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Editorial

Known as the next-generation e-commerce, m-commerce (mobile commerce) which enables buying and selling of goods and services through wireless hand-held devices such as cellular telephone and laptop, has made great strides in Europe, the US and Asia. Despite its fast growth, there are a number of factors hindering its adoption. Shahir Bhatt and Amola Bhatt analyses those factors in the context of India and examines the relationship between them and the demographics.

The relationship between capital formation and gross domestic product has been well established both theoretically and empirically. However, there has been limited research on this relationship in the case of India. B. Venkatraja fills this gap by examining both the short-run and long-run linkages between capital formation and economic growth in India during the period 1970-2013 by using the cointegration econometric tool and vector error-correction model. The study also explores the linear interdependencies between capital formation and economic growth.

The assumption of rationality of investors as posited in traditional finance theories has been questioned. One behavioural trait exhibited by an investor who is not rational is overconfidence. Minimol M. C. enquires into the existence overconfidence among Indian capital-market investors and the impact of that on their trading strategies.

A number of studies have shown that service-quality attributes directly influence customer satisfaction. Similarly, studies have revealed the positive connection between customer satisfaction and customer loyalty. However, studies have not been able to establish a direct link between service quality and customer loyalty. Sameer Sharma, Divya Mittal and Ratan Agarwal review the vast literature in this area to conclude that service quality indirectly influences customer loyalty through customer satisfaction.

This issue also contains a review by Bejoy John Thomas of the book entitled, "The Big Data-Driven Business: How to Use Big Data to Win Customers, Beat Competitors and Boost Profits" by Russel Glass and Sean Callahan, published in 2015.

I would be happy to receive your comments, suggestions and feedback.

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Assessing the Potential Barriers to M-Commerce Adoption in India

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Abstract

In the era of information technology and click-and-mortar businesses, execution of commercial transactions is experiencing a paradigm shift. New-age consumers have shifted to electronic commerce, and with the advent of smart-phone and internet usage on mobile phones, people are gradually tempted to use mobile commerce. In spite of the various benefits offered by mobile commerce, there are various factors which inhibit its adoption. Dearth of relevant research in this area makes the case for this empirical study. Data is collected from 296 respondents using a self-administered questionnaire. Analysis is done using multivariate techniques like factor analysis followed by ANOVA and independent sample t-test. Five factors, namely, unawareness, mobile-device inoperability, personalization, time consumption/ confusion, and cost are found to hinder the adoption of m-commerce. Additionally, it is seen that there is a relationship between unawareness and age, unawareness and educational qualification, personalization and educational qualification, personalization and occupation, and time consumption/ confusion and age.

Keywords: M-commerce, Unawareness, Mobile-device inoperability, Personalization, Time consumption / confusion, Cost.

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1. Introduction

An enormous growth of penetration in mobile devices is noted in research studies (Barnes & Scornavacca, 2004; Dholakia, N., Dholakia, R.R., Lehrer, M., & Kshetri, N., 2004; Massoud & Gupta, 2003). Mobile is now at the heart and soul of communication – from personal communication, mobile commerce, to entertainment and professional networking. Mobile commerce can pose as a solution to issues of productivity and sustainability.

Mobile commerce, which is commonly referred to as m-commerce, has become an imperative in today's business environment (Rottenberg & Sisi, 2002). According to Oxford Dictionary, m-commerce means commercial transactions conducted electronically by mobiles. Investopedia defines mobile commerce as the use of information technologies and communication technologies for the purpose of mobile integration of different value chains and business processes, and for the purpose of management of business relationships. Sadeh (2002) characterizes m-commerce in a similar vein as "the emerging set of applications and services people can access from their Internet-enabled mobile devices." This has been stated more accurately by Chaffey (2009, p. 6) who defines m-commerce as "electronic transactions and communications conducted using mobile devices such as laptops, PDAs, and mobile phones, and typically with a wireless connection".

As per the data released by the Telecom Regulatory Authority of India (TRAI) in December 2014, of the total 237 million internet subscribers in the country, 92 per cent comprise mobile wireless subscribers, which clearly highlights the importance of mobile internet services. According to TechNavio Report (2012), the mobile-commerce market in India is expected to grow at an annual compound rate of 71 per cent over the period 2012-2016. In a different vein, Rackspace Survey released in September 2014 found that while huge numbers of consumers in Asia-Pacific are using their smartphones to browse and purchase items from m-commerce sites, the impact of a poor user experience acts as a deterrent in the adoption of m-commerce. M-commerce can be said to be in the nascent stage. It has a potential to deal with various transactions like mobile banking, mobile ticketing, mobile entertainment, and mobile advertising. Therefore, an extensive research in this area is very much needed (Kao, 2009).

M-commerce is extremely user friendly as it can be used by any individual carrying a mobile-phone, unlike e-commerce, which is not as much felicitous. On one hand, m-commerce is handy and can be used at any point of time, on the other, it also poses a risk as far as security of transactions is concerned. Moreover, since mobiles are used by illiterate segment of customers also, they can also be educated on the usage of m-commerce. However, for this to happen, it is essential that the issues faced by existing customers and the more literate lot be known. Thus, the present study elicits the problems faced by consumers in adopting m-commerce specifically. The results from the study would help the businesses in shaping appropriate strategies to promote their products through m-commerce.

2. Literature Review

2.1 Association between m-commerce and e-commerce

Approaches to association between m-commerce and e-commerce have differed over a period of time. Vrechopoulos, Constantiou, Sideris, Doukidis and Mylonopoulos (2003) consider m-commerce as an extended form of e-commerce based on internet technology that offers services and products through mobile network and device. Feng, Hoegler, and Stucky (2006) went on further to state that m-commerce is more than e-commerce due to its different interaction style, usage pattern and value chain. They also stated that m-commerce is a new and innovative business opportunity with its own unique characteristics and functions, such as mobility and broad reachability. However, Sharma (2009) adapted a very simplistic approach that m-commerce is a subset of e-commerce which includes all e-commerce transactions carried out using a mobile (hand-held) device. He meant that the functionality of m-commerce, as far as the implementation of business transactions is concerned, is the same as that of e-commerce.

2.2 Impact of demographic factors on usage of m-commerce

Alkhunaizan and Love (2013) in their research analyzed the effect of demographical factors (gender, age, and education) on mobile-commerce usage in Saudi Arabia. Findings of the study indicate that age has a statistically significant impact on the actual usage while gender and education do not impact the actual usage of mobile commerce. In contrast, Park, Yang and Lehto (2007) find moderating factors such as gender and education to have a significant influence but interestingly, Internet usage

experience is found to have no significant effect on m-commerce adoption. Rhee and Kim (2004) and Chinn and Fairlie (2006) as cited in Gitau and Nzuki (2014) found that people with high education level were more likely to use the Internet. This finding can be used to conclude that such people are more likely to use mobile and other electronic devices for carrying out commercial transactions. Dai and Palvia (2008) have revealed that younger users tend to adopt m-commerce more than the older users. Teo (2001) has showed that males in general are inclined to use the technology more than females. This indicated that gender also influenced the technology usage and could be extended to m-commerce transactions.

2.3 Factors affecting adoption of m-commerce

Qingfei, Shaobo and Gang (2008) noted the importance of "user acceptance" in the development and success of m-commerce. With the help of m-commerce, marketers can reduce time by easily accessing information in a real-time environment and can cultivate new business opportunities. Consumer experiences evoked with mobile phones may differ by shopping motivations, as m-commerce can provide both hedonic (entertainment) and utilitarian (efficiency and time-critical) features (Anckar & D'Incau, 2002). Bhatt and Bhatt (2014) explored the major factors influencing the adoption of m-commerce and segmented the m-commerce customers into groups. The factors which came out from this study as influencing the usage of m-commerce were: attitude towards m-commerce, perceived benefits, adventure, perceived risk and idea (awareness about the usage of m-commerce). Further, three segments of m-commerce users were brought out from the study, which included reserved shoppers, utilitarian shoppers, and assured shoppers. Thakur and Srivastava (2013) also investigated the factors influencing the adoption of mobile commerce based on constructs from the technology-acceptance model and innovation-resistance theory in India.

2.4 Factors discouraging adoption of m-commerce

M-commerce is considered as an innovative platform where the benefits from it are continuously at odds with the concerns and needs of individual privacy. Consequently, the advantages of m-commerce must be weighed against its potential for privacy violations (Milne, 2003). Kini (2009) conducted a study among MBA students in Chile and found that despite this community being an extensive user of electronic commerce, it is not content with using mobile

commerce owing to mobile-access speed, service quality and price factors. Fong and Burton (2008) also conducted an experiment in China to understand the Chinese acceptance of m-commerce. The results suggested that the Chinese were not too eager to explore m-commerce story despite their agreeing to the convenience it offers. High subscription fees and poor download speed are critical barriers to m-commerce success (Samtani, Leow, Lim, & Goh, 2003). Other technical factors that can impact m-commerce adoption include user interface constraints, slow network connections, information security, or even the threat of government regulations (Wen and Mahatanankoon, 2004). Rahman (2013) noted that language barrier is also an issue as far as m-commerce is concerned, especially in the developing countries. He surveyed the customers of Bangladesh and found that due to rampant illiteracy and lack of knowledge of English, many people could not use the services of m-commerce. In addition to this, he also states that perceived risk, government regulations and cost were cited as issues by the customers but they were not very significant. A similar study was conducted in India, which states that language barrier is an equally disturbing feature which discourages Indian customers from resorting to m-commerce. Other factors which potentially obstruct the usage of m-commerce are complete lack of Internet connectivity in some areas, less graphic resolutions as compared to laptops or computers, lack of awareness due to widespread illiteracy and less number of mobile phone users in India as compared to world scenario (Gupta & Vyas, 2014). Batra and Juneja (2013) focus more on the technical problems related to the usage of m-commerce like security issues, lack of ubiquitous wireless network coverage, lack of standards, and technical mismatches among various wireless devices and smartphones. Moreover, the cost of smartphones and low access speed exacerbate the situation. Similar reasons are cited by Carlsson and Walden (2002) and Wu and Wang (2005) as they emphasize that the constraints of mobile devices adversely affect the usage of m-commerce.

Thus, many risks must be overcome to ensure the success of mobile commerce. These include inefficiencies within the device and the system, security and privacy concerns, high user costs from time-usage charges, the possible abuse of advertising, user comfort levels, and fulfilment issues caused by absence of incentives to use m-commerce (Chae & Kim, 2004; Chiu, 2001; Ding & Hampe, 2003; Herb, 2001; Srivastava, 2005; Yeo & Huang, 2003; and Mahatankoon & Vila-Ruiz, 2007).

Several researchers studied the antecedents and determinants of m-commerce (Langendoerfer, 2002; Martin, 2012; and Jaradat & Rababaa 2013). Majority

of research on m-commerce in India is conducted on factors influencing the adoption of m-commerce (Bhatti, 2007; Patel, 2011; Batra & Juneja, 2013; and Bhatt & Bhatt, 2014). Very few studies till date have been conducted exclusively on the potential barriers to m-commerce adoption in India (Gupta & Vyas, 2014; Batra & Juneja, 2013; and Tandon, Mandal & Saha, 2003).

Mobile user's perceptions and intention to use m-commerce are differentiated by the variability of the user's demographics, shopping motivations, and media dependency. So, a research indicating the perceptions of consumers towards m-commerce and segmenting the customers based on their demographic or other factors would help the retailers identify their target audience and design appropriate marketing strategies. Hence, the researchers have made attempts to study the aspects that can hinder the adoption of m-commerce, so that the impact of these factors can be minimized by the retailers or the retailers can make the consumers aware of the potential benefits and how they can avoid the perceived losses.

3. Research Objectives

The literature review suggested that researchers have studied the factors influencing the usage of m-commerce and the impact of demographic factors on the same. However, there is a dearth of research which pinpoints the problems faced by customers in adopting m-commerce, especially in India. Hence, the present study is undertaken with the following objectives:

- To explore the factors hindering m-commerce adoption
- To examine the relationship between the factors brought out in the study and the demographics

4. Research Methodology

The sampling unit for the study is consumer who is aware about e-commerce. The participants were provided with the definition of m-commerce to avoid possible misunderstanding about it. The respondents belonged to Ahmedabad district of the State of Gujarat. The survey was conducted from April 2014 to June 2014. The questionnaire constructed for the study included several questions which were continuous and categorical in nature. A scale was constructed with five point Likert-type statements in which respondents were asked to indicate their level of agreement (1 = *strongly disagree* to 5 = *strongly agree*). The questionnaire for the study was based on the scale developed by Mahatanankoon

and Vila-Ruiz (2007) consisting of 24 items. The reliability of the scale was found sound and apt for the current study. The sampling technique used for the study was convenient sampling. Reponses were obtained from 296 respondents. The respondents were guaranteed anonymity and confidentiality of their responses. SPSS 19 was used to analyze the data. Factor analysis and one-way ANOVA were used to analyze the data collected.

5. Sample Characteristics

As shown in Table 1, the demographics of respondents who are aware about m-commerce were classified according to their age, gender, education, monthly income and occupation. Out of the total respondents, 61.5% were males and the rest were females. Majority of respondents were post graduates (48.3%) and 61.5% respondents belonged to the age group between 20 to 35 years. 88.9% of respondents earned less than Rs 30000 per month and most of the respondents were students (45.6%) or were engaged in the private sector (29.4%).

Table 1: Demographics of the Sample

		Frequency	Percentage
Age	Less than 20 years	95	32.1
	20 - 35 years	182	61.5
	More than 35 years	19	6.4
Gender	Male	182	61.5
	Female	114	38.5
Educational Qualification	Undergraduate	51	17.2
	Graduate	102	34.5
	Postgraduate	143	48.3
Occupation	Self employed	51	17.2
	Homemaker/Housewife	23	7.8
	Student	135	45.6
	Job/Service	87	29.4
Monthly Income	Less than Rs. 30000	263	88.9
	Equal or more than Rs. 30000	33	11.1

Source: Primary data collected through questionnaire.

6. Factors Hindering M-commerce Adoption

To determine the important factors hindering m-commerce, the factorability of 24 items measuring perceptions of consumers was examined. The respondents were asked to rate 24 variables using a 5-point Likert scale, which ranged from 'strongly disagree' to 'strongly agree'. Firstly, the internal consistency of the items was checked using Cronbach's alpha. The Cronbach's alpha value came to 0.910 for the entire scale of 24 items which was considered to be excellent, as the closer the reliability coefficient gets to the value of 1 the better is the reliability of the measures (Cronbach, 1951). Moreover, deletion of any item could not significantly improve the reliability results. Next, the Bartlett's test of sphericity (Bartlett, 1954) was found to be significant (Chi-Square 3944.859, p-value < 0.0001). The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was high at 0.885. The KMO value of 0.885 was excellent since it exceeded the recommended value of 0.6 (Kaiser, 1974). The two results of (KMO and Bartlett's) suggested that the data was appropriate to proceed with the factor analysis using all the 24 items of the scale (Malhotra, 2010). The principal component analysis with varimax rotation was used as the basic idea was to identify the factors, thereby narrowing the scope and computing factor loadings for the same.

