The Impact of SaaS Quality on Customer Satisfaction in the Egyptian Telecom Service Providers

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Abstract

The goal of this research is to empirically investigate the influence of SaaS Quality on Customer Satisfaction in Egyptian telecom service providers: The objectives of this research are: to examine the relationship between SaaS Quality and Customer Satisfaction, to test the relationship between SaaS Quality and Social Capital, to test t the relationship between social capital and Customer Satisfaction, and to investigate the mediation role of social capital between SaaS Quality and Customer Satisfaction. The methodology used is focused on quantitative analysis utilizing an online survey tool to collect the necessary data and AMOS software for structural equation model analyses (SEM). The study's main findings are that: there is a statistically significant direct effect between SaaS Quality and Customer Satisfaction, as well as a statistically significant direct effect between SaaS Quality and Social Capital. Social Capital has a statistically significant direct effect on Customer Satisfaction. Finally, the study found that there is a partial mediation effect of the Social Capital between SaaS Quality and Customer Satisfaction in Egyptian telecom market.

***Keywords**: SaaS Quality, Social Capital, Customer Satisfaction, Telecom.*

Introduction

The telecommunications industry plays a vital and enormous role in the financial stability of developed as well as developing countries, especially Egypt. As is the case in many nations, government officials and the telecommunications sector are working hard to provide these vital services, especially to remote areas, in order to eradicate poverty and promote growth in the economy (Asongu & Odhiambo, 2020). The regulation of the communications industry in order to achieve a multiplier effect on the country's economy has driven the success of telecommunications in Egypt, resulting in the growth of other sectors like education (Chidozie et al., 2015). According to Bhavnani et al. (2008), gaining access to vital information is the key to the development of knowledge, which plays a significant role in fostering skills, strengthening underprivileged communities, and interconnecting numerous institutions associated with economic development. The communications field can play a key part in facilitating such relationships and addressing other developmental challenges if it is administered effectively (García, 2019). The industry of telecommunications is the largest market for telecom companies and one of the fastest-growing industries in the service sector. Due to their remarkable technological advancement and a growing number of machine operators in a competitive market, both developed and emergent telecoms have become vital to organizational management and economic growth in the majority of countries. The objective of mobile service quality is to both attract new users and retain existing ones. Numerous studies (Ifie et al., 2018) have elaborated on the vital role of SaaS quality in client recruitment, especially through word of mouth.

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Software-as-a-service (SaaS) is a term with multiple definitions, but one way to describe it is as a software distribution model where programs are hosted by a vendor or service provider but made accessible to clients online (Laroui, 2021). Additionally, both large and small businesses look into ways to go from a product provider to a service provider in an effort to capitalize on the trend. Even Apple, a firm that has always been viewed as a hardware company, has started to lean more toward services (Floerecke, 2018). SaaS has been becoming increasingly popular among consumers as Netflix and similar services become more widely used.

According to the preceding explanation, the concept of SaaS Quality and its impact on customer outcomes has been verified in the Western context. Nonetheless, additional study is needed in the African context in general (Palladan & Ahmad, 2019) and in a developing economy like Egypt. The findings of this study will have a significant impact on existing literature, as information on the concept of SaaS Quality and its customer outcomes is sparse in Egypt. As a result, experts have focused their attention on how customers obtain service quality. Users' expectations and actual performance obtained from mobile telecom staff facilities were shown to be the most important predictors of alleged SQ (Palladan & Ahmad, 2019).

The primary objective of this study is to use social capital theory in examining the post-adoption of Software as a Service (SaaS) and its impact on customers' intention to explore new features of SaaS services, ultimately leading to client loyalty. The researcher uses service quality to complement structural capital as an indicator, as it is more suitable for assessing the service structure of systems. The study will be guided by the following objectives:

1- To investigate the relationship between SaaS quality and satisfaction in the Egyptian telecom market.
2- To examine the relationship between social capital and customer satisfaction in the Egyptian telecom market.
3- To identify customers' internal behavior as a social capital that exists in the relationship between SaaS quality and customer satisfaction in the Egyptian telecom market.
4- To validate the proposed model investigating the relationship between SaaS Quality and satisfaction, a mediating role of social capital in the Egyptian telecom market.

