, it concluded that performance, financial, time and privacy risks are major risk concerns for the adoption of e-services. Gerlach et al. (2019) demonstrated prospective variables that will impact the present usage as well as future usage of adopting Fintech and digital finance solutions. The research attempted to explain behavioural intention as a dependent variable and Perceived risk (Financial risk, Security risk,



Legal risk and Operational risk), Perceived benefits (Economic benefits, seamless transactions and convenience) as independent variables. The study also focussed on independent constructs like performance expectancy, social influence, effort expectancy, facilitating conditions, price value, hedonic motivation and habit. The study intends to determine the past and present usage behaviour with future usage behaviour of Fintech and digital finance solutions. Aisaiti et al. (2019) explored inclusive finance and analyzed perceived risk, perceived benefits and knowledge of inclusive finance. The researcher considered digital finance and social embeddedness as moderating variables for analyzing the adoption intention of inclusive finance. The researcher concluded that perceived risk has a negative influence, and perceived benefit has a positive influence on the adoption intention of inclusive finance. The study also highlighted that social embeddedness lowered the impact of perceived risk and increased the influence of perceived benefits on ordering finance. Whereas digital finance as a moderating factor supported the impact of perceived benefits on the intention to adopt Inclusive Finance. Finau et al. (2016) explored the deterrents and benefits of digital financial services in Fiji rural areas. Both perceived risk and benefits were considered while analyzing the adoption behaviour. According to the findings of (Königsheim et al. 2017), financial expertise and risk tolerance are highly connected with the likelihood of using digital financial services.

### Hypotheses formulation

The significance of perceived risk has been gained in Consumer and IT literature. It has been described as a barrier in intention to adopt digital finance. Previous studies have established a negative relationship between perceived risk and IT services adoption (Abramova and Böhme 2016; Ryu 2018; Benlian and Hess 2011; Farivar and Yuan 2014; Lee 2009). Thus, the first hypothesis has been framed as:

*H<sub>1</sub>*: Perceived Risk negatively influences Digital finance adoption.

Perceived benefits have always been a motivator in IT services adoption for consumers (Kim et al. 2008; Melewar et al. 2013). Previous literature has emphasized the positive relationship of perceived benefit and IT services adoption (Abramova and Böhme 2016; Ryu 2018; Benlian and Hess 2011; Farivar and Yuan 2014; Lee 2009). Abramova and Böhme (2016) in their study established a positive relationship between perceived benefits and bitcoin usage. Hence, the second hypothesis has been framed as:

*H<sub>2</sub>*: Perceived Benefit positively influences Digital finance adoption.

Three indicators of perceived risks have been identified for the adoption of digital finance—financial risk, performance risk and security risk. A positive relationship between

the financial risk (Benlian and Hess 2011; Melewar et al. 2013), security risk (Lwin et al. 2007) and perceived risks (Ryu 2018). A positive relationship has also been established between performance risk and perceived risks (Lee 2009). Thus, the following hypotheses have been framed:

*H<sub>3</sub>*: Financial risk is associated with perceived risk.

*H<sub>4</sub>*: Security risk is associated with perceived risk.

*H<sub>5</sub>*: Performance risk is associated with perceived risk.

Further, perceived benefits have also been classified into three factors, namely- convenience, seamless transactions and economic benefits. A positive relationship between convenience (Kim et al. 2010), economic benefit (Mackenzie 2015), seamless transaction (Chishti 2016) and perceived benefits have been established (Ryu, 2018). Hence, the following hypotheses have been generated for the study:

*H<sub>6</sub>*: Economic benefit is associated with perceived benefit.

*H<sub>7</sub>*: Seamless transaction is associated with perceived benefit.

*H<sub>8</sub>*: Convenience is associated with perceived benefit.

## Research methodology

### Data collection and sample design

The study is based on a quantitative approach to identify the risks and benefits of the adoption of digital finance, so the research is entirely based on primary data. The questionnaire has been chosen as a method to collect data for geographically scattered population. (Robson and McCartan 2016). The data have been collected from Northern regions of India, including Amritsar, Jalandhar, Delhi, Noida, Ghaziabad, Faridabad, Ludhiana, Gurgaon, Ambala, Chandigarh and Panipat. Due to the ongoing pandemic, purposive sampling has been used to collect the responses via digital platforms. The minimum sample size was estimated with the help of G\* power software (Faul et al., 2009). The sample size was estimated at 159 respondents at 0.80 power with 95% confidence level. Out of the 500 questionnaires distributed, the responses were received from 433 respondents. About 411 responses were accepted for the final analysis as the remaining respondents were excluded due to missing values and outliers. The response rate is acceptable, as suggested by (Nuttly 2008). The Smart PLS 2.0 software has been used to conduct the analysis of the final data.