Exploratory factor analysis (EFA) was performed and it was found that all the items carried an eigenvalue of more than 1. Hence, all the factors were retained as they were considered significant to the study. The result was that there were a total of 5 factors, which explained 66.32 % of the total variance. Moreover, factor reliability tests which state whether all items in a particular factor are internally consistent and will consistently load on the same factor, were conducted. These are represented by the Cronbach's alpha value for each factor in Table 2. The table gives the rotated component matrix dimensions along with the Cronbach's alpha value for better understanding of the factors.

Factor 1 has an eigenvalue of 8.861 and has ten variables clubbed under it. The reliability of the variables that constitute the factor is 0.913 (Cronbach's alpha). This can be labelled as "unawareness", as these ten variables revealed the unawareness of consumers towards m-commerce. This included the individual's unawareness towards m-commerce applications and their pricing schemes, lack of knowledge of mobile service provider, demands for conventional business transactions and thus exhibiting resistance towards change, and lack of knowledge of the manufacturer as well as Internet

Table 2: Factors Hindering M-commerce

	1	2	3	4	5	Reliability	Mean Value
Factor 1: Unawareness							
I lack knowledge of the pricing scheme of M-commerce	.841					0.913	2.59
I am unaware of existing M-commerce applications	.805						
I am unaware of my mobile capabilities	.767						
My mobile service provider does not support M-commerce application	.733						
Manufacturer doesn't develop apps for my mobile	.641						
Internet vendor do not offer mobile transaction services	.599						
I prefer face-to-face interaction while purchasing	.591						
I am used to the physical form of payment	.568						
My mobile carrier doesn't provide other services	.540						
Lack of telecom standards hinders acceptance	.540						
Factor 2: Mobile Device Inoperability							
Roaming capabilities hinders acceptance of M-commerce		.820				0.796	2.69
Interoperability of different sender hinders the acceptance		.814					
Reliability of mobile carriers hinders acceptance		.607					

My mobile can be customized to reflect M-commerce activities		.581					
Factor 3: Personalization							
I am able to customize my M-commerce activities			.816			0.761	2.94
I need to personalize my M-commerce activities			.791				
I prefer to purchase via my computer			.758				
I prefer electronic form of payment			.610				
Factor 4: Time Consumption/ Confusion							
Using my computer than mobile to purchase is faster				.737		0.762	2.63
Functions of my mobile hinders acceptance of M-commerce				.599			
My mobile is cumbersome for M-commerce activities				.592			
I am impatient with M-commerce				.524			
Factor 5: Cost							
It is costly to add M-commerce in subscription plan					.717	0.652	3.08
It is too time consuming to perform M-commerce activities					.631		

Source: Primary data collected through questionnaire.

vendor. The items received a mean score of 2.59 on a scale of 1 to 5 where majority agreed that unawareness towards m-commerce is an important reason hindering m-commerce adoption. Consumers often perceive m-commerce as surfing the Internet, checking sports, or viewing weather information. Some may be aware of m-commerce applications but do not know how to install them on their devices. Mahatankoon and Vila-Ruiz (2007)

have also cited this as an influential factor; and this result coincides with prior research. In addition to that, m-commerce marketing relies on word-of-mouth and other intricate social factors. For example, a consumer will utilize mobile applications if his/her friends are active mobile users (Lu, Yu, Liu & Yao, 2003; and Kleijnen & Wetzels, 2004).

Factor 2 has an eigenvalue of 2.899 and has four variables clubbed under it. The reliability of the variables that constitute the factor is 0.796 (Cronbach's alpha). This can be labelled as "mobile-phone inoperability", as these four variables included poor reliability of mobile carriers, inability of mobile phones to customize and poor roaming capabilities. The items received a mean score of 2.69 on a scale of 1 to 5 where majority indicated the inefficiency of mobile phones as the reason for not adopting m-commerce. Carlsson and Walden (2002) also stated the slow speed of service and the limited screen size of mobile devices as the main hindrance for adoption of m-commerce expansion. The difficulties because of limitations of mobile devices diminish the potential uses of mobile commerce. It is evident that m-commerce would not be able to fulfil its potential without widespread proliferation of wireless devices and related applications.

Factor 3 has an eigenvalue of 1.983 and has four variables clubbed under it. The reliability of the variables that constitute the factor is 0.761 (Cronbach's alpha). This can be labelled as "personalization", as these four variables comprise the inability to customize m-commerce activities, and the preference towards e-commerce. The items received a mean score of 2.94 on a scale of 1 to 5 where majority had a neutral opinion towards customization. Langendoerfer (2002) revealed that psychological factors mainly related to privacy issues are responsible for the lack of advocacy for m-commerce rather than technological issues. Mahatankoon and Vila-Ruiz (2007) also stated that electronic commerce customers may decide to buy products from a trusted vendor just by looking at its reliability and reviews, but for m-commerce consumers, this functionality still remains a challenge. M-commerce services must be personalized and tailored to each consumer based on his/her profile, location and need. These operations range from customized ring-tone recommendations to location-based services (Ho & Kwok, 2003). One of the reasons for preferring e-commerce in comparison to m-commerce is security. Mobile phones are more likely to be stolen compared to computers and laptops. So, it is quite important for the companies to ensure that the security of the customers are not compromised in such cases. Often the customers face trouble while losing their mobile

phones (Varshney, 2004). Examining barriers to adoption, Khodawandi, Pousttchi and Wiedemann (2003) indicate that the lack of perceived security (defined as subjective security) is the most frequent reason for a refusal. Rogger and Celia (2004) found similar results.

Factor 4 has an eigenvalue of 1.115 and has four variables clubbed under it. The reliability of the variables that constitute the factor is 0.762 (Cronbach's alpha). This can be labelled as "time consuming / confusion," as these four variables comprise speed-related issues leading to impatience amongst customers and computer purchases being faster than mobile purchases. The items received a mean score of 2.63 on a scale of 1 to 5 where majority agreed that speed is an important determinant hindering the spread of m-commerce. It is found that mobile phones are slower in terms of speed as compared to computers. Optimization of m-commerce application would result into customer satisfaction. Upkar (2002) reveals that companies using m-commerce need to remove several images that might be vital for the applications. He further states that companies should not include some attractive flash, scripts or plug-ins in their m-commerce websites or apps.

Factor 5 has an eigenvalue of 1.059 and has two variables clubbed under it. The reliability of the variables that constitute the factor is 0.652 (Cronbach's alpha). This can be labelled as "cost", as these variables include the opportunity cost of opting for m-commerce. The items received a mean score of 3.08 on a scale of 1 to 5 where majority cited cost as the most important reason hindering m-commerce adoption. Similarly, some studies revealed that high subscription fees are a critical barrier to m-commerce success (Samtani, Leow, Lim & Goh, 2003).

7. Hypothesis

The study tested the following hypothesis:

Ho: There is no significant relationship between factors hindering m-commerce and the demographics

H1: There is significant relationship between factors hindering m-commerce and the demographics

One-way ANOVA (analysis of variance)/ independent sample t-test is used to test the hypothesis. On a variable of interest, ANOVA tests the significance

of differences between two or more groups, while t-test looks at differences between two groups. Of the independent variables relating to demographics, gender contains only two groups while the other variables like age, educational qualification, occupation and monthly income consist of more than two categories. Hence, t-test is applied for gender while ANOVA is used for the remaining variables. Data is normally distributed and homogeneity of variance is checked using Levene's statistic which can be seen in Table 3. Post-hoc tests (Tuckey/Games Howell) are also carried out to further analyze the data wherever a significant relationship is established.

Table 3: Relationship of Factors with Demographics

		Age	Gender	Educational Qualification	Occup-ation	Monthly Income
Unawareness	Levene statistic (Sig)[3]	0.398	0.365	0.002	0.708	0.428
	Anova/Welch / t-statistic[4]	4.334	0.496	10.071	2.112	0.875
	Significance[5]	0.014	0.620	0.000	0.099	0.350
Mobile-device Inoperability	Levene statistic (Sig)	0.074	0.094	0.170	0.066	0.669
	Anova/Welch/ t-statistic	1.740	1.539	2.371	0.889	0.362
	Significance	0.177	0.125	0.095	0.447	0.548
	Levene statistic (Sig)	0.027	1.570	0.712	0.077	0.950

[3] Levene's test is used for determining the homogeneity of variances. In the given table, the significance value of Levene's test is shown. If this significance value is less than 0.05, the null hypothesis of equal variances is rejected.

[4] ANOVA test indicates whether there is an overall difference between the groups. However, it can only be used if the data meets the assumption of homogeneity of variance (as indicated by Levene's test). If the data does not satisfy the assumption of homogeneity of variance, Welch F-test is run to identify the overall difference between the groups. The t-test is also used to find the difference between the groups, when the groups are limited to two. In this case for "gender", t-test is run as groups are only two. If the groups exceed two, then ANOVA is used. The statistics in this row relate to ANOVA or Welch F or t-test as applicable under the given constraints.

[5] The significance value given in this row is used to accept or reject the null hypothesis tested using ANOVA or Welch or t-test.

Personal-ization	Anova/Welch/t-statistic	2.744	1.364	4.226	6.669	0.265
	Significance	0.073	0.174	0.016	0.000	0.607
Time Consumption/ Confusion	Levene statistic (Sig)	0.064	0.184	0.169	0.581	0.678
	Anova/Welch/t-statistic	3.330	0.818	2.280	1.532	0.857
	Significance	0.037	0.414	0.104	0.206	0.355
Cost	Levene statistic (Sig)	0.353	0.005	0.720	0.544	0.549
	Anova/Welch/t-statistic	0.784	0.942	2.017	1.848	3.038
	Significance	0.457	0.494	0.135	0.139	0.082

Source: Primary data collected through questionnaire.

Unawareness Vs Age

There is a statistically significant difference between groups as determined by the one-way ANOVA (F (2,293) = 4.334, p = 0.014). The null hypothesis can be rejected here. A Tuckey post-hoc test revealed that unawareness is statistically higher for respondents above 35 years bracket (3.09 ± .569, p = .010) than for respondents in 20-35 years bracket (2.58 ± .725). For other age categories there are no statistically significant differences. It can be concluded that for the given data there is a relationship between unawareness and age. Thus, unawareness may yield to rejection of m-commerce more in the younger generation (20-35 years).

Unawareness Vs Educational Qualification

The assumption of homogeneity of variance is violated and therefore, the Welch F-ratio is reported. There is a statistically significant difference between groups as determined by Welch (F (2, 130.812) = 10.071, p = .000). Hence the null hypothesis can be rejected here. The Games-Howell post-hoc test does not rely on homogeneity of variance and so this was chosen. This test revealed that unawareness is statistically higher for undergraduate participants (3.03 ±.775, p = .000) than for graduates (2.47 ± .600). Also the test revealed that unawareness is statistically higher for undergraduate participants (3.03 ±.775, p = .003) than for post graduates (2.61 ± .737). It

can be concluded that for the given data there is a relationship between unawareness and educational qualification. It can be stated that graduates and post-graduates believe that lack of knowledge can be the critical factor hindering m-commerce adoption.

Personalization Vs Educational Qualification

There is a statistically significant difference between groups as determined by one-way ANOVA ($F(2,293) = 4.226$, $p = 0.016$). The null hypothesis can be rejected here. A Tuckey post-hoc test exhibited that personalization is statistically lower for undergraduates ($2.68 \pm .700$, $p = .020$) than for graduates ($3.00 \pm .640$). Also the test showed that personalization is statistically lower for undergraduates ($2.68 \pm .700$, $p = .023$) than for post graduates ($2.98 \pm .733$). It can be concluded that for the given data there is a relationship between personalization and educational qualification. It can be inferred that graduates and post-graduates may not opt for m-commerce if it is not tailored as per their requirements.

Personalization Vs Occupation

There is a statistically significant difference between groups as determined by one-way ANOVA ($F(2,293) = 6.669$, $p = 0.000$). The null hypothesis can be rejected here. A Tuckey post-hoc test exhibited that personalization is statistically higher for students ($3.12 \pm .651$, $p = .008$) than for people in service ($2.80 \pm .727$). For other occupation categories, there are no statistically significant differences. It can be concluded that for the given data there is a relationship between personalization and occupational background. It can be inferred that students require customized mobile applications, and if not provided, that can be a reason for minimizing m-commerce transactions.

Time Consumption /Confusion Vs Age

There is a statistically significant difference between groups as determined by one-way ANOVA ($F(2,293) = 3.330$, $p = 0.037$). The null hypothesis can be rejected here. A Tuckey post-hoc test exhibited that time consumption/ confusion is higher for respondents above the age of 35 years ($2.98 \pm .494$, $p = .043$) than for respondents below the age of 20 years ($2.53 \pm .584$). For other age categories there are no statistically significant differences. It can be concluded that for the given data there is a relationship between time consumption/confusion and age. It can be inferred that older consumers may reject the use of m-commerce if found time consuming and confusing.

8. Limitations and Future Scope

Every study is prone to certain limitations owing to time and monetary constraints. The present study is restricted in its geographical scope as it has been carried out in the Ahmedabad district of the State of Gujarat. If carried out nationwide, with a larger sample size, the accuracy of findings can be improved and the findings can be generalized to a greater extent. Also, it would facilitate comparison of results pertaining to different geographical regions, so that area specific strategies could also be developed. Different paradigms of research methodology can be used to study the factors which discourage the customers from adopting m-commerce. In the present study, exploratory factor analysis has been conducted to identify the factors which can hinder the adoption of m-commerce. This study can be extended with the help of confirmatory factor analysis and structured equation modelling to further validate the factors which have come out of this research and design a model based on the same.

9. Conclusion

The advent of technology and proliferation of electronic gadgets have significantly impacted the business world. Communication has experienced radical shift from the age of telephone to mobile phones and phablets. Likewise, commercial transactions which took place on physical platforms are now done online using electronic devices like computers and laptops, and the trend is turning towards usage of smartphones and i-pads. Hence, it becomes pertinent to study how customers view the usage of e-commerce and m-commerce facilities. Similarly, it becomes equally important to study the factors which have the potential to hinder the growth of e-commerce and m-commerce. The present study focuses on the same.