Literature Review

SaaS Quality is considered as the independent variable, Social Capital is considered as the mediator variable and Customer Satisfaction is considered as the dependent variable.

Software-as-a-Service (SaaS)

Cloud computing is taking the world by storm, and in the last few years, the world has witnessed the emergence of an explosion of new subscription services, ranging from streaming to various audio and e-book services. The services fall under the umbrella of SaaS, or software as a service. For the use of a SaaS program, customers often pay a monthly or yearly charge. For the average person, the businesses selling SaaS just offer software to utilize. In actuality, the company accomplishes much more. They manage all aspects of IT support for the software, including daily software maintenance, data backups, software updates, and gathering and archiving user data.

Thus, SaaS providers may be said to supply computational utility (Dubey & Wagle, 2007). Not long ago, after purchasing software, it was delivered to the customer by hand, with the vendor assisting in the installation. Following that, customers had complete ownership of the product, but in order to keep the software operating and in continuous use, they had to provide all IT infrastructure, including hardware and support services (Dubey & Wagle, 2007). The SaaS players upended the old software model (also known as shrink-wrap software) and ushered in a new order. Instead of the time-consuming process of purchasing and maintaining software on your own, software became essentially a service to be pur-

chased in this exciting new world. The following explores the conceptual definition of six SaaS-Qual factors according to (Benlian et al., 2012) as follows:

- **Rapport:** Includes all aspects of a SaaS provider's ability to provide professional, understanding, and courteous support (e.g., joint problem-solving or aligned working styles) as well as individualised attention (e.g., support that is tailored to the individual requirements of the customer).
- **Responsiveness:** Consists of all aspects of a SaaS provider's ability to guarantee the availability and performance of the SaaS-delivered application (for example, through professional planning for disaster recovery or load balancing) as well as the responsiveness of support staff (for example, 24x7 hotline support availability).
- **Reliability:** includes all features of a SaaS vendor's capacity to perform the promised services in a timely, dependable, and correct manner (e.g., provision of error-free services).
- **Flexibility:** Covers the degrees of flexibility consumers have in their relationship with a SaaS vendor to adjust contractual (e.g., cancellation period, payment mechanism) or functional/technical (e.g., scalability, interoperability, or modularity of the program) features.
- **Features:** refers to the extent to which a SaaS application's key functionalities (for example, data extraction, reporting, or configuration features) and design features (such as the user interface) meet the customer's business requirements.
- **Security:** includes all components to guarantee that regular (preventive) measures (such as regular security audits, usage of encryption, or anti-virus technology) are taken to prevent unintentional data breaches or corruptions (such as via loss, theft, or invasions).

The Social Capital Theory

Social capital theory refers to the social capital existing in social networks and is primarily concerned with the significance of social relationships for accessing resources or information (Adler & Kwon 2002) and value creation (Nahapiet & Ghoshal 1998). Social capital emerges throughout social interaction and supports long-term interpersonal relationships in addition to mutual trust, and the sharing of knowledge, experience, and information (Nahapiet & Ghoshal, 1998; George et al., 2014).

Social capital comprises three dimensions: structural, cognitive, and relational capital (Nahapiet & Ghoshal, 1998). Structural capital is "the overall pattern of connections between actors-that is, who you reach and how you reach them" (Nahapiet & Ghoshal, 1998). Structural capital is created by the structure of the social network and the interactions amongst actors, counting the location of actors and the frequency of communication. It describes the impersonal configuration of relationships between people or units. Cognitive capital is "resources providing shared representations, interpretations, and systems of meaning among parties" (Cicourel, 1973).

Cognitive capital highlights the common understanding that facilitates interactions amongst the actors in the social network. Relational capital is assets that are generated and leveraged throughout social relationships, including trust and trustworthiness, obligations, norms, and identification (Nahapiet and Ghoshal, 1998). It characterizes resources rooted in the interpersonal relationships throughout a history of interaction amid actors. This multi-dimensional viewpoint of social capital delivers a valuable theoretical lens to examine the IT service coproduction process, since each of the three dimensions facilitate exchange and combination of knowledge resources (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998).