### Measurement of variables

The proposed model consists of nine variables adapted from previous studies. The items, however, were altered according to the need of the study. The structured questionnaire was created using a five-point Likert scale, and the responses were analyzed using partial least squares—structural equation



**Table 1** Construct and their sources

Constructs	No. of Items	Source
Perceived Risk	3	Kim et al. (2008) and Benlian and Hess (2011)
Financial Risk	3	Featherman and Pavlou (2003) and Lee (2009)
Security Risk	3	Featherman and Pavlou (2003) and Lee (2009)
Performance Risk	3	Featherman and Pavlou (2003) and Lee (2009)
Perceived Benefit	4	Kim et al. (2008) and Benlian and Hess (2011)
Economic Benefit	3	Featherman and Pavlou (2003) and Lee (2009)
Seamless Transaction	3	Chishti (2016)
Convenience	3	Okazaki and Mendez (2013)
Adoption of Digital Finance	3	Cheng et al. (2006) and Lee (2009)

modelling (PLS-SEM). The link between the variables was investigated using the smartPLSv2.0 software. PLS-SEM is a second-generation exploratory technique for determining the effect of exogenous variables on the endogenous variable (Hair et al. 2012, 2019, Reinartz et al. 2009).

The survey was influenced and composed by undertaking an extensive literature review. Perceived Risk and Perceived Benefit was inspired by Kim et al. (2008), Benlian and Hess (2011). Whereas constructs like an economic benefit, financial risk and security risk were influenced by Featherman and Pavlou (2003), Lee (2009). Other variables like performance risk (Featherman and Pavlou 2003; Lee 2009), Seamless transaction (Chishti 2016) and Convenience (Okazaki and Mendez 2013) are adapted from respective literature. The dependent variable, i.e., Adoption of digital Finance, has been influenced and adapted from the works of researchers, namely (Cheng et al. 2006; Lee 2009). Some of the independent variables included, i.e., financial risk, security risk, perceived benefit, and convenience, have together been included in the research paper (Gerlach et al. 2019). The summary has been displayed in Table 1.

## Results

### Demographic profile

Table 2 summarises the demographic profile of the survey respondents. Among the respondents, 223 were males, and 188 were females. Most of the respondent's ages varied between 25 and 35 years, constituting 34.1%, followed by 45–55 years with 28%. The others constituted 24.3% (35–45 years), 10.7% (55 years and above) and 2.9% (18–25 years). The majority of the respondents were either graduates or post-graduates. The respondents were asked which type of digital finance was mostly used by them. Digital Finance was bifurcated into five categories, i.e., Internet Banking, Mobile Banking, Mobile wallets, Credit cards and Debit cards. Internet banking was the most used,

**Table 2** Demographic information

Characteristics	Frequency	Percentage (%)
Gender		
Male	223	54.30
Female	188	45.70
Age		
18–25 years	12	2.90
25–35 years	140	34.10
35–45 years	100	24.30
45–55 years	115	28.00
Above 55 years	44	10.70
Educational Qualification		
High School	14	3.4
Diploma	70	17.00
Graduate	165	40.10
Post-graduate	129	31.4
PhD	33	8.00
Most Digital Financial services used		
Internet Banking	118	28.70
Mobile Banking	117	28.50
Mobile Wallets	39	9.50
Credit Cards	38	9.20
Debit Cards	99	24.10

whereas Credit cards were the least used form of digital finance by the respondents.

Further, the data were first checked for any missing values or outliers with the help of SPSSv25. The analysis of data through measurement model and structural model was done on SmartPLSv2.0. The measurement model implies the relationship between the latent variables and their consisting variables, whereas the structural model will help determine the cause and effect relationship between the dependent and independent variables. SmartPLS was chosen for its appropriateness for hypothesis testing and explaining the relationship among the variables (Chin 1998).