Based on data collection and analysis, it is found that five factors, namely, unawareness, mobile-device inoperability, personalization, consumption/ confusion, and cost hinder the adoption of m-commerce. Lack of knowledge related to m-commerce pricing, applications and supporting infrastructure could act as a huge deterrent. Similarly, incapacity of mobile phones, issues related to speed and cost could also pose as obstacles in the development of m-commerce. To improve the spread of m-commerce, people will need to be made more aware about the usage and plans of m-commerce. Some retailers have already started providing incentives and other offers for promoting the usage of online transactions. Simultaneously, the make of mobile phones will also need to be revamped, such that these transactions can be carried

out easily and in a cost-effective manner. Later on, the scope of adding customized features can also be considered for improving the usage of m-commerce.

Additionally, it is found that there is a relationship between unawareness and age, unawareness and educational qualification, personalization and educational qualification, personalization and occupation and time consumption/confusion and age. The younger generation agrees to unawareness being a hindrance, while the comparative elder lot believe that time consumption may pose as an issue in m-commerce development. Also, graduates and post–graduates believe that lack of knowledge can be the critical factor hindering m-commerce adoption and they would also like m-commerce to be more personalized in approach. These factors can be kept in mind while promoting m-commerce to a particular target audience.

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A Causality Analysis on the Empirical Nexus between Capital Formation and Economic Growth: Evidence from India

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Abstract

The study investigates the causal relationship between gross capital formation (GCF) and gross domestic product (GDP) over the period 1970-2013 using annual data. The study has employed econometric tools to analyse the behaviour of both the series. Johansen's co-integration test has been applied to explore the long-run equilibrium relationship between GCF and GDP. The analysis reveals that GCF and GDP are cointegrated and, hence, a long-run equilibrium relationship exists between them. The vector error correction model (VECM) has shown that the lagged terms of gross capital formation influence the gross domestic product of India. The Granger causality test exhibits the presence of short-run relationship between GCF and GDP and the relationship appears to be bidirectional. It is therefore concluded that high capital formation drives economic growth and, in turn, high economic growth contributes to the accumulation of more capital assets in India.

Keywords: Gross capital formation, Gross domestic product, Investment, Economic growth, Cointegration.

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1. Introduction

Capital formation or accumulation refers to the process of amassing or stocking of assets of value, the increase in wealth or the creation of further wealth. Capital formation can be differentiated from savings because accumulation deals with the increase in stock of needed real investments and not all savings are necessarily invested. Savings are essentially the first and the foremost requirement for capital formation to take place. Only when the banking institutions channelize such mobilized savings of households and business firms for investment, capital accumulation takes place. An empirical examination of the savings and investment behaviour in the Indian economy over the period from 1950-51 to 2005-06 made by Joshi (2007) reveals that while a one per cent increase in the household financial savings rate increases the capital formation rate in the long term by 0.25 per cent.

Economic theories have shown that capital formation plays a crucial role in the models of economic growth. Keynes (1936) was the first to call attention to the existence of an independent investment decision in the economy. He observed that investment depends on the prospective marginal efficiency of capital relative to some interest rate that reflects the opportunity cost of the invested funds. After Keynes, the evolution of investment theory was linked to simple growth models. These models gave rise to the accelerator theory, which makes investment a linear function of changes in output.

Other investment theories include the neoclassical model developed by Jorgenson and Hall (1967) and the "Q" theory associated with Tobin (1969). In the Q theory of capital formation the ratio of the market value of the existing capital stock to its replacement cost is the main force driving investment and growth. Another approach dubbed as neoliberal propounded by Galbis (1979) emphasizes the importance of financial deepening and high interest rates in stimulating growth. The core argument rests on the claim that developing countries suffer from financial repression and that if these countries were liberated from their repressive conditions, this would induce savings, investment and growth.

The Harrod-Domar model describes the economic mechanism by which more investment leads to more growth. For a country to develop and grow, it must divert part of its resources from current consumption needs and invest them in capital formation. Diversion of resources from current consumption is called saving. While saving is not the only determinants of growth, the Harrod-Domar model suggests that it is an important ingredient for growth.

Its argument is that every economy must save a certain proportion of its national income if only to replace the worn-out capital goods. The model shows that growth is directly related to the saving-income ratio and inversely related capital-output ratio. Hence, considering the Harrod-Domar model as a theoretical framework, the present study aims to investigate the relationship between capital formation and economic growth of India.

2. Review of Literature

Capital formation is a key to economic growth. Some past empirical studies (Hernandez-Cata, 2000; Ndikumana, 2000; Ben-David, 1998; Collier & Gunning, 1999; Ghura & Hadji, 1996; and Khan & Reinhart, 1990) conducted in Africa, Asia and Latin America have established the critical linkage between capital formation and the rate of growth. This analogy has been supported by a number of very recent studies. The study by Athukorala and Sen (2002) is a comprehensive Indian case study of saving, investment and growth. The empirical analysis found strong support for the view that the levels of investment as well as its efficiency are the proximate causes of growth.

Calderón and Liu (2003) examine the direction of causality between financial development and economic growth of 109 developing and industrial countries from 1960 to 1994. The paper finds the following: (1) financial development generally leads to economic growth; (2) the Granger causality from financial development to economic growth and the Granger causality from economic growth to financial development coexist; (3) financial deepening contributes more to the causal relationships in the developing countries than in the industrial countries; (4) the longer the sampling duration, the larger the effect of financial development on economic growth; (5) financial deepening propels economic growth through both a more rapid capital accumulation and productivity growth, with the latter channel being the strongest.

Verma and Pahlavani (2007) estimate the interdependencies between capital formation, saving and output for Iran for the period 1960 to 2003. The analysis uses Lee and Strazicich procedure to endogenously determine that structural breaks occurred in 1979 for real output, 1983 for saving and 1977 for investment. The relationships were estimated using Johansen's full information maximum likelihood (FIML) procedure which is appropriate for estimating the effects of non-stationary variables in a simultaneous setting. The estimates indicate a Solow-style relationship where a one per cent increase in saving will be associated with a 0.55 per cent increase in the long-run equilibrium level of output. The short-run estimates show that

saving has a short-run equilibrating effect on output with elasticity -0.13, which further supports the Solow model whereby changes to saving have only transitory effects on the growth in output. The other important result found that investment dynamically Granger causes output growth with a short-run elasticity of 0.17, consistent with the endogenous growth explanation. The structural change parameter estimates that the effect on the growth in output fell by around 10 per cent after 1979.

Bakare (2010), in his study, focuses on capital formation and economic growth of Nigeria by applying the Harrod-Domar model. The ordinary least square multiple regression analytical method was used to examine the relationship between capital formation and economic growth. The study tested the stationarity and cointegration of Nigeria's time series data and used an error-correction mechanism to determine the long-run relationship among the variables examined. The empirical study found that the data were stationary and cointegrated and showed that there is a significant relationship between capital formation and economic growth in Nigeria. The results supported the Harrod-Domar model which proved that the growth rate of national income will directly or positively be related to saving ratio and capital formation (i.e. the more an economy is able to save and invest out of a given GNP, the greater will be the growth of that GDP).

Mehta (2011), in his study, empirically tested the short-run and long-run relationship between capital formation and economic growth variables in India with the help of cointegration technique and vector error correction technique. The study reveals a long-run relationship between capital formation and economic growth. From the policy point of view it suggests that more thrust may be given for boosting the capital formation in the economy in order to achieve high economic growth in Indian economy.

Hussin and Saidin (2012) examine the impact of foreign direct investment (FDI), openness, and gross fixed capital formation on economic growth (GDP) over the period 1981-2008 in ASEAN-4 countries by using panel estimation models. The findings show that all variables are correlated with each other and also have a positive relationship to GDP. FDI appears to be the most efficient variable in assisting the economic growth followed by openness and gross fixed capital formation. However, the results from ordinary least squares (OLS) method shows that only gross fixed capital formation is significant to growth and contributes positively to GDP in each of the ASEAN-4 countries.

Nowbutsing (2012) discerns the short-run and long-run impacts of public, private, and foreign fixed capital formation on growth of the economy of

Mauritius using the bounds testing methodology for the period 1976-2010. In addition, a composite index is used to control for conditional factors. The index comprises measures of human capital, public infrastructure, financial development, and trade openness. As regards trade openness, difference is made between services trade and merchandise trade. Among the measures of capital formation, positive and significant effects are reported for FDI, whereby a percentage point increase in FDI contributes 0.17 per cent to long-run economic growth. Moreover, the impact of private capital formation on economic growth is positive but insignificant, and that of public capital formation is negatively insignificant. This study separately tests for accelerator, or simply, the growth effects on public, private, and foreign capital formation. And, significant accelerator effect is established only in the case of private capital formation. Finally, significant crowding-out is established from foreign to private capital formation. And, the crowding-out hypothesis also holds from foreign to public capital formation, and *vice-versa*. However, insignificant crowding-out is detected between private and public capital formation. Among the conditional factors, human capital stock, public infrastructure, financial development and trade are important contributors to economic growth.

Gangal and Gupta (2013) analyse the impact of public expenditure on economic growth of India from 1998 to 2012. This study includes annual data of total public expenditure (TPE) and gross domestic product (GDP) per capita as an indicator of economic growth. ADF unit root test, cointegration test and Granger causality test techniques have been applied. The study reveals that there is linear stationarity in both the variables that indicates the long-run equilibrium and there is a positive impact of total public expenditure on economic growth. There is a unidirectional relationship from TPE to GDP found by the Granger causality test.

Ugochukwu and Chinyere (2013) investigate the impact of capital formation on economic growth in Nigeria by employing ordinary least square (OLS) technique. To test for the properties of time series, Phillip-Perron test was used to determine the stationarity of the variables and it was discovered that gross fixed capital formation and economic growth are integrated of order zero (I(0)). Johansen cointegration test was employed to determine the order of integration while error correction model was employed to determine the speed of adjustment to equilibrium. The empirical findings suggest that capital formation has positive and significant impact on economic growth in Nigeria for the period under review.

Mehrara and Maysam (2013) investigate the causal relationship between gross domestic investment and GDP for the Middle East and North Africa

(MENA) region countries by using panel unit-root tests and panel cointegration analysis for the period 1970-2010. The results show a strong causality from economic growth to investment in these countries. Yet, investment does not have any significant effects on GDP in short- and long-run. It means that it is the GDP that drives investment in these countries, and not *vice versa*. So the findings of this paper support the point of view that it is higher economic growth that leads to higher investment.

Uneze (2013) examines the causal relationship between capital formation and economic growth in sub-Saharan African countries using panel cointegration and causality testing techniques. It is found that causality is bi-directional, suggesting that higher economic growth leads to higher capital formation and the increases in capital formation, in turn, results in higher economic growth.

Kanu and Ozurumba (2014) studied the impact of capital formation on the economic growth of Nigeria. It was ascertained that in the short run, gross fixed capital formation had no significant impact on economic growth; while in the long-run, the VAR model estimate indicates that gross fixed capital formation, total exports and the lagged values of GDP had positive long-run relationships with economic growth in Nigeria. It was also ascertained that there exists an inverse relationship between imports, total national savings and economic growth; while GDP was seen to have a unidirectional causal relationship with exports, gross fixed capital formation, imports and total national savings.

Shuaib and Dania (2015) examine the impact of capital formation on the economic development of Nigeria, using time series data from 1960 to 2013. The paper applied the Harrod-Domar model to Nigerian economic development model and tested if it has a significant relationship with the Nigerian economy. The paper explored various econometric and statistical methods to examine the relationship between capital formation and economic development. The paper tested for stationarity and conducted different diagnostic tests of Nigeria's time series data. From the empirical findings, it was discovered that there is a significant relationship between capital formation and economic development in Nigeria. The results corroborated the Harrod-Domar model which proved that the growth rate of national income will directly be related to saving ratio and capital formation, i.e., the more an economy is able to save and invest out of a given GNP, the greater will be the growth of that GDP.

Based on the review of the literature presented above, it can be concluded that empirical findings for different countries are in line with the theoretical predictions. These studies explain whether there exist a positive or negative relationship

between capital formation and economic growth and also the strength of relationship, the direction of the cause-and-effect relationship etc., which have a lot of policy implications for national governments. It is pertinent to note that though a good number of research studies focused on investigating the impact of capital accumulation on economic growth in countries of Asia, Africa, America and Europe, hardly there are any significant research contributions empirically analyzing the causal relationship between capital formation and economic growth in India. Therefore, the present paper is an attempt in filling this vacuum.

3. Objectives

The main objective of this study is to explore the causal nexus between capital accumulation and economic growth in India. The specific objectives are:

- To examine the dynamics of short-term linkages between capital formation and economic growth.
- To explore the presence of long-term equilibrium relationship between capital formation and economic growth.
- To capture the linear interdependencies among the variables under study.

4. Methodology

4.1 Variables and Data

As the present study aims at exploring the causal relationship between capital accumulation and economic growth in the Indian context, capital formation and economic growth form the two main variables. Gross capital formation (GCF) and gross domestic product (GDP) are used as the proxies for capital formation and economic growth respectively. The study uses the annual data for the period from 1970 to 2013 which gives 44 annual observations. All the necessary data for the sample period are obtained from the secondary sources. Data are processed by applying econometric tools and techniques for facilitating further analysis through *EViews* econometric package.

4.2 Econometric Specification

The study has employed certain econometric tools and techniques for analysing the relationship between the variables. The study consists of the following steps:

- Test the stationary of data
- Test the co-integration between the variables
- Fitting an error correction model if cointegration is established, and
- Test the causal relationship between the variables.

4.2.1 Test of Stationarity - Unit Root Test

Empirical work based on time series data assumes that the underlying time series is stationary. Broadly speaking a data series is said to be stationary if its mean and variance are constant over time and the value of covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed (Gujarati & Sangeetha, 2007). The present study investigates whether GDP and GCF series are stationary by applying the unit root test.

An empirical way of checking the stationarity of the time series is by applying unit root test. It has become widely popular test of stationarity over the past several years. Stationarity condition has been tested using augmented Dickey-Fuller (ADF) method. ADF test is the modified version of Dickey-Fuller (DF) test. ADF makes a parametric correction in the original DF test for higher order correlation by adding lagged difference terms of the dependent variable to the right hand side of the regression. The ADF test, in the present study, consists of estimating the following regression.

$$Yt = bo + \beta Yt_{-1} + \sum_{i=1}^{m} \mu i \; Yt_{-i} + e_t \text{ ---------- (1)}$$

Yt represents the series to be tested, *bo* is the intercept term, β is the coefficient of the lagged value of *Yt*, μ_1 is the parameter of the augmented lagged first difference of the dependent variable, *Yt-i* represents the i^{th} order autoregressive process, e_t is the white noise error term. The number of lagged difference terms to include is determined empirically, the idea being to include enough terms so that the error term is serially uncorrelated (Gujarathi & Sangeetha, 2007).