This research proposes that only two of the three dimensions of social capital (relational and cognitive capital) directly influence the intention to explore SaaS features, since structural capital represents multirotational personal social networks, whereas in this SaaS case firms only get a single resource from each individual service provider. Thus, service quality will be used instead of structural capital, because the consequences of service quality is more suitable for defining the SaaS system structure and the situation in the workplace.

Customer Satisfaction

Customer satisfaction, as defined by Bhattacherjee (1988), is a result of job performance and is a person's good emotion that causes them to value their job. This idea would suggest that in the case of SaaS, a customer's level of satisfaction is based on whether the service provider satisfies the expectations set when the program was acquired (Chou & Chiang, 2013). Since customers have high expectations these days and it is impossible to ignore them, it is crucial to put their satisfaction first while producing a product or service. According to Taghizadeh et al., (2013), businesses may increase revenues by ensuring that customers are satisfied with their product or service so that they will spread the word about them. Prior research examined satisfaction with technical rather than socio-technical factors, notably communication, which was lacking in prior studies (Basiran & Yusof, 2021).

The importance of service quality in measuring customer satisfaction stems from the fact that satisfying user requirements increases customer satisfaction. Carlson and O'Cass (2010), Kao and Lin (2016), and Zhou et al. (2019) have all conducted extensive research on the influence of e-service quality on customer satisfaction, underlining the positive effect. Since the introduction of service quality research, there has been a shift from physical to essentially electronic services in the field of service delivery. (Du et al., 2013) Traditional models for measuring service quality no longer satisfy the requirements for developing a comprehensive representation of the quality of e-services. Table 1.1 explores a summary of the literature regarding the relationships between variables as follows:

Table 1.1: A Summary of the Literature Regarding the Relationships between Variables

SaaS Quality and Customer Satisfaction	
Authors/ Year	**Findings**
Chou (2019) Benlian et al., (2011) Chou & Chiang, (2013) Chou, (2019) Baumann et al., (2020)	- The author stated that, When the quality of a relationship is deemed outstanding, it may result in the client developing a sense of trust towards the provider, probably leading to long-term advantages. - The authors confirmed that, the primary determinant for consumers to engage in repeat purchases of a product or service is the degree of customer satisfaction since it has been empirically shown that customer satisfaction has a substantial and statistically significant impact on the likelihood of continued use. - The authors emphasized that, the decision to continue using a product or service is comparable to the decision to repurchase in that they both include the following characteristics: usage, the decision to continue using a product or service comes after the first decision to use or buy. Furthermore, the initial use of the product or service plays a crucial role in influencing the subsequent decision to sustain its usage. Additionally, the scenario may potentially lead to the discontinuation of the initial purchase.
SaaS Quality and Social Capital	
Authors/ Year	**Findings**
Chang & Wong (2010) Chou & Chiang (2013) Chou & Hsu (2015) Benlian et al., (2011)	- Relational capital affects users' interactive behaviours while using SaaS service features. The relationship between a customer's company and other SaaS users, as well as the impact of quality interaction on the customer's decision-making process, may both improve the client's incentive to develop additional system features. - Customers' worries about SaaS's interaction quality are alleviated because of the service's capacity to foster a sense of familiarity and trust between itself and its users, as well as to facilitate the client's exploration of the system's functionality.
Social Capital and Customer Satisfaction	
Authors/ Year	**Findings**
Ozmen et al., (2015) Saleem & Raza (2019) Smith et al., (2009)	- The significance of social capital in the telecom business was investigated by the authors, who found that social capital significantly influences customer satisfaction. Customer satisfaction was found to be positively impacted by both the structural and relational components of social capital, such as network ties and trust. - The authors examined the impact of social capital on customer satisfaction. They found that customer satisfaction was significantly boosted by social capital, specifically trust. The results of the study suggested that increasing the number of individuals who use their services is the greatest way to enhance the quality of life for customers. - The authors demonstrated the existence of a positive association between social capital and customer satisfaction. They examined the effect of social networks in the context of online purchases and found that customers who used social networks had higher levels of customer satisfaction than those who did not. Because of the common ties inside these networks, customers were able to voice their opinions, seek advice, and get suggestions, resulting in better-informed purchasing choices and greater levels of customer satisfaction with the products or services they chose.