## Measurement model

The measurement model was first examined for multivariate normality. The web software was used to check the normality of data through multivariate kurtosis and skewness (Cain et al. 2017; Mardia 1970). The results signified that the data lacked multivariate normality as the  $P < 0.05$  for kurtosis and skewness. Thus, PLS-SEM was chosen for analyzing the data (Hair, Risher, Sarstedt, & Ringle, 2019). Further, the data were checked for common method bias. According to Podsakoff et al. (2003), a single factor should not account for a variance of more than 50% for model assessment. The concern for common method bias was eliminated since its value for the present analysis was established at less than 50%.

Three parameters of validity and reliability were chosen to assess the reflective measurement model, i.e., indicator reliability, convergent validity and discriminant validity (Coltman et al. 2008; Hair et al. 2011). The values of outer loadings were more than 0.7, as shown in Table 3. Therefore indicator reliability is justified. Further, the convergent validity of the model was evaluated through internal consistency

(Cronbach Alpha) (rho Alpha), Composite Reliability (CR) and Average Variance Extracted (AVE) (Barclay et al. 1995). The internal consistency was verified through the values of Cronbach Alpha and rho alpha which were all above 0.7 (Nunnally and Bernstein 1994; Henseler et al. 2015). The values of composite reliability were all higher than 0.7, and so the data is reliable. AVE is also above the value of 0.5 (Bagozzi and Yi 1988), so the data has been approved for convergent validity.

The Discriminant Validity was verified through the values of the square root of AVE and its comparison with the inter-correlation of constructs with other measures (Fornell and Larcker 1981). The values on the diagonal in Table 4 represented the square root of AVE, and the values off-diagonal represented the inter-correlation between the constructs. Since the value of the square root of AVE was greater than the inter construct correlation, discriminant validity was proven, reasoned that (Fornell and Larcker 1981) is not adequate for determining the discriminant validity. Thus, The Discriminant Validity was verified through the values of the Heterotrait–Monotrait ratio (HTMT). All the values

**Table 3** Indicator reliability, internal consistency and convergent validity of measurement model

Constructs	Items	Outer Loadings	Cronbach Alpha	rho Alpha	CR	AVE
ADF	ADF1	0.95	0.926	0.938	0.953	0.871
	ADF2	0.92				
	ADF3	0.93				
CONV	Conv1	0.91	0.905	0.908	0.94	0.84
	Conv2	0.93				
	Conv3	0.91				
EB	EB1	0.93	0.863	0.868	0.917	0.787
	EB2	0.83				
	EB3	0.90				
ST	ST1	0.90	0.872	0.888	0.921	0.795
	ST2	0.89				
	ST3	0.89				
PB	PB1	0.90	0.869	0.879	0.91	0.718
	PB2	0.81				
	PB3	0.86				
	PB4	0.82				
FR	FR1	0.91	0.903	0.906	0.939	0.837
	FR2	0.90				
	FR3	0.93				
SR	SR1	0.94	0.909	0.909	0.943	0.847
	SR2	0.90				
	SR3	0.93				
PERF R	PERFR1	0.88	0.876	0.911	0.923	0.799
	PERFR2	0.91				
	PERFR3	0.90				
PR	PR1	0.92	0.901	0.901	0.938	0.835
	PR2	0.89				
	PR3	0.94				



**Table 4** Discriminant validity

	ADF	Conv	EB	FR	PB	PR	Perf R	SR	ST
ADF	0.93								
Conv	0.57	0.92							
EB	0.48	0.6	0.89						
FR	-0.51	-0.49	-0.46	0.91					
PB	0.55	0.67	0.83	-0.53	0.85				
PR	-0.48	-0.53	-0.49	0.63	-0.55	0.91			
Perf R	-0.33	-0.44	-0.46	0.72	-0.53	0.71	0.89		
SR	-0.52	-0.48	-0.46	0.72	-0.51	0.62	0.59	0.92	
ST	0.66	0.77	0.68	0.52	0.71	-0.55	-0.44	-0.49	0.89

**Table 5** HTMT ratio

	Conv	DF	EB	FR	PB	PR	PerfR	SR	ST
Conv									
DF	0.622								
EB	0.684	0.523							
FR	0.543	0.554	0.512						
PB	0.746	0.586	0.756	0.582					
PR	0.589	0.524	0.554	0.7	0.623				
PerfR	0.484	0.358	0.522	0.804	0.611	0.78			
SR	0.527	0.558	0.521	0.79	0.561	0.683	0.649		
ST	0.76	0.731	0.768	0.58	0.796	0.613	0.485	0.54	