The stationary condition under ADF test requires that the probability (p) value is less than 1 (IpI<1). Another way of stating the same is that the computed t-value should be more negative than the critical t-value (t-statistic < critical value). The computed t-statistic will have a negative sign and large negative t-value is generally an indication of stationarity (Gujarathi & Sangeetha, 2007).

4.2.2 Johansen's Cointegration Test

If ADF test results exhibit stationarity of the time series data and all the data sets are integrated at the same order, then we have to examine whether or not there exists a long run relationship between GCF and GDP. To investigate the cointegration between GCF and GDP, Johansen's cointegration test is administered. The Johansen method of cointegration applied in the study is as the follows:

$$Xt = a + \sum_{j=1}^{p} \beta j \, Yt - j + et \text{ ---------- (2)}$$

where, X_t is an n×1 vector of non-stationary I(1) variables, a is an n×1 vector of constants, p is the maximum lag length, β_j is an n×n matrix of coefficient of Y and e_t is a n×1 vector of white noise terms. The coefficient value (β) indicates the degree of cointegration or relationship, while the sign preceding to the coefficient indicates whether the long-run relationship between the variables is positive or negative.

4.2.3 Vector Error Correction Model (VECM)

Johansen's cointegration test reflects only the long-term balanced relationship between gross capital formation (GCF) and gross domestic product (GDP). Of course, in the short run, there may be disequilibrium. In order to cover the shortage, correcting mechanism of short-term deviation from long-term balance could be adopted. Therefore, under the circumstances of long-term causality, short-term causalities should be further tested (Ray, 2012). Hence, the vector error correction model (VECM) is used to analyse whether error correction mechanism takes place if some disturbance comes in the equilibrium relationship. In other words, it is to measure the speed of convergence to the long-run steady state of equilibrium. Thus the Johansen co-integration equation (2) has to be turned into a vector error correction equation as follows.

$$\Delta Xt = a + \sum_{j=1}^{p-1} \Gamma j \, \Delta Xt - j + \Pi \, Xt - p + et \text{ ---------- (3)}$$

where, Δ is the first difference operator, Γj is $-\sum_{j=1+1}^{p} \beta j$ and Π is equal to $-1 + \sum_{j=1+1}^{p} \beta j$.

4.2.4 Granger Causality Test

Upon confirmation of variables being co-integrated, study will proceed towards testing the presence of casual relationship between GCF and GDP administering

the Granger causality test. Causality is a kind of statistical feedback concept which is widely used in the building of forecasting models (Ray, 2012). The Granger causality test (1969, 1988) seeks to determine whether past values of a variable help to predict changes in another variable. The Granger causality technique measures the information given by one variable in explaining the latest value of another variable. In addition, it also says that the variable *Y* is Granger caused by variable *X* if variable *X* assists in predicting the value of variable *Y*. If this is the case, it means that the lagged values of variable *X* are statistically significant in explaining the variable Y (Ray, 2012).

GCF and GDP are interlinked and co-related. However, co-integration test provides no theoretical or empirical evidence that could conclusively indicate sequencing from either direction. For this reason, in the present study, Granger causality test was carried out on GCF and GDP. The causality test will see the reaction between GCF and GDP such as, if variable GCF has Granger cause to GDP and GDP also has Granger cause to GCF, it means that the value after GDP can help us to expect the value for the next period of GCF and also the value after GCF can help us to expect the value for the next period of GDP respectively. The Granger method involves the estimation of the regression equations. In this study of two-way variables (GCF and GDP), two equations are used for the Granger causality regression tests.

If the causality runs from GCF to GDP, then the Granger causality regression equation is:

$$GDPt = n + \sum_{a11} GDPt - 1 + \sum_{\beta 11} GCFt - 1 + \varepsilon_1 t \text{---------- (4)}$$

If the causality runs from GDP to GCF, then the Granger causality regression equation is:

$$GCFt = n + \sum_{a12} GCFt - 1 + \sum_{\beta 12} GDPt - 1 + \varepsilon_2 t \text{---------- (5)}$$

From the equation (4), GCF_{t-1} Granger causes GDP_t if the coefficient of the lagged values of GCF as a group $\beta 11$ is significantly different from the zero based on F-test. Similarly, from equation (5), GDP_t Granger causes GCF_t if $\beta 12$ is statistically significant.

5. Hypotheses

The following hypotheses are developed to meet the objectives of the present study.

H_1: GCF has a unit root
H_2: GDP has a unit root
H_3: There is no co-integration between GCF and GDP
H_4: GDP does not Granger cause GCF
H_5: GCF does not Granger cause GDP

6. Results and Discussion

In order to test whether there exists any cointegration and causality between gross domestic product (GDP) and gross capital formation (GCF), the pre-condition is that the time series data pertaining to both the variables are stationary and do not encounter unit root problem. For this purpose ADF unit root test is administered and the results are presented in Table 1.

Table 1: ADF Unit Root Test for GCF and GDP

Particulars	GCF				GDP			
	t-statistic	Critical Value		p-value	t-statistic	Critical Value		p-value
At level	-0.801132	1%	-3.605593	0.8079	-0.279363	1%	-3.605593	0.9743
		5%	-2.936942			5%	-2.936942	
		10%	-2.606857			10%	-2.606857	
At 1st difference	-3.603060	1%	-3.596616	0.0038	-4.235106	1%	-3.605593	0.0497
		5%	-2.933158			5%	-2.936942	
		10%	-2.604867			10%	-2.606857	

The results of ADF unit root test show that both variables under study, namely GDP and GCF, did not attain stationarity at level (I (0)). However, after first differencing (I (1)), both the variables become stationary. The results indicate that the null hypotheses H_1(GCF has a unit root) and H_2(GDP has a unit root) can be rejected as the t-statistic value is smaller than the ADF critical value at first difference (I (1)) at 1% level of significance. That is, in case of GCF the t-value is -3.603, which is lower than calculated ADF critical value (-3.596), at 1% level of significance. Even in respect of GDP the t-value (-4.235) is smaller to the computed ADF critical value (-3.605) at 1% level of significance. Hence, one can conclude that GDP and GCF time series are stationary at first difference (I(1)) in ADF test. In other words, GDP and GCF time series data do not have any unit root problem and hence, they can be taken up for testing the presence of cointegration.

After ensuring the stationarity of the time series data of GCF and GDP, a cointegration test is carried out by using Johansen method to identify whether there exists any long-run equilibrium relationship between the variables. The results of this test are presented in Table 2.

Table 2: Results of Johansen Cointegration Test

Cointegration Test	Level	Max. Eigen- value	t-statistic	C.V. at 5%	Prob.
Trace Test	H_0: r=0 (none)*	0.394528	25.89007	15.49471	0.0010
	H_1: r≤1 (at most 1)	0.164370	6.823655	3.841466	0.0090
Max. Eigen	H_0: r=0 (none)*	0.394528	19.06642	14.26460	0.0081
	H_1: r≤1 (at most 1)	0.164370	6.823655	3.841466	0.0090

Note: Trace test and Max-Eigen test indicate 2 cointegrating equations at the 0.05 level.
* Denotes rejection of the hypothesis at the 0.05 level.

The results of Johansen co-integration test as presented in Table 2 exhibit that the trace statistic for the calculated maximum eigenvalue (25.89007) is more than its critical value (15.49471) indicating the presence of co-integration between variables. Even the Max-Eigen test confirms the existence of long run cointegration between the two variables, since Max-Eigen t-statistic value (19.06642) is greater than its critical value (14.26460) at 5 per cent level of significance.

The results of Johansen co-integration test denote that the null hypothesis H_0: there is no cointegration between the GCF and GDP is rejected at 5 per cent level of significance. This, in turn, leads to the acceptance of alternative hypothesis that there is cointegration between GCF and GDP.

After confirming the presence of co-integrating vectors based on Johansen cointegration test results, the short run and long run interaction of the underlying variables is examined by fitting them in vector error correction model (VECM) based on Johansen cointegration methodology. The results show that a long run equilibrium relationship exists between the GDP and GCF. The estimated cointegrating coefficient for the GDP based on the first normalized eigenvector, derived from the results presented in Table 3, is as follows:

$$LGDP = -306.2549 + 5.13665\,LGCF$$
$$(20.6148)$$

The variables are converted into log transformation and these values represent long-term elasticity measures. The t-statistic of the co-integrating coefficient of

GCF is given in brackets. The coefficient for GCF is positive, which implies that increase in the gross capital formation enhances the economic growth of India. And this positive impact of GCF appears to be statistically significant. Thus the result is in line with the theoretical predictions.

Table 3: Cointegrating Vector

Cointegration Equation		
GDP	**GCF**	**Constant**
1.0000	-5.136651 (0.24917) [-20.6148]	306.2549

Note: Standard errors in ( ) & t-statistics in [ ].

Table 4: Vector Error Correction Estimates (VECE)

Error Correction	D(GDP)	D(CF)
CointEq1	-0.224346 (0.05420) [-4.13942]	-0.059318 (0.03147) [-1.88514]
D(GDP(-1))	-1.344592 (0.58503) [-2.29833]	-0.527437 (0.33966) [-1.55285]
D(GDP(-2))	-0.901247 (0.60895) [-1.47999]	-0.356357 (0.35355) [-1.00795]
D(CF(-1))	2.610182 (1.10092) [2.37092]	1.177198 (0.63917) [1.84176]
D(CF(-2))	0.577779 (1.21665) [0.47489]	0.352242 (0.70636) [0.49867]
C	95.81553 (21.0422) [4.55350]	29.86293 (12.2167) [2.44444]

Note: Standard errors in ( ) & t-statistics in [ ].

The coefficient of error correction term (ECT), as shown in Table 4, is negative (-0.224346) and statistically significant at 5 per cent level of significance, indicated by greater t-statistic value (4.13942) than critical value (1.96) at 5 per cent level. This implies that GDP do respond significantly to re-establish the equilibrium relationship once deviation occurs. Thus the statistically significant negative ECT confirms the long-run equilibrium relation between GDP and GCF. The significant negative sign of relation between GDP and GCF reflects a healthy convergence rate to equilibrium point per period. From the results presented in the Table 4, it could be inferred that GDP will converge towards its long-run equilibrium after the change in GCF at lag 1. Thus, the value of next year's GDP is influenced to a higher degree by the current year's GCF and this prediction appears to be accurate by 95 per cent.

The results also show that the change in the GCF is not influenced much by the lagged value of GDP. Therefore, VECM results confirm that GDP converges toward its long-run equilibrium after the change in GCF at lag 1. Thus, from this it is found that capital formation has significant positive impact on economic growth process of Indian economy.

As the Johansen cointegration test exhibits only the presence of long-run equilibrium relationship between GCF and GDP, pairwise Granger causality test is applied to capture the degree and direction of relationship between the two variables under study. The results of Granger causality test are presented in Table 5.

Table 5: Results of Granger Causality Test

Null Hypotheses	Observations	F-statistic	Probability	Decision
GDP does not Granger cause GCF	36	6.23944	0.0005	Reject
GCF does not Granger cause GDP	36	6.07513	0.0006	Reject

From the results it appears that there exists causality between GCF and GDP. The test explores bidirectional causality between the two variables. The causality runs from GCF to GDP and from GDP to GCF. It means that the value after GCF can help us to expect the value for the next period of GDP

and also the value after GDP can help us to expect the value for the next period of GCF. Hence, GDP is Granger caused by GCF and GCF is Granger caused by GDP. Based on the results of Granger causality test, F-statistic values are significant and hence, null hypotheses (H_4: GDP does not Granger cause GCF and H_5: GCF does not Granger cause GDP) are rejected. This leads to the conclusion that capital formation Granger cause economic growth and economic growth also Granger cause capital formation. Therefore, capital formation and economic growth are mutually correlated in India.

7. Summary and Findings

The paper examines the relationship between capital formation and economic growth in India using annual data over the period 1970 to 2013. The unit root properties of the time series data were assessed using ADF test after which the cointegration and causality tests were conducted. The vector error correction model was also estimated in order to examine the short-run dynamics. The major findings of this study are the following:

- Based on the results of unit root test, the null hypotheses that there exist unit root problem in GCF and GDP time series data are rejected. The unit root test ensured that both GCF and GDP are stationary at first difference [I(1)] in case of augmented Dickey Fuller (ADF) test.

- The Johansen cointegration test confirmed that economic growth and capital formation are cointegrated, indicating an existence of long-run equilibrium relationship between the two. The trace test under Johansen cointegration method indicates two cointegrating equations at 5 per cent level of significance.

- The normalized cointegrating equation derived from the VECM indicates that capital formation has profound positive impact on GDP. This long-run positive relationship is tested statistically significant by a negative coefficient of the error correction term.

- The Granger causality test results revealed the presence of bidirectional causality. It suggests that GDP does Granger cause GCF and GCF does Granger cause GDP. Thus, the causality runs from GCF to GDP and from GDP to GCF indicating that, in Indian economy, high economic growth leads to high capital formation and, in turn, high capital formation drives economic growth.

8. Conclusion

The study reveals bidirectional causality between capital formation and economic growth in India and these results have significant policy implications. It is imperative for the national government to create pre-conditions for capital accumulation. Firstly, fiscal and monetary measures must encourage households and business community to save more. Secondly, banking services should be made available in every village so as to promote rural savings and mobilize their savings. Thirdly, a liberal and competitive investment climate should be created so that savings mobilized by the banks will channel towards investment in the creation of more capital assets such as physical capital, human capital and technology. This improves the potential for productivity growth. The onus of providing very conducive environment for capital formation is on the government. Agricultural sector, manufacturing sector and services sectors as well could gain from strongly-built capital assets. Therefore, it is imperative for the Government of India to frame a policy for encouraging public, private and foreign investment in such areas of the economy which would enhance sectoral capital formation, and, in turn, driving inclusive economic growth.

As the results of the VECM test reveal that economic growth of India is influenced by the capital formation of the previous year, key policy measures focusing on developing infrastructure, improving human resource quality through health, education and sanitation, mechanization of all spheres of economic activities should be drafted by the government. These steps would speed up the process of development and, in turn, would attract foreign direct investment and absorb more domestic savings into investment. Hence, the liberalized savings and investment policy on the one hand, and inclusive growth policy on the other, will have profound positive and complementarity effect on each other to augment the process of wellbeing in the country.

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Overconfidence, Risk Tolerance and Investment Strategy: A Study of Capital Market Investors in India

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Abstract

Traditional finance theories postulate that capital markets are efficient and that investors are rational. Markowitz, Fama and Samuelson pioneered thinking in traditional finance in the fifties and sixties. Later on, objections were raised on the assumption of rationality of investors. One actual behavioural trait exhibited by investors, which is far from being rational, is overconfidence. The present paper investigates the existence of overconfidence among investors, their risk tolerance levels and their impact on investment strategies adopted by them. The study showed significant levels of overconfidence that can impact investors' strategy. Investors do fall into very distinctive categories of risk tolerance levels. They can be risk taking and risk averse, but majority are risk neutral. Investors can have distinctive levels of risk attitude/tolerance and overconfidence, but it is found that their risk attitude does not impact or determine their overconfidence.