Conceptual Framework and Research Hypotheses

The conceptual framework is established after analyzing existing theories and models and was applied to the data collection and data analysis. The independent variable "SaaS Quality" is measured by 6 dimensions: (Rapport, Responsiveness, Reliability, Flexibility, Features and Security) (Benlian et al., (2012), The variable "Social Capital" is measured by 2 dimensions (relational capital and Cognitive capital) (chiu et al., 2006); and the variable "Customer Satisfaction" is measured by (Sanita et al., 2019); (Ipukite & Geipele, 2017).

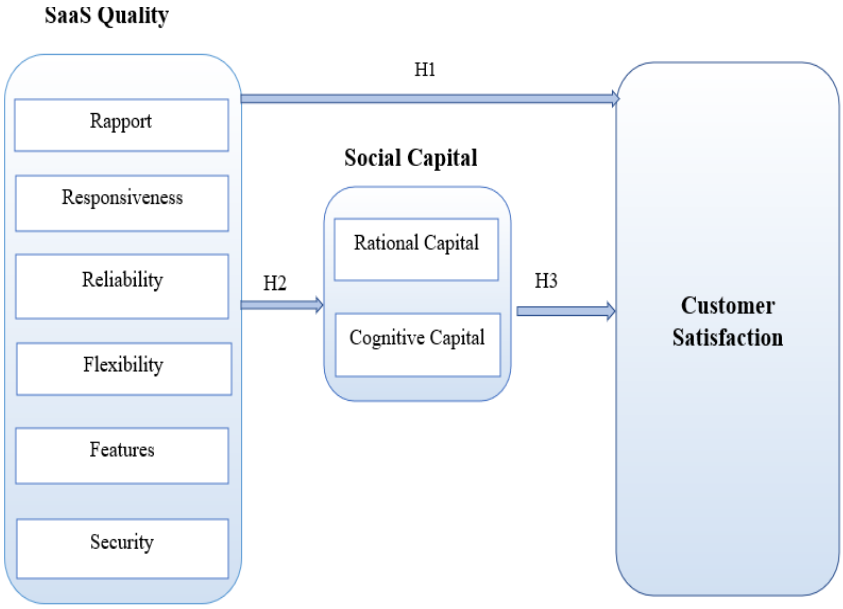

Figure 1 Conceptual Framework

The study hypotheses are formulated as follows based on the conceptual framework, the formulated model, and the reviewing of relevant studies and theories:

- **H_1:** SaaS Quality has an impact on Customer Satisfaction in the Egyptian telecom service providers.
- **H_2:** SaaS Quality has an impact on Social Capital in the Egyptian telecom service providers.
- **H_3:** Social Capital has an impact on Customer Satisfaction in the Egyptian telecom service providers.
- **H_4:** Social Capital mediates the relationship between SaaS Quality and Customer Satisfaction in the Egyptian telecom service providers.

Research questions could be stated as follows:

1- What is the impact of SaaS Quality on Customer Satisfaction in the Egyptian telecom service providers?
2- What is the impact of SaaS Quality on Social Capital in the Egyptian telecom service providers?
3- What is the impact of Social Capital on Customer Satisfaction in the Egyptian telecom service providers?
4- Does Social Capital mediate the relationship between SaaS Quality and Customer Satisfaction in the Egyptian telecom service providers?

Research Methodology

The sample of this research considers SaaS customers who subscribes to internet services from Egyptian telecommunications firms, whether through an ADSL subscription or a mobile internet subscription, serve as the unit of analysis in this study. The questionnaire was divided in two broad categories. The first category is made up of general information and the second category is the body of the questionnaire that includes three sections: first: SaaS Quality included (Responsiveness, Reliability, Flexibility, Features and Security). Second section: Social Capital and Third section: Customer

Satisfaction. A Likert-scale was used to measure opinions. The research questionnaire was given to 800 people, and 463 questionnaires representing 57.9% were returned, and 48 questionnaires representing 6% were incomplete or ineligible or refusals and 337 (42.1%) were not reached. There were 415 acceptable responses, a response rate 51.9%, which is very good given the nature of the study. The structural equation modelling (SEM) software package was utilized in this Research Paper to investigate the interrelationships between the constructs of the hypothesized model. Testing Hypotheses After completing a confirmatory factor analysis, the structural model is valued by evaluating the hypotheses that underpin the research model.