**Table 6** Multicollinearity examination

Constructs	VIF values
CONV	2.710
EB	3.466
FR	2.989
PB	4.160
PR	2.565
PERF	2.773
SR	2.341
ST	3.214

**Table 7** Hypothesis testing

Hypothesis	Path coefficients	T Statistics	P-value	Decision
Conv → PB	0.17	2.02	0.05	Supported
EB → PB	0.63	6.57	0.05	Supported
FR → PR	0.09	0.71	0.05	Not Supported
PB → ADF	0.4	3.90	0.05	Supported
PR → ADF	-0.26	2.66	0.05	Supported
Perf R → PR	0.49	4.00	0.05	Supported
SR → PR	0.27	2.21	0.05	Supported
ST → PB	0.15	1.23	0.05	Not Supported

were found to be under the limit of 0.85, as shown in Table 5 (Henseler et al. 2015).

## Structural model

The structural model was assessed through collinearity examination, the significance of the structural model and coefficient of determination ( $R^2$ ) (Cohen 1988). Variance Inflation Factors (VIF) was used to determine the multicollinearity among the constructs (Henseler et al. 2009; Hair et al. 2012). The values obtained for VIF through SPSSv25 with latent variable scores were below the value of 5, as shown in Table 6. Therefore, it is ensured that there is an absence of multicollinearity (Hair et al. 2012). Since the values of collinearity were justified, we can say that the

relationship between the constructs was significant. The test of significance of constructs in the model was done through PLS-SEM bootstrapping algorithm. Using the original cases, a random sample of 5000 cases was generated to test the significance of the relationship between the construct (Henseler et al. 2009; Hair et al. 2012). The results are shown in Table 7. Figures 1, 2 displays the hypothesis testing. Post hypothesis testing, the calculation of the coefficient of determination ( $R^2$ ) was done and was found to be satisfactory (Cohen 1988) and has been recorded in Table 8.

The model was also examined for good fit using standardized root mean square residual (SRMR), Normed fit index (NFI) and RMS theta. The SRMR value has been





Fig. 1 Research model

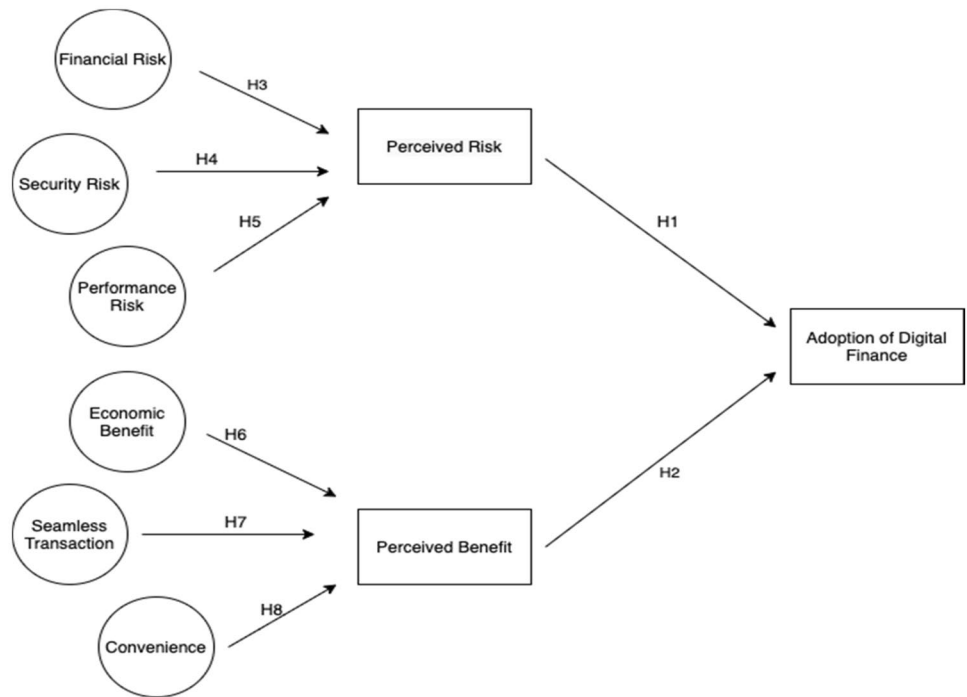
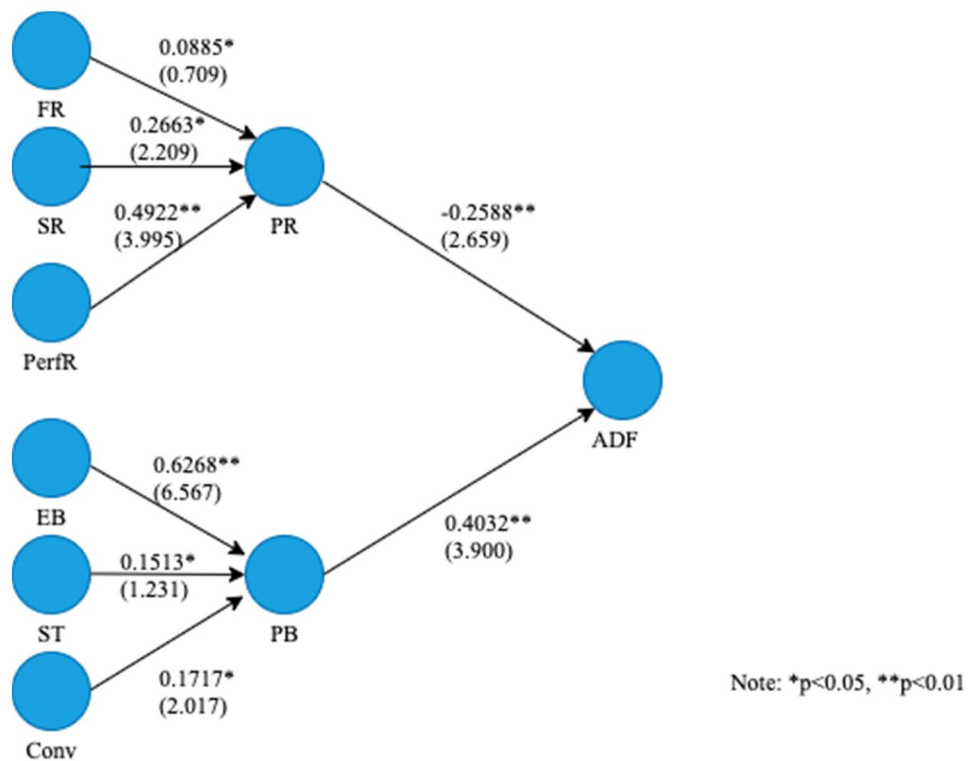