Keywords: Traditional finance, Behavioural finance, Overconfidence, Risk tolerance.

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1. Introduction

The primary role of the capital market in any economy is to ensure mobilization of capital and its allocation to various productive avenues in an efficient manner. Firms should be able to make appropriate production and investment decisions as well. All market participants make their investment decisions on information gathered from various sources. An individual, investing in stocks of firms, would attempt to minimize risks and maximize returns. In the traditional approach to decisions on investments and stock portfolio selection, investors were expected to follow a framework based on expected performance of investments and his risk appetite. This foundation later came to be referred to as the modern portfolio theory (Markowitz, 1952).

For an investor going for an investment in a stock, his future risks and returns depend largely on two things: one, the future trends in stock price, and two, the price he pays for the purchase. This inevitably raises two questions: one, whether the purchase price paid by the investor is correct and two, whether the future price trends can be predicted accurately. The concept of efficient-market hypothesis has been extensively used to provide answer to the first question. Prices at any time in the market fully reflect all available information on the stock, provided the capital markets are efficient. Thus, prices paid by investors are always correct, thereby, making it impossible to consistently generate above normal trading gains. Empirical evidence is scarce to reject efficiency of markets (Fama, 1965). As to the second question, there have been arguments and counter-arguments regarding whether the past history of a stock's price can be effectively used to accurately predict the future price of the stock. Many chartist theories, assuming that past behaviour of a stock price is rich in information content of its future behaviour, postulate that future prices can be predicted. History repeats itself so that patterns in past prices repeat in the future, thus facilitating better investment decisions and better returns. The theory of random walk is in complete contrast with the chartist's assumptions (Fama, 1970).

In competitive markets, prices display changes over time that takes the form of a random walk, with no predictable bias. It means that if prices are properly anticipated, next period's price differences are uncorrelated with, or completely independent of, previous period's price differences. If numerous sequences of prices are observed, it will turn out that, on an average, there

exists no upward or downward shift anywhere. This means one thing – there is no way of making profits by extrapolating past changes in prices by charts or by mathematics (Samuelson, 1965).

Fallacy of Traditional Finance

Traditional finance theories that have attempted to define investment decisions are primarily normative in nature. They define a prescribed behaviour that the investors should ideally follow to construct a portfolio, rather than a behaviour that is actually followed (Fabozzi, Gupta & Markowitz, 2002). This raises the question on whether investors are really rational. This is because, where it is postulated on one hand that capital markets are efficient to reflect true and fair prices, irrational investors on the other hand can thwart the correct prices. They can cause the market prices to move away from the fair price. The simplest description of human behaviour would assume that people are motivated by self-interest and can be calculating when valuable opportunities arise, learning from others' success. It does not mean that investors can be irrational or thoughtless. It implies that investors can be biased by various external social influences, perceptive skills and simplified thumb rules in their decision making (Andreassen, 1993).

Irrational investors can cause price deviations in the short-run (bring down prices by selling, being pessimistic), but rational investors, stepping in, would correct the prices immediately (bring up prices by buying, being optimistic and seeing opportunity to buy at low prices) (Friedman, 1953). But this argument has suffered theoretical criticisms. Strategies adopted by rational investors to correct prices can be very risky and costly, making it ineffective to practice. Thus, mispricing remains unchallenged, casting serious doubts on market efficiency (Barberis & Thaler, 2002).

A number of studies in the field of behavioural finance empirically have shown that overconfidence influences the investment strategies adopted by investors. However, such studies are done mostly in Western countries and not in the Indian context. Therefore, the present study intends to analyze the levels of overconfidence exhibited by equity investors in India and understand the relationship between overconfidence and investment strategy.

The attempt is to verify whether Indian investors are far from being rational as is assumed by traditional finance theories. It is also intended to understand the risk-taking capacity of investors that can influence the way they behave in the market. The role of overconfidence and risk capacity in guiding investing behaviour is also studied.

2. Literature Review

Review of literature is done in three areas: behavioural finance in general, overconfidence, and risk perception in investing.

2.1 Behavioural Finance

The fallacy of traditional or standard finance assuming rationality of investors is that it ignores the emotional and cognitive weaknesses that affect them (Statman, 1995). There are common investment mistakes that are caused by these weaknesses. Traditional finance fails to address actual investment behaviour and its consequences (Baker & Nofsinger, 2001). Traditional finance can be very satisfying and simple only if its predictions about the market and investors are confirmed. Moreover, it has been proved over the years that market and investor behaviour cannot be easily understood under the traditional framework. Behavioural finance is the new approach to financial markets to respond to the difficulties faced by the traditional framework. The new approach argues that many phenomena in the financial markets can be better understood using models which accept that agents are not fully rational (Barberis & Thaler, 2002). It integrates classical economics and finance with psychology and decision-making sciences, attempting to explain two things – one, why anomalies have been observed in finance literature, and two, how investors systematically make errors in judgment. These errors or mental mistakes can cause investors to form biased expectations regarding the future, which in turn causes the securities to be mispriced (Fuller, 1998). There are investors who are prone to committing errors that can be minor or fatal, seriously damaging their wealth (Shefrin, 2000). Such investors take risks that they do not acknowledge, experience outcomes that are not anticipated, commit unjustified trading, and end up blaming themselves or others for the outcome (Kahneman & Piepe, 1998). There has been extensive amount of work done on the types of mistakes committed by investors, casting doubts over the existence of rationality.

Investors can bias their investment decisions by having their judgment based on stereotypes, causing them to buy stock that represents desirable qualities, rather than intrinsically good ones. In cognitive dissonance, investors may tend to reject or ignore their recollections or beliefs about the poor past performance of their investments and even try to remember that their investments had performed better than what it actually did (Akerlof & Dickens, 1982). Investors can also be biased by their preference for stocks that are more familiar to them, putting too much faith in them. They, forcing themselves to believe that familiar stocks are better than even diversified portfolio, can excessively trade in such stocks. Familiarity bias can compel investors to prefer and buy stocks of firms that have a very local business presence (Huberman, 2001). Investors can tend to be affected by their swings of mood in their analysis and judgment of investments. They can also suffer from optimism bias causing failure in critical investment analysis and ignoring negative information on their stocks.

Fischer and Gerhardt (2007) identified the basic behavioural factors affecting investor as: fear, love, greed, optimism, herd instinct, the focus on the recent experience, and overconfidence. Hon-Snir, Kudryavtsev, and Cohen (2012) examined five behavioural biases in decision-making process in the stock market and differences of possible individual solutions due to these behavioural deviations such as disposition effect, herd behaviour, availability heuristic, gambler's fallacy and hot-hand fallacy. Bikas, Daiva, and Lina (2012), explained the psychological effects of investing activities. Gholizadeh and Iraj (2013) identified meaningful relationship between behavioral biases such as, compatibility, familiar concept, realistic belief, fresh point, irreversibility and investment decisions among investors in Tehran stock market.

2.2 Overconfidence

Investors can also be misled to excessively believe in their capabilities of selecting better-performing stocks. They can consider their knowledge of stocks to be much better and their predictions of future markets to be more accurate. Overconfidence can also be very pervasive and act as a trap (Belsky & Gilovich, 1999). It can be said that investors also fall into the error of wrongly interpreting information to confirm their prior beliefs particularly where they possess very limited capacity or experience to manage information effectively. Even in cases where investors had actually experienced setbacks

in their stock investments, when they were asked, they were sure that the future expected returns of their portfolios would generate above-average returns (Baker & Nofsinger, 2002). Investors can overestimate the accuracy of the market information available to them and exhibit biases in the way they interpret the information. They believe more in their valuation of stock and are less concerned about what others believe about the stock (Barber & Odean, 1999). It has also been proved that overconfidence in investors can lead to high levels of trading activity (Barber & Odean, 2001). Glaser and Weber (2007), tested the hypothesis that overconfident investors will trade more than rational investors by correlating individual overconfidence scores with several measures of trading volume of individual investors. Rostami and Zohreh (2015) found out that there is a significant relationship between overconfidence bias and investing in Tehran stock exchange.

2.3 Risk Perception

Risk is commonly defined in negative terms. It is used to denote the probability of suffering losses, or having actions that involve unpredictable dangers. But when it comes to defining risk in finance and investments, it simply refers to uncertainty of returns – the extent of variation that occurs in the actual returns generated from the expected in the course of a particular choice of investment decision (Andreassen, 1993). Under the concept of rationality, risk in investments can include losses as well as gains, since it is not the direction (up or down) of movement of returns, but the magnitude that is important.

Risk and its evaluation are very important in the matter of investment decisions. Random variations in returns and its volatility make accurate predictions of risk very difficult. Underestimation of risk can cause very poor investment decisions (Biais & Weber, 2008). Shafi, Muhammad, Mubashir, Imran, and Kashif (2011) suggested strong relationship between risk perception and investment decision.

2.4 Overconfidence, Risk Tolerance and Investment Strategy

Investors need not necessarily be always rational when it comes to decisions about their investments. It is also known that investors can be classified on the basis of their risk tolerance levels. While some can be extremely averse to risk taking, there can be some who love it. Jauhari (2011) clustered the

behaviour of an Indian investor investing in various instruments into "fundamental perspective", "acquaintance perspective", "public perspective", and "individual perspective". Rakesh (2014) analysed the behaviour of individual investor in Indian stock market and concluded that investors assimilate the objectives of saving, the factors influencing the saving, and the sources of information for decision making.

Literature talks about overconfidence that can lead to irrational investment decisions. It also talks about the varying levels of risk tolerance among investors which can cause changes in the investment strategy. But most of the studies in this regard are undertaken in Western countries. Most of the studies on risk tolerance are undertaken from traditional-finance perspective, and not from the behavioural-finance perspective. Not much studies are undertaken on the relationship between risk tolerance and overconfidence. There exist gaps in the literature pertaining to the relationship between overconfidence and investment strategy in the Indian context, risk tolerance and investment strategy from behavioural-finance perspective and relationship between risk tolerance and overconfidence.

3. The Scope of Study

The present study is undertaken in the framework of behavioural finance, which tries to establish the relationship between behavioural anomalies – overconfidence, risk tolerance and investment strategy. A number of studies in the field of behavioural finance, empirically have shown that overconfidence influences the investment strategies adopted by investors. However, such studies are done mostly in Western countries and not in the Indian context. Therefore, the present study intends to analyze the levels of overconfidence exhibited by equity investors in India and understand the relationship between overconfidence and investment strategy in India. The attempt is to verify whether Indian investors are far from being rational as is being postulated in traditional finance theories. It is also intended to understand the risk-taking capacity of investors that can influence the way they behave in the market. Thus, the role of overconfidence and risk-taking capacity as guiding investing behaviour is studied.

3.1 Objectives of the Study

The following are the objectives of the present study:

i) To evaluate the level of overconfidence exhibited by investors,

ii) To evaluate the level of risk tolerance of investors,

iii) To identify the investment strategies adopted by investors,

iv) To reveal the relation between risk tolerance and overconfidence of investors, and

v) To identify the effect of risk tolerance and overconfidence on investment strategy.

3.2 Research Methodology

Stock investors of different age groups and gender, from different parts of India formed the population under the present study. A sample of 100 investors, who had at least one year of previous investment experience were selected through purposive sampling technique. Twenty investors each were selected from five different States of India – Kerala, Karnataka, Madhya Pradesh, Jharkhand, and Punjab to constitute the sample. The sample profile is given in Table 1.

Table 1: Sample Profile

Age	Male	Female	Total
Up to 25	4	2	6
26 - 35	18	7	25
36 – 45	21	16	37
46 – 55	10	14	24
Above 55	5	3	8
Total	**58**	**42**	**100**

Primary data were collected through a structured questionnaire. The questionnaire administered to investor respondents consisted of three parts – part one, aimed to evaluate investors' level of overconfidence; part two, to evaluate their risk tolerance level; and part three, to evaluate investment

strategies. The questionnaire was developed based on the variables - overconfidence, risk tolerance and investment strategies - identified from previous studies, contextualized into Indian scenario and finalized after discussion with investment experts.

The questionnaire consisted of different statements pertaining to the three parts mentioned above. The responses were marked on a five-point scale of agreement to the given statements – highly disagree (HDA), disagree (DA), neutral (N), agree (A) and highly agree (HA). The scoring pattern of responses was like this: one for "highly disagree", two for "disagree", etc. on an ascending scale culminating with five for "highly agree".

Reliability and validity of estimates were tested using different statistical tools. Chronbach's alpha estimate showed a value of 0.78 indicating high reliability. A pilot study was conducted among 25 per cent of the sample. Overconfidence was measured on the basis of respondents' level of response towards the statements included in the questionnaire. The statements do not purport to directly measure the investors' overconfidence in investments, rather overconfidence is considered as a natural behavioural anomaly, which preexist among investors who are essentially human, exposed or subjected to fallibility. This view is drawn from the existing literature.

4. Results and Discussion

The results of the study are grouped into five parts. They are:

Part One: Overconfidence among Investors,

Part Two: Risk Tolerance among Investors,

Part Three: Relation between Levels of Risk Tolerance and Overconfidence,

Part Four: Investment Strategies, and

Part Five: Impact of Overconfidence and Risk Attitude on Investment Strategy Adoption.

Major findings of the study are given under the five headings below:

Part One: Overconfidence among Investors

Levels of overconfidence were evaluated through a set of statements, attempted to reveal whether the investors were far from being rational. The following were the statements:

Statement 1: *Indian national flag has red colour in its upper part.*

Statement 2: *Dr. Manmohan Singh has his doctorate degree in politics.*

Statement 3: *Tomato is a vegetable.*

Statement 4: *S&P CNX Nifty includes thirty stocks.*

Statement 5: *NSE is bigger than BSE in terms of market capitalization.*

All these statements are obviously false. They were mixed with other statements that were true to ensure unbiased responses. Mean scores, standard deviation and skewness were calculated for response to each statement. One sample t-test was employed to evaluate whether there existed statistically significant levels of overconfidence among the investors. Test value was set as one, denoting the absence of overconfidence. Tables 2 and 3 give the results.