Results and Findings

Composite Reliability (CR) of Rapport = 0.879, Responsiveness =0.878, Reliability =0.827, Flexibility = 0.919, Features = 0.918, Security =0.884, Relational Dimension = 0.926, Cognitive Dimension =0.767 and Customer Satisfaction =0.946). As a result, it is evident that all of the constructs in the measurement model are reliable.

The Average Variances Extracted (AVE) of the constructs (Rapport = 0.594, Responsiveness =0.590, Reliability =0.560, Flexibility = 0.739, Features = 0.737, Security =0.606, Relational Dimension = 0.715, Cognitive Dimension =0.528 and Customer Satisfaction =0.714) are more than 0.500. Overall, the measurement results are satisfactory, indicating that the structural model may be evaluated.

Measurement Model Result: The 9 factor was CFA using the AMOS application. The value of DF was 824 (it should be more than 0), c^2 /DF has a value of 2.426, that is less than 3.0 (it should be less than or equal 3.0). The RMSEA was .055 (it should be less than 0.08). The TLI index was .915 which is very close to 1.0 (a value of 1.0 indicates perfect fit). The CFI was .922. All indices are close to a value of 1.0 in CFA, indicating that the measurement models provide good support for the factor structure determined through the CFA.

Structural Model

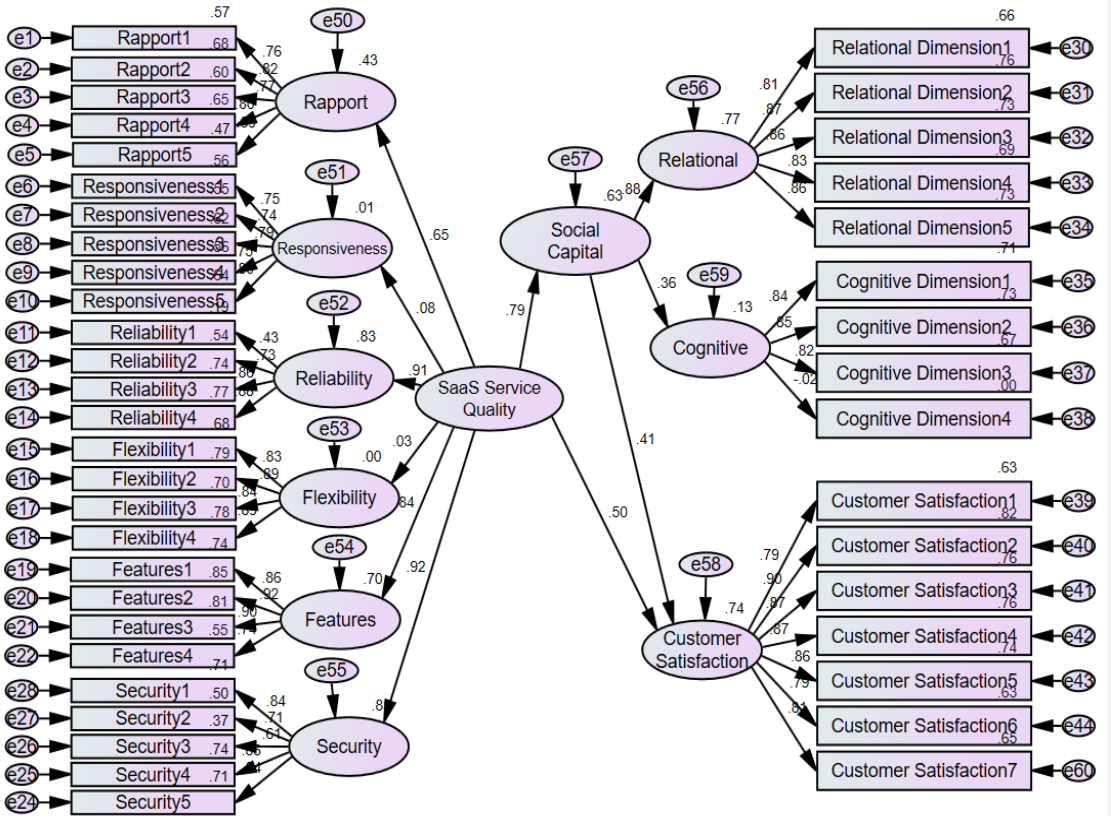

Figure (2) Structural Model

Structural Model Validity: The findings of the structural model using the AMOS software shows that DF was 849 (it should be more than 0), c^2 /DF has a value of 2.444, that is less than 3.0 (it should be less than or equal 3.0). The RMSEA was .056 (it should be less than 0.08). The TLI index was .914 which is very close to 1.0 (a value of 1.0 indicates perfect fit). The CFI was .919. All indices are close to a value of 1.0 in CFA, indicating that the measurement models provide good support for the factor structure determined through the CFA.

Discussions

The aim of this research paper is to investigate the relationship between SaaS Quality and Customer Satisfaction in the Egyptian telecom services providers, with the role of Social Capital as a mediating variable. The study used a quantitative correlational methodology to obtain primary sample data from 415 Egyptian SaaS customers. The findings and hypothesis testing revealed that the independent variable (SaaS Quality) had a significant positive effect on Customer Satisfaction (dependent variable) in the Egyptian telecom service providers, SaaS Quality has a positive effect on Customer Satisfaction, SaaS Quality has a positive effect on Social Capital. Social Capital has a positive effect on Customer Satisfaction Finally, Social Capital mediates the relationship between SaaS Quality and Customer Satisfaction in the following ways:

The first objective is to investigate the relationship between SaaS Quality and Customer Satisfaction and **H_1:** SaaS Quality has an impact on Customer Satisfaction in the Egyptian telecom service providers. The findings reveal that SaaS Quality has a substantial direct association with Customer Satisfaction. (β = .500, CR (Critical Ratio) = 4.082, CR > 1.96, p = 0. 000, p<0.05). This is consistent with (Benlian, et al., 2011; Chou and Chiang, 2013; Chou, 2019) whom emphasized that, the level of customer satisfaction is the most important factor for customers to purchase a product or service again, with customer satisfaction having a validated significant effect on usage continuance. The decision to continue using a product or service is similar to the decision to repurchase in that both share the following aspects; the decision to continue usage follows an initial decision to use or purchase. Second, the first usage of the product or service impacts the decision to continue using it; third, the scenario might result in a termination of the initial purchase (Baumann et al., 2020). Moreover, SaaS users pay on a regular basis, service providers rely heavily on their customers' continued intent and subscription renewal, resulting in a SaaS provider spending a significant amount of time, money, and effort interacting with customers to create commitment after their first purchase (Baumann et al., 2020).

The second objective is to test the relationship between SaaS Quality and Social Capital. and **H_2:** SaaS Quality has an impact on Social Capital in the Egyptian telecom service providrs. The findings reveal that SaaS Quality has a significantly positive effect on Social Capital. (β = .792, CR (Critical Ratio) = 13.448, CR > 1.96, p = 0. 000, p<0.05), This result is in the same vein with George et al., (2014) who reported that, the quality of the client's interaction with the SaaS service being utilized mirrors the interaction quality. Also, interaction quality reflects the relationship between the customer and the SaaS service features, which positively impacts social capital. Moreover, relational capital impacts the interactive behaviours of customers while using SaaS service features. The relationship of a customer's business with other SaaS users can increase the client's incentive to build new system feature interactions, as well as the influence of interaction quality on the customer's decision-making process (Chang and Wong 2010; Chou and Chiang 2013; Chou and Hsu 2015). By encouraging the role of social capital in the post-adoption stage, outcome quality impacts relational and cognitive capital and mirrors the success of the innovative features in the workplace (Chou and Hsu, 2015). It is anticipated that these investments will alleviate customers' concerns regarding the interaction quality of SaaS, as they increase the customers' rapport with the system as well as the system's adaptability (Benlian et al., 2011) and support the client's ability to investigate new system features.