Fig. 2 Path coefficients and structural model



prescribed to be below the critical threshold limit of 0.08 (Henseler, et al., 2014; Hair et al., 2020). The value found

was 0.073, which indicates that the model is a good fit. NFI has been reported at 0.844 and RMS theta at 0.133.



**Table 8** R<sup>2</sup> value

Variables	Coefficient of Determination (R <sup>2</sup> )
PB	0.74
PR	0.57
ADF	0.35

## Discussion and implications

### Discussion

PLS-SEM bootstrap algorithm was used to analyze the relationship among the constructs. The results showed that perceived risk had a negative impact on the adoption of digital finance and that perceived benefit had a positive impact on the adoption of digital finance. Therefore, H<sub>1</sub> (t = 2.66,  $P < 0.05$ ) and H<sub>2</sub> (t = 3.90,  $P < 0.05$ ) were supported. The results also concluded that perceived benefit had more influence on the adoption of digital finance than perceived risk. Therefore, respondents are willing to adopt digital finance. The perceived risk was further examined with the help of three variables which are- financial risk, performance risk and security risk. The study concluded that respondents find digital finance risky in terms of performance and security as it had a positive impact on perceived risk. Therefore, H<sub>4</sub> (t = 2.21,  $P < 0.05$ ) and H<sub>5</sub> (t = 4.00,  $P < 0.05$ ) were supported. Whereas respondents did not confirm the association of financial risk with perceived risk. Hence, H<sub>3</sub> (t = 0.71,  $P > 0.05$ ) was not supported. Variance in perceived risk was 57% explained by performance risk, security risk and financial risk.

Further, the results concluded that convenience and economic benefits positively impacted perceived benefits, which means that respondents found digital finance convenient and economically beneficial. So the study supported H<sub>6</sub> (t = 6.57,  $P < 0.05$ ) and H<sub>8</sub> (t = 2.02,  $P < 0.05$ ). The respondents did not associate the seamless transaction with perceived benefit, which signified that respondents

did not see seamless transactions as a benefit associated with digital finance. Therefore, H<sub>7</sub> (t = 1.23,  $P > 0.05$ ) was not supported. The summary of hypotheses testing are displayed in Table 9. The total variance in perceived benefit was 74%, explained by convenience, seamless transaction and economic benefit (Table 10).