Table 2: Levels of Overconfidence among Respondents

Overconfidence Level	Mean	SD	Skewness
Statement 1	3.550	1.60	- 0.589
Statement 2	2.625	1.46	0.647
Statement 3	3.850	1.27	- 0.942
Statement 4	3.000	1.52	- 0.092
Statement 5	2.925	1.42	0.026

Mean scores were plotted very near to or above three, denoting positive agreement to the statements (Table 2). The t-test reveals that the mean response in all the five cases was significantly different from the test value at 95 per cent confidence level (Table 3). This shows that there existed statistically significant levels of overconfidence among investors. The finding does raise objections over rationality of investors, as is assumed in traditional

Table 3: Levels of Overconfidence among Respondents - One Sample t-test

Overconfidence	Test Value =1				95% Confidence Interval of the Difference	
	t	df	Sig.	Mean Difference	Lower	Upper
Statement 1	10.07	39	0.00	2.55	2.038141	3.061859
Statement 2	7.03	39	0.00	1.625	1.157389	2.092611
Statement 3	14.17	39	0.00	2.85	2.443199	3.256801
Statement 4	8.33	39	0.00	2.00	1.514165	2.485835
Statement 5	8.57	39	0.00	1.925	1.470471	2.379529

finance theories. Investors may take decisions on capital market investments that are far from rational.

Part Two: Risk Tolerance among Investors

Levels of risk tolerance of investors were evaluated through a set of statements. The attempt was to identify the level to which risk in investment was tolerated by the investors. They may be classified as risk averse, risk neutral or risk taker. The following were the statements:

Statement 1: *I prefer an income of (Rs. 1, 00,000 with 60 % certainty + 40 % risk of zero income) than a Rs. 60,000 of certain income.*

Statement 2: *If an investment opportunity comes, I would borrow money to invest.*

Statement 3: *My investment period is 5 years. The stock I just bought fell by 20 %. I would buy more of it.*

Statement 4: *When I hear the word "risk" in money matters, I prefer to explain it as "opportunity".*

Statement 5: *When I take a major financial decision, I am concerned always about possible losses.*

High levels of agreement to the first four statements denote higher risk taking capacity of investors, whereas disagreement denotes risk aversion. In case

of statement five, agreement denotes risk aversion and disagreement denotes higher risk tolerance. These statements were mixed with other statements to ensure unbiased response. Frequencies of responses give an indication of risk attitude of investors. Mean scores, standard deviation and skewness were calculated for response to each statement (Table 4).

Table 4: Risk Attitude among Respondents

	Opinion of Respondents							
Risk Attitude	**HDA**	**DA**	**N**	**A**	**HA**	**Mean**	**SD**	**Skewness**
Statement 1	5	28	13	38	18	3.350	1.210	- 0.269
Statement 2	30	15	20	33	3	2.625	1.295	- 0.066
Statement 3	3	23	20	45	10	3.375	1.030	- 0.387
Statement 4	3	20	25	45	8	3.350	0.975	- 0.427
Statement 5	13	55	13	18	3	2.425	1.010	0.766

On an average, investors exhibited substantial levels of risk neutral attitude, with mean scores hovering around three. Nearly sixty per cent of investors exhibited risk neutral attitude, whereas as nearly twenty per cent each exhibited risk aversion and risk taking attitude.

Part Three: Relation between Risk Tolerance and Overconfidence

It was attempted to establish the existence of relation or association that exist between risk attitude and overconfidence of investors. It may be argued that risk takers are overconfident by nature. There is enough empirical proof of investors overestimating their capacity of stock selection, performance of portfolio and assimilation of market information. If investors can be overconfident in their investment decisions, what drives it? Is it their risk tolerance levels that make investors overconfident? Can it be said that an investor who enjoys risk tends to underestimate the intricacies of investments and overestimate their capacity to outperform the market. To identify the existence of association between risk attitude and overconfidence, Somers' D test was performed. Table 5 gives the details.

Table 5: Somers' D - Association between Risk Attitude and Overconfidence

Dependent Variable: Overconfidence	Value	Direction	Significance (5 % Level)
Statement 1	0.003	negative	0.983
Statement 2	0.122	positive	0.299
Statement 3	0.006	positive	0.968
Statement 4	0.035	negative	0.757
Statement 5	0.178	positive	0.125

It was found that there existed very little association between risk attitude (independent) and overconfidence (dependent). In no cases, was the association found to be statistically significant (at 95 % confidence level). The study provides evidence that risk attitude of the investors does not determine levels of their overconfidence. Thus, a risk taker is not driven to higher levels of overconfidence by his risk-loving attitude.

Part Four: Investment Strategies

Investors may individually differ in their strategies adopted for investments. For example, some investors may borrow money to make investments, being optimistic about funding debt services through superior returns from investments. Bearish markets can mean doom to some, forcing themselves out of the market, but others may grab the opportunity and enter the market. Investors were asked to specify their perception in different strategies of investments. The following were the statements:

Statement 1: *Normally a high-priced stock, which lately fell continuously, can be a good buy.*

Statement 2: *Stocks which caused losses previously will not be bought again.*

Statement 3: *Stock which fell after buying, will be sold later only at its purchase price, to avoid loss.*

Statement 4: *Frequent buying and selling of equity can ensure better than average returns.*

Statement 5: *It is very easy to pick good equity shares.*

Statement 6: *Predicting future values of a share to maximize returns is easy.*

Statement 7: *Above-average returns in stock investment is a skill.*

Statement 8: *Knowledge of markets can generate high returns in under-diversified portfolios.*

Statement 9: *My favorite stock is slightly down. Negative news on it from market need not be always true.*

Statement 10: *Favourite stocks, but if very highly priced, is not a good buy.*

The nature of investment strategy adopted by investors was evaluated. Mean scores, standard deviation and skewness were calculated for response to each statement (Table 6).

Table 6: Investment Strategies

Investment Strategy	Opinion of Respondents					Mean	SD	Skewness
	HDA	DA	N	A	HA			
Statement 1	8	23	23	40	8	3.175	1.107	-0.364
Statement 2	3	65	23	8	3	2.425	0.781	0.953
Statement 3	8	53	23	15	3	2.525	0.933	0.720
Statement 4	10	35	23	30	3	2.800	1.067	0.021
Statement 5	10	45	28	13	5	2.575	1.010	0.649
Statement 6	13	43	33	10	3	2.475	0.933	0.475
Statement 7	10	40	20	30	0	2.700	1.020	0.037
Statement 8	10	25	45	0	20	3.750	0.900	-0.363
Statement 9	8	20	18	53	3	3.225	0.050	-0.758
Statement 10	3	23	23	43	10	3.350	1.030	-0.321

There is a strong belief among the investors that the bad news about their bearish favourite stock need not be always true. They also believe that a fovourite stock, if it is highly priced, is not a good buy. It sheds light to a finding that investors are unwilling to bear the cost of investing in an

expensive favourite stock, but on the other hand, they are willing to suffer losses from holding on to their poor-performing favourite stock. There is also solid belief among investors that an expensive stock can be a good buy in its bearish trend. Investors also believe that frequent reshuffling of portfolio can increase returns and that generation of such higher returns is an investment skill.

Investors pursued a strategy of buying back stocks that previously had caused losses. They also reported being ready to suffer temporary losses, by selling off a stock bought, if its price fell, after buying. It indicates that investors were unwilling to hold on to a loss-making stock, but would buy it back later at favourable prices. Investors found that picking the right stock was not very easy, and that it was difficult to predict future stock prices to maximize returns.

Part Five: Effect of Overconfidence and Risk Attitude on Investment Strategy

Attempt was made to identify whether the risk attitude and levels of overconfidence of investors impacted the investment strategies adopted by investors. For example, what makes an investor believe that a stock, which was sold off for making losses in portfolio previously, can be bought back later? Is it his risk attitude or is it his overconfidence that makes him decide so? To identify the existence of impact of risk attitude and overconfidence on adoption of investment strategies, a regression analysis was performed. Table 7 gives the results.

It is very important to note that the risk attitude of the investors does not impact any of the decisions on investment strategies. None of the values are statistically significant at 5 % level of significance. In contrast, it is found that overconfidence of investors did significantly impact the investment strategies adopted.

Investors belief that a normally high-priced stock in a bearish trend is a good buy was significantly (0.003 significance value) impacted by their overconfidence. Changes in overconfidence level (predictor) caused 47.2 per cent of changes in their investment strategy of belief of good buy of bearish stock (dependent). Investors belief that frequent buying and selling can

Table 7: Effect of Overconfidence and Risk Attitude on Investment Strategy – Regression Results

Investment Strategies	R^2	Overconfidence		Risk Attitude	
		Value	Sig.	Value	Sig.
Normally a high-priced stock, which lately fell continuously, can be a good buy	0.472	0.760	0.003	0.200	0.463
Stocks which caused losses previously will not be bought again	0.280	0.260	0.160	-0.166	0.416
Stock which fell after buying, will be sold later only at its purchase price, to avoid loss	0.347	0.433	0.045	0.272	0.256
Frequent buying and selling of equity can ensure better than average returns	0.385	0.600	0.016	0.061	0.818
It is very easy to pick good equity shares	0.226	0.331	0.169	0.01	0.97
Predicting future values of a share to maximize returns is easy	0.268	0.356	0.107	0.142	0.561
Above-average returns in stock investment is a skill	0.450	0.630	0.006	-0.130	0.600
Knowledge of markets can generate high returns in under-diversified portfolios	0.408	-0.486	0.018	0.175	0.434
My favorite stock is slightly down. Negative news on it from market need not be always true	0.220	0.329	0.189	-0.034	0.902
Favourite stocks, but if very highly priced, is not a good buy	0.267	-0.376	0.122	0.096	0.720

increase returns and that the generation of above-average returns was a skill were also positively impacted by overconfidence levels.

To be noted is the finding that overconfidence of investors had a negative impact (-0.486 value) on their belief that knowledge of markets can generate higher returns in underdiversified portfolios. It is evident from the finding that overconfident investors can underplay the significance of diversification and hold underdiversified portfolio and try to invest in less-known stocks, on which their knowledge is very poor.

5. Limitations of the Study

The study concentrates only on one investment bias – that is over confidence. It does not cover the effect of any other investment bias on investment strategy. The study was conducted using a small sample. Inherent limitations of a small sample survey can be present in this study although efforts were made to solve this problem by making the sample more representative of the population.

6. Conclusion

The present study attempted to evaluate the levels of overconfidence and risk attitude of Indian capital market investors and find insights on various strategies adopted by them. It also attempted to: (i) identify whether there exists any relationship between risk attitude and overconfidence, and (ii) identify whether risk attitude and overconfidence impacted investment beliefs and strategies. The findings emerged from the study are as follows. First, investors need not necessarily be rational when it comes to stock investments. There existed significant levels of overconfidence in their behaviour that can impact their investment activities. This is against the postulations of traditional finance theories. Second, investors do fall into very distinctive categories of risk tolerance levels. There can be risk taking and risk-averse investors, but majority are risk neutral. Third, while investors can have distinctive levels of risk attitude/tolerance and overconfidence, their risk attitude does not impact or determine their overconfidence. That is, a risk taker need not necessarily be overconfident in investment decisions, or a risk averse investor need not be low on overconfidence. Fourth, investors are more sentimental regarding their favourite stocks. They tend to believe that bad news on their favourite stock need not always be true. This may prompt investors in holding on to loss-making favourite stocks. They also tend to stay away from an expensive favourite stock. Fifth, frequent portfolio revision was done to generate higher returns which was considered to be an investment skill. Prediction of future markets to maximise returns was believed to be difficult. Sixth, risk attitude/tolerance of investors was found not to impact investment strategies adopted. Finally, overconfidence of investors was found to significantly affect investment strategies. The impact of overconfidence is very evident particularly when it comes to decisions on buying a bearish loss-making stock, postponing sales of a poor stock to avoid losses, frequency of stock trading to improve returns, investment skills etc.

7. Implications of the Study and Future Direction of Research

Investors are not necessarily rational with regard to their stock market investments, and hence investment strategies can better be designed after considering various investment biases. Also, investors do fall into very distinctive categories of risk tolerance levels. There can be risk-taking and risk-averse investors, but majority are risk-neutral. Future studies can be undertaken in the same area by adding more number of investment biases. Studies can also be undertaken by expanding the list of investment strategies. This study can even be extended by incorporating other investment alternatives.

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Service Quality Indirectly Influences Customer Loyalty via Customer Satisfaction: Results from a Literature Survey

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Abstract

Very little research has been done on the effect of service quality dimensions on customer loyalty. This paper aims to explore the indirect influence of service quality and its dimensions on customer loyalty via customer satisfaction through a survey of existing literature. The study also investigates the direct influence of service quality dimensions as a whole and individually on customer satisfaction. The findings show that service quality parameters such as tangibles, reliability, responsiveness, assurance and empathy as a whole, and individually, indirectly influence customer loyalty through customer satisfaction. It also shows that service quality dimensions directly influence customer satisfaction. To maintain a competitive edge in the market, service-marketing managers can focus on dimensions of service quality with a view to measuring, controlling and improving the satisfaction and loyalty levels of their customers.

Keywords: Service quality, Customer satisfaction, Customer loyalty.

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1. Introduction

Declining customer satisfaction and loyalty become the major concern of service firms because these two factors determine the performance of the firms. Furthermore, the factor that simultaneously influences customer satisfaction and loyalty is customer perception of service quality. With increasingly intense competition for customers in today's service industry, these factors are high management priorities (Parasuraman, 1997). Financial executives and banking strategies are becoming more focussed on service quality to increase customer satisfaction, customer loyalty and business success in the financial services industry (Arasli, Mehtap-Smadi, & Katircioglu, 2005).

In a highly competitive and customer-centred market economy, service organisations are forced to provide high-quality services that generate customer satisfaction and customer loyalty, enlarge market share and improve their performance results.With time, firms are adding advanced services to their customers. In most services, customer satisfaction mainly depends on the process of service delivery, a fact that highlights the important role of the service quality parameters. In any case, customer satisfaction is an important concept because the relationship between customer satisfaction and financial performance has been repeatedly confirmed (Gruca & Rego, 2005).

Customer satisfaction is quite a complex issue and it is also responsible for customer retention and customer loyalty and hence for company's performance. In general, a two percent enhancement of customer retention can lead to a ten percent reduction of overhead costs, which, in turn, improves the profitability (Jamieson, 1994). There is always a possibility that a dissatisfied customer starts searching for another firm offering similar services, resulting in a break in the relationship with the firm, with which he is dissatisfied. Intensive competition has grown in the financial services market, resulting in greater variety and choice for customers within each product market (Asuncion, Martin, & Quintana, 2004).

In marketing of services, the quality of customer service holds primary significance, particularly in the context of sustained business growth of the firm. A study of individual service quality dimensions could provide researchers and managers with a better understanding of the linkages among service quality, customer satisfaction and customer loyalty. As

service quality is deemed a significant factor in increasing customer satisfaction and loyalty, the significance of service quality has been studied by academics and practitioners (e.g., Dukart, 1998; Leal & Pereira, 2003; Umbrell, 2003; and Parasuraman, Zeithaml, & Berry, 1985,1988). This team of researchers also developed SERVQUAL (Parasuraman, Zeithaml, & Berry, 1988), an instrument which played a pivotal role in measuring conventional service quality (Ladhari, 2009).