The research confirms the role of security and performance risk in perceived risk. Economic benefit and convenience contribute towards perceived benefit. Therefore, the study concluded that perceived risk and benefits play a major role in adopting Digital Finance. The weak association between financial risk and perceived risk contradicts the result of (Liu et al. 2012; Luo et al. 2010; Abramova and Böhme 2016). The strong association of economic benefit with perceived benefits is in accordance with the results of Gerlach et al. (2019). Perceived risks and benefits contributed to 35% of the variance in the adoption of digital finance. The findings of the study are in accordance with (Liu et al. 2012; Abramova and Böhme 2016; Lee 2009; Ryu 2018), which established the role of perceived risk and benefits experienced by people in terms of adoption of technology.

### Theoretical implications

The present study provides insights into how the risks and benefits affect the adoption of digital finance among

**Table 10** IPMA table

Constructs	Importance	Performances
Conv	0.069	56.853
EB	0.253	52.07
FR	0.023	46.003
PB	0.403	52.943
PR	0.259	47.67
PerfR	0.127	49.955
SR	0.069	44.74
ST	0.061	56.475
Mean	0.158	50.839

**Table 9** Summary of hypothesis testing

Hypotheses	Decision
H <sub>1</sub> : Perceived Risk negatively influences Digital Finance adoption	Accepted
H <sub>2</sub> : Perceived Benefit positively influences Digital Finance adoption	Accepted
H <sub>3</sub> : Financial risk is associated with perceived risk	Not Accepted
H <sub>4</sub> : Security risk is associated with perceived risk	Accepted
H <sub>5</sub> : Performance risk is associated with perceived risk	Accepted
H <sub>6</sub> : Economic benefit is associated with perceived benefit	Accepted
H <sub>7</sub> : Seamless transaction is associated with perceived benefit	Not Accepted
H <sub>8</sub> : Convenience is associated with perceived benefit	Accepted



individuals. The study contributes to the existing literature in the following ways. First, the study considers both benefits and risk to evaluate a comprehensive perception of individuals in the adoption of digital finance. Second, the study has been undertaken after the early stage of the covid-19 pandemic. Since the perception of individuals has changed after the health crisis, the impact has remotely been observed in the responses of the individuals, which makes the study different from the previous studies conducted. Third, the study incorporated multidimensional aspects of perceived risk and benefits. It helps in better decision making by the individuals since both the negatives and positive features have been included.