The purpose of this study is to explore the relationships between service quality parameters, customer satisfaction and customer loyalty. The study argues that service quality parameters lead to customer satisfaction, which in turn affects customer loyalty.

2. Conceptual Framework and Hypotheses

2.1 Service Quality Parameters

Service quality is a customer's judgement about a product's overall excellence or superiority (Zeithaml, 1988) and is similar to an attitude (Zeithaml, 1988; Parasuraman et al., 1985). Parasuraman, Zeithaml, & Berryin their exploratory research in 1985 on service quality identified ten dimensions in assessing the service quality. In 1988, these leading scholars further identified common themes in the ten dimensions and condensed the dimensions down to main five as given in Table 1.

Table 1: Five Main Parameters of Service Quality

S.No.	Dimension	Definition
1	Tangibles	The physical facilities, equipment and appearance of a firm's employees.
2	Reliability	The ability of service firms to perform the promised service dependably and accurately.
3	Responsiveness	Willingness to help customers and provide quick service.
4	Assurance	The knowledge and courtesy of a firm's employees and their ability to inspire trust and confidence.
5	Empathy	Caring and personalized attention provided by the service firm.

Source: Parasuraman et al. (1988).

Based upon their findings, they developed an instrument known as SERVQUAL scale (Kim, 2000), which consists of 22 questions measuring expectations and 22 questions measuring perceptions. Many researchers have studied the measurement of service quality. The most well-known instrument for measuring service quality is SERVQUAL, which was introduced by (Parasuraman et al., 1988). Since its introduction, SERVQUAL has been widely applied in various fields and provided meaningful information (Heung, Wong, & Qu, 2000). SERVQUAL has been widely acknowledged and applied in various service settings (Gilbert & Wong, 2003; Saleh & Ryan, 1991; and Vandamme & Leunis, 1993). Subsequent work widely utilised SERVQUAL instrument in different sectors of the service industry (Avkiran, 1994; Babakus & Boller, 1992; Buttle, 1996; Cronin & Taylor, 1992; Fick & Ritchie, 1991; Newman, 2001; and Smith, 1995) and despite concerns about the number and composition of service quality dimensions (Brown, Churchill & Peter, 1993; Carman, 1990; and Cronin & Taylor, 1992), the SERVQUAL framework is still considered a useful tool for measuring service quality (Bottle, 1996; Bloemer, de Ruyter, & Wetzels, 1999; and Wong & Sohal, 2003) as the five dimensions capture the general domain of service quality fairly well (Parasuraman, Zeithaml, & Berry, 2005).

Within the services marketing literature, overall service quality is normally not viewed as a separate construct but treated as an aggregate construct whereby the individual dimensions are summed to obtain an estimate of overall service quality (Dabholkar, Shepherd, & Thorpe, 2000; Sachdev & Verma, 2004; and Zhou, 2004). Previous research studies have also utilised direct measures of overall service quality using either a single item or multiple item statements (Dabholkar, et al., 2000). The service literature views service quality as an overall assessment of product or service attributes (Parasuraman et al., 1988), of which the SERVQUAL metric is a measuring device.

2.2 Service Quality and Customer Satisfaction

Customer satisfaction has been widely accepted among researchers as a strong predictor for behavioural variables (Liljander & Strandvik, 1995; and Ravald & Gronroos, 1996). Satisfaction in a relationship is centred on the roles assumed and performed by the individual parties (Crosby, Evans, & Cowles, 1990; Murstein, Cerreto, & MacDonald, 1977; and Storbacka,

Strandvik, & Gronroos,1994) defined customer satisfaction as a customer's cognitive and affective evaluation based on his or her personal experiences across all service episodes within the relationship.

Some researchers consider the concepts of service quality and customer satisfaction to be synonymous, as a high degree of correlation has been found between them (Oliva,, Oliver, & MacMillan,1992). Others have found notable distinctions between customer satisfaction and service quality (Sureshchander, Rajendran, & Anatharaman, 2002; and Bitner & Hubbert, 1994). Different opinions have also been expressed about the antecedents of service quality and customer satisfaction. Kotler and Levy (1969) reported that customer satisfaction is connected primarily with the concept of value and price, while service quality is related to customer needs and expectations. In addition, Cronin and Taylor (1994) specified service quality as impacting on long-term attitudes and customer satisfaction as the result of customer evaluating a specific experience (transaction with the firm).

However, more recent research has considered a somewhat different position that service quality leads to customer satisfaction. In this case, service quality is regarded as the independent variable and customer satisfaction as the dependent variable (Jamal & Naser, 2002; Ting, 2004; and Parker & Mathews, 2001). Although, for many years, arguments focussed on the causal relationship between service quality and customer satisfaction, recent approaches argue for merging the two elements into one (Gronroos, 2001) stating that service quality dimensions should be measured alongside customer satisfaction. Quality, as such, should not be measured, because research indicates that the technical and functional features directly influence perceived customer satisfaction. These arguments confirm the significance of different dimensions of service quality to a varying degree and highlight the need for the research reported here. Hence, we posit the following hypotheses:

H1. Service quality parameters are positively and directly associated with customer satisfaction. In particular:

H1.a. Tangibles of service delivery are positively and directly associated with customer satisfaction.

H1.b. Reliability of service delivery is positively and directly associated with customer satisfaction.

H1.c. Responsiveness of service delivery is positively and directly associated with customer satisfaction.

H1.d. Assurance of service delivery is positively and directly associated with customer satisfaction.

H1.e. Empathy of service delivery is positively and directly associated with customer satisfaction.

2.3 Service Quality and Customer Loyalty via Customer Satisfaction

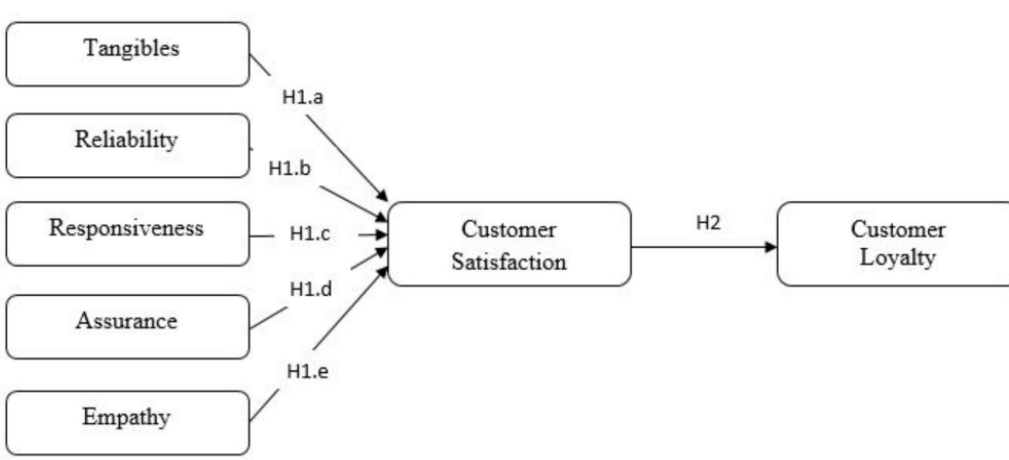
Customers who feel they have obtained value from a product or service may develop loyalty. Loyalty, in turn, breeds retention which translates into higher corporate profits. Customer loyalty can be explained in three things (Oliver, 1999). First, loyalty is shown by customers' behaviour in doing repeat purchase. Second, loyalty is indicated by customers' attitude toward the company. This includes preference and commitment towards brand and recommending it to others. Third, it is the combination of customers' behaviour and attitude towards the company. That is, besides actively repeating purchase, the customers also give positive appraisal of the brand and share the company's positive value to others. Reichheld and Sasser (1990) concluded that customer defections had a stronger impact on the financial performance of an organization than other factors, as it pertained to gaining competitive advantage. Since there is a learning curve that both the company and customer must travel, research suggests the longer a company keeps a customer, the more profitable that customer becomes. Customer loyalty is an important theoretical as well as practical issue for most marketers and customer researchers (Aaker, 1992; and Reichheld, 1996). In the context of services, a number of scholars have highlighted the significance of loyalty (Asuncion et al., 2004; Bloemer et al., 1999; and Caruana, 2002). Greater loyalty can lead to lower marketing costs (Aaker, 1991), enhanced opportunities for brand extensions and increased market shares (Buzzell, Gale, & Sultan, 1975; and Buzzell & Gale, 1987). It can also encourage favourable word of mouth and greater resistance among loyal customers to competitive strategies (Dick & Basu, 1994) and can lead to lower levels of price sensitivity among customers (Keller, 1993; and Rundle-Thiele & Mackay, 2001). Customer loyalty is also an important antecedent to brand equity, which in turn is significantly important in creating differentiation and competitive advantage (Aaker, 1991; and de Chernatony & McDonald, 1998).

However, despite tremendous interest in loyalty, very little empirical research has explored the effects of key dimensions of service quality on loyalty (Bloemer et al., 1999). With this prevailing focus on customers and service quality, financial firms have been concerned with continuously monitoring how effectively they meet or exceed the needs of their customers (Shin & Elliot, 2001). As a result, the notion of customer satisfaction has emerged as a key factor in modern marketing and consumer behaviour analysis. Winning customer satisfaction through superior service quality has become an effective strategy that service providers diligently strive to pursue. Such a strategy aims at ensuring a 100 per cent satisfactory performance from a customers' viewpoint (Tantakasem & Lee, 2007), ultimately protecting and retaining the loyalty of existing customers. In other words, the direct effect of customer satisfaction on customer loyalty is more likely to be larger than that of service quality. Therefore, it is expected that:

H2: Service quality parameters indirectly influence customer loyalty through customer satisfaction.

Figure 1 shows the conceptual framework of the study, where in the service quality parameters are shown as influencing customer satisfaction which in turn influences customer loyalty.

Fig. 1: Conceptual Framework of the Relation between Service Quality, Customer Satisfaction and Customer Loyalty



3. Methodology

The present study, through a review of existing studies, aims to explore the interrelationships between service quality parameters, customer satisfaction and customer loyalty. Specifically, the study uses SERVQUAL dimensions as predictors of customer satisfaction and customer behaviour intentions (Gronroos, 1990). The study is an attempt to answer how to acquire, develop, and retain loyal and profitable customers in the service industry. Literature was reviewed to clarify the constructs of service quality scale and to develop the interrelationships between customer satisfaction and customer loyalty. The service quality dimensions, customer satisfaction and customer loyalty in this study have been adopted from previous studies. For service quality variable, the researchers have adopted from Bloemer et al.(1999) and Wong and Sohal (2003); for customer satisfaction based on the service quality parameters have been adopted from Spreng & MacKoy (1996); and Storbacka, Strandvik, & Grönroos (1994) and for customer loyalty from Anderson & Mittal (2000); and Athanassopoulos, & Gounaris (2001).

4. Results and Discussion

4.1 Accessing Service Quality Parameters

The identification of different dimensions of service quality (SEVRQUAL) in different surveys has been confirmed by a number of researchers. Babakus and Boller (1992) argue that the number and nature of dimensions depend on the type of service setting. During the last decades competition has intensified and firms have encountered difficulties in selling their goods or services, and also in keeping their market share (Bazini, Elmazi, & Sinana, 2012). As a result, a phrase that has been commonly used in recent times is to keep the “customer in focus”. This represents a threat and, at the same time, an opportunity to firms, as it opens up the possibilities of offering customers a more integrated range of services. The search for competitive advantage has increasingly tended to focus on the service quality and the process of service delivery rather than the service itself. This is particularly significant in the context of complex services (such as stock broking, insurance, mutual funds, banking, mortgages, etc.). Evidence from previous studies suggests that the five principal dimensions which customers use in evaluating service quality are also important tools of service quality scale

for measuring customer satisfaction, customer retention and customer loyalty. Subsequent works have widely utilised service quality instruments.

Table 2 shows the different service quality dimensions cited for research in services.

Table 2: Service Quality Dimensions

S.No.	Dimension	Author and Year
1	Tangibles	Bitner (1990); Parasuraman, Zeithaml, & Berry (1991); Bitner (1992); Yavas, Bilgin, & Shemwell (1997); Wakefield & Blodgett (1999); Bahia & Nantel (2000); Sureshchandar et al. (2002); and Arasli et al. (2005)
2	Reliability	Crosby et al. (1990); Parasuraman et al. (1991); Zhou (2004); Arasli et al. (2005); and Baumann, Burton, Elliot, & Kehr (2007)
3	Responsiveness	Parasuraman et al. (1985); Parasuraman et al. (1991); Yavas et al. (1997); Yang & Jun (2002); and Baumann et al. (2007)
4	Assurance	Parasuraman et al. (1991); (Zhou, 2004); Arasli et al. (2005); and Baumann et al. (2007)
5	Empathy	Parasuraman et al. (1985); Parasuraman et al. (1991); Mouawad & Kleiner (1996); Yavas et al. (1997); and Baumann et al. (2007)

Reimer and Kuehn (2005) took into consideration that physical quality is a directly observable variable by the customers. Physical quality indicates that tangibles have a significant influence on intangible dimensions of service quality. Customers make inferences about the service quality on the basis of tangibles such as buildings, equipment, physical layout, communication materials, etc. that surround the service environment (Bitner, 1990). Bateson (1995) expressed a different opinion arguing that the physical elements of an organisation form behaviours on the path to the service encounter. According to Nguyen (2006), service-scape should consider two types of needs: operational and marketing. Operations are important to improving employee performance (responsiveness and empathy), while marketing positively influences customer beliefs (reliability and assurance). Hence, the service environment (assurance) affects the interactive service features in two ways: it supports employees by providing better and promised services with speed and influences customers by creating expectations of reliability

of services. Parasuraman et al. (1991) argued that reliability was mainly concerned with the outcome of service whereas tangibles, responsiveness, assurance and empathy were concerned with the service delivery process. In other words, customers not only judge the accuracy and dependability (i.e. reliability) of the service delivery but they also judge the other dimensions as the service is being delivered (Parasuraman et al., 1991; and Levesque & McDougall, 1996). Therefore, the role of service quality parameters in customer evaluations of the service delivery, the service outcome and the overall corporate image of the firm cannot be underestimated. Hence, designing a simple and seamless service delivery process helps service providers to shorten the necessary time of delivery of the service products (Al-Hawari, Ward, & Newby, 2009).