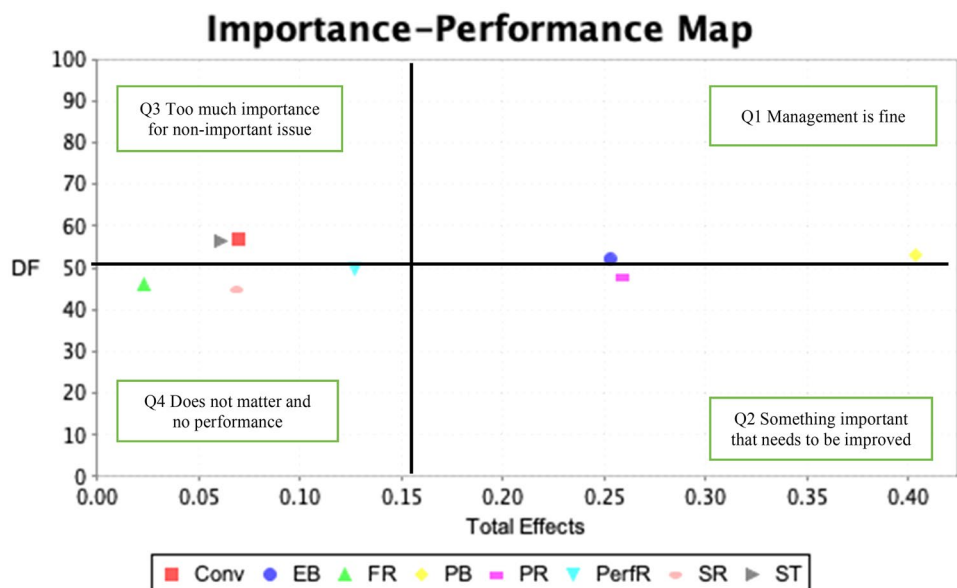
**Practical implications**

Importance Performance Map Analysis (IPMA) was performed to examine the importance and performance of the variables on digital finance adoption as the target variable. By explaining the endogenous target construct’s variation, the IPMA results show which exogenous variable’s total effects are essential (Hair et al., 2018; Ringle and Sarstedt 2016). The results have been displayed in Fig. 3 and Table 9. The results suggest that perceived benefit and economic benefit are of great importance since both the importance and performance of both the variables are high, and thus, are important in explaining digital finance adoption behaviour. Further, the main focus should be on perceived risk as it is a performing variable but is not given enough performance and therefore needs to be proved. Seamless transaction, convenience and performance risk have a smaller total effect on digital finance

adoption and realize moderate performance. Financial risk and security risk have both weak total effects and performance.

On the basis of IPMA results, we recommend that the strategists and policymakers keep on improving the perceived benefits associated with digital finance services. They should provide more factual information on the performance of digital financial services so that consumers have more knowledge of the same. This, in turn, will encourage them to develop a positive perception of digital financial services. As the results suggest, perceived risk plays an important role in the adoption behaviour of digital finance, which should be addressed by the financial service providers so that they can expand their customer base. The marketers should focus on advertising the benefits of digital financial services, especially economic benefits, since it is of great importance and have high performance. Further, more emphasis and value given to the advertisement of advantages will, in turn, help to establish a significant impact of seamless transaction and convenience. In addition to advertisements, face to face interactions with the customers can also help in reducing their risk perception and hesitation as their concerns will be addressed. The promotion of the adoption of digital financial services can help in eradicating fake currency from the economy. It will also help to move towards the goal of financial inclusion. Society can gain from the transparency of the system and have complete trust in digital financial services.

Fig. 3 IPMA



## Conclusion

In this ever-changing environment, information technology in finance is the need for the industry to grow in India. Crucial to the growth of the country, it is pertinent that people use digital finance as it not only helps in easy access to financial records but also helps in reducing the circulation of fake money, contributing to the gross domestic product of the country. Even though people are aware of the available financial services via digital platforms, yet they resist due to some risks or hesitations involved in the adoption of the technology. This study focussed on analyzing both aspects of technology adoption, i.e., perceived risks and benefits. Though, there is still some resistance from people, which should be overcome by the industry so that the adoption rate increases and people trust the process completely.

The study revealed that perceived benefits outweighs the perceived risk in adopting digital finance. This signifies that people are moving towards the adoption of digital finance. The study categorized perceived risk into financial risk, performance risk and security risk; perceived benefits into convenience, economic benefit and seamless transaction for a better understanding of how the users perceive digital finance. Through this study, an individual will have a better understanding of various risks and benefits associated with adopting technology and will be able to access their stand on digital finance.

It is empirical for the fintech industry to understand and work on a risk-free transaction environment in order to sustain and grow in the Indian economy. Therefore, they should work on strategies that would reduce the risks of using digital finance and improve confidence and influence potential users to adopt the technology. The study also gives an insight for financial managers marketing digital finance on which factors to be enhanced or avoided while promoting digital finance to potential users. This will also help the managers efficiently allocate their resources like time, effort and money so that they can improve their services and increase their existing customer base. The companies providing digital finance services should work on reducing risks and make the environment of digital finance stabilized and user friendly for users. The digital finance service providers should understand the target consumers and their concerns while designing new products and services that will cater to their needs and overcome the risks and enhance benefits received from digital finance services.

The present study can be used as a basis for further research in Digital Finance. As the study focussed on specific benefits and risks, other factors can be put into play in order to have a better understanding of individuals behaviour for the adoption of digital finance.

## Limitations and future scope of the study

A significant contribution has been made through the present study, yet the study has some limitations which provide a future scope of research. First, the study addressed a limited set of perceived risk and benefits in the study restraining the literature review. Future studies can include more variables according to the circumstances in the economy. Second, the present study has not included the impact of gender or age on the adoption of digital finance, which can be explored in future studies. Third, as suggested, Covid-19 has played a significant role in expanding digital finance adoption through literature. Therefore, Covid-19 can also be explored as a moderating variable in the studies to quantify the results. Another avenue that can be explored is examining the financially excluded individuals perception of the adoption of digital finance. Finally, the study discussed only the behaviour of individuals, whereas actual usage can also be examined.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1057/s41264-021-00127-8>.

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