4.2 Relationship between Service Quality Parameters and Customer Satisfaction

Customer satisfaction is the full meeting of one's expectations (Oliver, 1980) and can be described as the feeling or attitude of a customer towards a product or service after it has been used (Evans, Jamal & Foxall, 2006). A substantial amount of research has reported a causal link between service quality and customer satisfaction (e.g. Anderson & Sullivan, 1993; Bolton & Drew, 1991; Cronin & Taylor, 1992; and Woodside, Lisa & Robert, 1989). A few studies have investigated the link between each of the service quality parameters and satisfaction and have reported some mixed results as below in Table 3.

These results from existing studies clearly show that the service quality parameters are directly associated with customer satisfaction. Customers perceive service based on the attributes of the service personnel and those of a service firm. The customer-oriented attributes of the service personnel are called human aspects of service quality. These are reliability, responsiveness, assurance, and empathy, and reflect the soft quality attributes of service providers. Favourable interpersonal interactions between customers and employees based on these attributes can improve customer satisfaction (Hartline et al., 2000; and Parasuraman et al., 1985).The attributes of the service firm are called the hard quality. These are the technology and tangible aspects of service quality. Tangible elements include the exterior facilities of the firm like parking, interior décor, furniture and equipment used. Customers look at these tangible elements and make inferences about the firm and its

Table 3: Results of Testing of the Hypotheses

Hypotheses	Results	Sources
H1. Service quality parameters are positively and directly associated with customer satisfaction.	Supported	Anderson & Sullivan (1993); Bolton & Drew(1991); Cronin & Taylor (1992); Woodside et al. (1989); Taylor & Baker (1994); Hartline, Maxham, & McKee (2000); and Parasuraman et al. (1985)
H1.a. Tangibles of service delivery are positively and directly associated with customer satisfaction.	Supported	Arasli et al. (2005); Yavas et al. (1997); Baker, Parasuraman, Grewal & Voss (2002); Parasuraman et al. (1988); and Bitner, Brown, Meuter (2000)
H1.b. Reliability of service delivery is positively and directly associated with customer satisfaction.	Supported	Arasli et al. (2005); Zhou (2004); Baumann et al. (2007); Hartline et al. (2000); and Parasuraman et al. (1985)
H1.c. Responsiveness of service delivery is positively and directly associated with customer satisfaction.	Supported	Yavas et al. (1997); Baumann et al. (2007); Hartline et al. (2000); and Parasuraman et al. (1985)
H1.d. Assurance of service delivery is positively and directly associated with customer satisfaction.	Supported	Arasli et al. (2005); Zhou (2004); Baumann et al. (2007); Culiberg & Rojsek (2010); Hartline et al. (2000); and Parasuraman et al. (1985)
H1.e. Empathy of service delivery is positively and directly associated with customer satisfaction.	Supported	Arasli et al. (2005); Yavas et al. (1997); Baumann et al. (2007); Culiberg & Rojsek (2010); Hartline et al. (2000); and Parasuraman et al. (1985)

service performance. Therefore, the physical environment can have an influence on customer perceptions of service quality (Baker et al., 2002; and Parasuraman et al., 1988). A study of the Cyprus banking system by Arasli et al. (2005) reported that the service quality dimensions of assurance, reliability, empathy and tangibles were predictors of customer satisfaction. Similarly, Yavas et al. (1997) found tangibles, empathy and responsiveness to be important predictors of customer satisfaction among bank customers in Turkey. Additional support came from Zhou (2004), who reported that reliability and assurance were important predictors of satisfaction for bank customers in China. Baumann et al. (2007) found that all dimensions except

tangibility impacted the customer satisfaction of Australian banking customers. Culiberg and Rojsek (2010) found a positive relation between service quality dimensions and overall customer satisfaction, especially with the assurance and empathy aspects of service quality. Accordingly, it is concluded that the better the human, technical and tangible aspects of services, the better the satisfaction of customers. Service quality is the managerial delivery of the service, whereas satisfaction is customers' experiences with the service. Improved service quality will result in more customer satisfaction (Bitner et al., 1994). It is evident from the above that service quality parameters, both overall and individually, are positively and directly associated with customer satisfaction.

4.3 Relationship between Service Quality Parameters and Customer Loyalty via Customer Satisfaction

A vast stream of literature has revealed that customer satisfaction has positive links with customer loyalty and retention (Fornell, 1992; Levesque & McDougall, 1996; Lovelock, Patterson, & Walker, 2001; Oliver, 1980; and Sharma & Patterson, 2000), commitment (Burnham et al., 2003; and Morgan & Hunt, 1994), service quality (Athanassopoulos, 2000; Parasuraman et al., 1988; and Sureshchandar et al., 2002) and behavioural intentions (Olorunniwo, Hsu, & Udo, 2006; and Zeithaml, 2000). The common presumption in such studies is that the prosperity and growth of a service firm depends to a large extent on its ability to build a base of loyal customers and to differentiate itself via superior service quality that results in satisfied customers. In spite of the fact that academics have reached some sort of an agreement that customer satisfaction and service quality are two distinct but intertwined constructs, the evidence documented in the literature concerning the causal sequence of their relationship has been conflicting (Olorunniwo et al., 2006). This issue is of immense significance to service providers in the sense that it provides them with information about whether they need to aim at satisfying their customers or delivering superior service quality and which of those two constructs has greater potential to predict re-purchase intention (Cronin and Taylor, 1992).

A flurry of research has identified customer satisfaction as a salient antecedent to customer loyalty, customer retention, behavioural intention, market share and profitability (Anderson & Mittal, 2000; Athanassopoulos et al., 2001; Beerli, Martin, & Quintana, 2004; Heskett, Sasser, &

Schlesinger,1997; Levesque & McDougall, 1996; Muffato & Panizzolo, 1995; and Wood, 2008). Increased customer satisfaction is presumed to lead to greater customer retention and loyalty, eventually maximising profitability. A satisfied customer is expected to be more likely to form future purchase intention, engage in positive word-of-mouth advertising (Jamal & Naser, 2002) and be more tolerant of price increases (Anderson, Fornell, & Lehmann, 1994). Olorunniwo et al. (2006) pointed out that satisfied customers who maintain a long-term relationship with a service provider tend to impact profitability through their repeat business, shrinking expenditures on advertising, promotion and start-up activities, and spreading positive word-of-mouth.

Most researchers agree that customer satisfaction and service quality act together on customer loyalty. Several studies have identified customer satisfaction as a mediator between service quality and behavioural intentions or customer loyalty (Cronin, Brady, & Hult, 2000; Dabholkar, Shepherd, & Thorpe, 2000; and Olorunniwo et al., 2006). Olorunniwo et al. (2006) found a statistically significant but relatively small direct effect of service quality on customer loyalty. Nonetheless, the direct effect of customer satisfaction on behavioural intentions or customer loyalty was found to be overwhelmingly larger than that of service quality. While a substantial amount of research has reported that overall service quality perceptions act as antecedents of customer satisfaction (Anderson & Sullivan, 1993; Cronin & Taylor, 1992; Oliver, 1997; Taylor & Baker, 1994; and Woodside et al., 1989) and of loyalty (Zeithaml, Berry, & Parasuraman, 1996) via customer satisfaction. Despite the apparent absence of an empirical direct link between service quality and customer loyalty, several studies show that customer satisfaction affects customer loyalty directly (Bolton, 1998; and Bolton, Kannan, & Bramlett, 2000). A substantial amount of research has concluded that satisfaction is an important determinant of customer loyalty (Bearden and Teel, 1983; Cronin & Taylor, 1992; Caruana, 2002; Dick & Basu, 1994; Oliva, Oliver, & MacMillan, 1992; and Selnes, 1993). It is concluded, therefore, that the service quality parameters indirectly influence and associate with customer loyalty via customer satisfaction. Hence, H2 is supported.

5. Conclusion and Managerial Implications

The present study aims to understand the interrelationships among service quality parameters, customer satisfaction and customer loyalty. Existing studies have investigated the link between each of the service quality

dimensions and customer satisfaction. Very limited research has, however, investigated the effects of service quality dimensions on customer loyalty. The paper seeks to investigate the effects of service quality dimensions on customer loyalty via customer satisfaction.

It is evident from the extensive literature survey that service quality parameters, both as a whole and individually, are positively and directly associated with customer satisfaction. The study also revealed the fact that the direct effect of customer satisfaction on customer loyalty was found to be overwhelmingly larger than that of service quality. It means that service quality parameters indirectly influence customer loyalty through customer satisfaction.

The findings suggest that for predictive purposes, managers can focus on dimensions of service quality with a view to measuring, controlling and improving the satisfaction and loyalty levels of their customers (Johnston, 1995). Measures of tangibility, reliability, empathy and satisfaction can provide better feedback to managers regarding the overall levels experienced by their customers. Given the significance of tangibility, managing the evidence and the use of physical environment can be treated as powerful marketing tools (Baker et al., 1994; Bitner, 1990; and LeBlanc & Nguyen, 1988). As many of the mainstream services firms still depend upon a high degree of contact between the firm and the customers, special attention needs to be placed on managing the physical evidence carefully. This could be done by making sure that the physical surroundings are visually pleasing, the contact personnel dress neatly and the overall atmospherics reinforce the firm's positioning statement. Managers can still improve the levels of customer satisfaction and loyalty by improving the overall feel and quality of the environmental factors.

6. Limitations and Future Research

The study has some limitations that must be considered. The study focused only on five main service quality dimensions. There could be some other service quality parameters that influence customer satisfaction and customer loyalty. These open many opportunities for future researchers. It would be advisable to examine the interrelationships between service quality parameters, customer satisfaction, and customer loyalty in services-marketing firms based on primary data collection and analysis. Another

possible area for future research is to replicate the present study in specific service industries such as insurance, banking, and stockbroking, loan financing etc.

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Book Review

The Big Data-Driven Business: How to Use Big Data to Win Customers, Beat Competitors and Boost Profits, Russel Glass and Sean Callahan, John Wiley & Sons, New Jersey, 2015, 224 pages, $21.78.

The author Russell Glass is the head of B2B marketing products for LinkedIn. He is a seasoned technology entrepreneur who founded and then served as president and CEO of Bizo, a B2B audience marketing and data platform, which was acquired for $175 million by LinkedIn in 2014. The co-author Sean Callahan is the senior manager (content marketing) at LinkedIn. Formerly he was the marketing director at Bizo.

The book contains 13 chapters and it starts with the "big benefits" of "big data", traces the evolution of data-driven business, discusses the rise of marketing department and ends with the future of big data.

Big benefits of big data

The early humans collected and analyzed data using their brains. They used data to go beyond the surface impressions that senses gave them. Eratosthenes used data to prove that the earth was round and determined its circumference. Copernicus used data to prove that the earth revolves around the sun. The advent of computers has allowed data to grow at a rate of 2.5 quintillion bytes of data every day. The sheer amount of data and our growing ability to process it has led to the coining of the term,"big data". Big data has impacted everything from sports to politics. Nate Silver, a big data practioner in baseball before he moved on to politics, predicted an Obama victory in 2008 and 2012. Dan Siroker, now the CEO of Optimizely, used data to make Obama victories actually happen.

Evolution of data-driven business and the buyer's journey

The two 19th century entrepreneurs, viz., Marshal Field and John Wanamaker established department stores built on the philosophy of serving the customer. Sears, Roebuck & Company was established to serve customers in the farmlands. Today's companies like Dell, Google and Amazon are data savvy and customer focused.

In the pre-internet days, sales people formed relationships and built trust with the buyers by having lunch and sharing a drink with them. The buyers' journey changed with the advent of internet. Nowadays, the marketing department traces the digital body language of the buyer.

The rise of the marketing department

The integration of technologies like marketing automation software, business intelligence databases, CRM systems, data-management platforms and analytics tools is called the marketing technology stack which enables marketers to read the digital body language of the buyers. In this era the CMO needs to work hand-in-hand with the IT department. The relationship between marketing and sales changed from being rocky to that of greater alignment. Companies such as DocuSign and Bizo used technology to create a greater harmony between sales and marketing.

Earlier, the CMOs and the entire marketing department were right-brained people. But, as data-driven digital marketing gained prominence, the marketing department acquired the left-brained talent as well. This change has helped various CMOs to occupy the CEO positions.

Using data for online advertising to understand customers and pursue prospects

The novelty of banner ads and the increased level of click-through rates contributed to the rise of internet advertising. The other advances that online advertising offered to marketers were ad networks, audience platforms, online advertising exchanges, retargeted display ads and social media advertising.

Companies like Google, Netflix and Pandora Media (internet radio service) have attained success by collecting and leveraging data to serve customers and create great products. The software as a service (SaaS) business model and the predictive lead-modelling companies have helped in understanding customers and pursuing prospects.

Implementing a big data plan

A large corporation such as Tellabs.com embraced big data. It is easier for smaller companies and start-ups to implement data-driven marketing

principles. There are eleven principles for bringing big data into the business.

The data has the ability to influence website design, measure PR performance, study the power of display ads and test market-creative campaigns. The data also attributes the contribution made by each and every one of a company's marketing tactics to leads and to revenue. The three basic attribution models are last-click attribution, rules-based attribution and algorithmic attribution.

Data can be a matter of corporate life and death

The RDBMS (relational database management system) market controlled by Oracle, IBM and Microsoft was disrupted by a data-driven and customer-focused start-up, Splice Machine. Ignoring of data led to the downfall of companies like DEC, Tower Records and Borders Books & Music. Also, the mistake of not embracing data has led to the near death experience of Blackberry, Culture Clash of New York Times and the missed opportunity of General Electric.

Corporations need to act responsibly because there are increasing incidents of corporations crossing the line to know far too much about consumers. The companies need to embrace complete transparency to address the privacy concerns raised by online advertising and retargeting. The corporations need to own the responsibility of protecting their customers' privacy.

Big data's big future

Some of the key trends defining big data's future are personalization of website using analytics software, integrating data silos and platforms to get a 360-degree view of the customer, measuring the impact of marketing programmes, checking whether the website is navigable in a smartphone, creation of internet-enabled machines that generate their own data, privacy security issues, product development and social media generated data. The big data is set to transform every industry including healthcare, government and the education sector.

The authors have done justice by unraveling the hidden secrets of big data.This book is a must read for marketers because the book beautifully traces the changes that are happening in the marketing department due to the availability of "big data". This book will help marketers to rethink on

certain concepts of marketing. The book provides an interesting experience to its readers with examples of companies ignoring “big data” and paying a heavy price.

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The length of the article should be 3000-6000 words (inclusive of tables and figures) with about 1 inch left, right, and top and bottom margins each. It must have sections and subsections which are named and numbered as appropriate. The material should be formatted in Times New Roman, font size 12 and double spaced. All tables and figures are to be serially numbered (in Arabic numerals) and sequentially placed after references in the text. The source should be indicated at the bottom of tables and figures, wherever necessary. It has to be noted that all tables and figures are to be also given in a separate word file with the file mentioning the paper to which they belong. Also, all tables and figures should be in black and white and not in colour.

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