The third objective is to examine the relationship between Social Capital and Customer Satisfaction, and **H_3:** Social Capital has an impact on Customer Satisfaction in the Egyptian telecom service providers. The findings show that in Egyptian telecom service providers., Social Capital has a significant direct relationship with Customer Satisfaction. (β = .411, CR (Critical Ratio) = 2.788, CR > 1.96, p = 0.005, p<0.05). This finding is consistent with Sun et al., (2012) who explored the influence of social capital in online communities on customer satisfaction. They discovered that customers who join in online communities develop social capital, which improves their satisfaction with the product or service. Higher satisfaction results from a sense of belonging shared standards, and trust within the group. Smith et al. (2009) confirmed that social capital and customer satisfaction have a positive relationship. They examined the role of social networks in the context of online purchasing and found that customers who participated in social networks had greater levels of customer satisfaction than those who did not. Customers were able to voice their thoughts, ask for guidance, and get suggestions because of the shared relationships within these networks, which eventually resulted in better-informed buying decisions and higher levels of customer satisfaction with the items or services they selected. Furthermore, Saleem and Raza (2019) investigated the influence of social capital on customer satisfaction in the Pakistani telecommunications industry. They found that social capital, specifically trust, significantly increased customer satisfaction. The researchers' findings suggest that the best way to improve the quality of life for consumers is to increase the number of people who use their services.

The fourth objective is to investigate the mediation role of Social Capital between SaaS Quality and Customer Satisfaction. and **H_4:** Social Capital mediates the relationship between SaaS Quality and Customer Satisfaction in the Egyptian telecom service providers. The results indicate that partial mediation effect of the Social Capital between the relationship of SaaS Quality and Customer Satisfaction in the Egyptian telecom service providers. (P = 0.004, P<0.05). Our findings are in line with earlier SaaS studies that show SaaS quality as one of the most important factors in resolving clients' concerns about multi-tenant architecture (such as limited customization), which in turn affects customers' satisfaction and post-adoption intention.

Authors Contributions

This research paper has fulfilled the research gaps and contributed to the body of literature regarding the impact of SaaS quality on customer satisfaction with mediation role of social capital theory in the Egyptian telecom context. Further, it came as a response to the call of (Gupta and Prasad, 2023) while social capital has been studied extensively in other contexts, such as organizational behavior and community development, there is limited research on its application in the Egyptian telecom market. This research gap has been fulfilled by examining the specific social capital factors that are relevant to this market and how they impact customer behavior.

According to the analysis, At the 5% significance threshold, all are considered significant. The estimated structural model corroborated the four hypotheses, as SaaS Service Quality construct explained 62.7 % of Social Capital variance (R^2 = 0.627), Besides, SaaS Service Quality through Social Capital explained 74.4 % of Customer Satisfaction variance (R^2 = 0.744). This research provides insights to partitioners and policy makers to pay more attention to the importance of social capital and its effect on the satisfaction levels of SaaS customers which in turn affects the reuse intention and continuous decision with SaaS services of such telecom services providers.

Research Limitations

The degree to which the conclusions may be extrapolated to a larger population, cases, or situations is referred to as external validity. (Saunders et al., 2019) As a result, the researcher cannot presume that the findings apply to other situations, so the study excludes:

First, Because the participants in this study come from just one nation (Egypt) and are all Egyptian telecom companies, the findings should be taken with a grain of salt. In spite of the fact that the research was conducted in a very specialised context, it is believed that the findings can be applied to a variety of other sectors, industries, and countries. Second, cross-sectional data were used in this study to examine the relationship between SaaS Quality and Customer Satisfaction, as well as the mediating role of Social Capital in the Egyptian telecom market. As a consequence of this, the study only offers a picture of a single instant in time. This suggests that the findings of the research are only useful under certain conditions, including when external factors such as governmental regulations, economic activity, the competitive climate, and so on are unaffected. Third, Data gathering from respondents over a set period of time utilising a convenience sample approach had its limitations. The scope of potential responders was constrained by the short time span for data gathering. Because responses are collected based on the accessibility of respondents, this method may not produce a representative sample and may also lead to potential limitations in the range of respondents who would participate.

Future Research Suggestions

The following areas for further investigation are suggested based on the findings of this study: First, a study should be undertaken utilizing a qualitative technique or a mixed strategy using both qualitative and quantitative approaches in order to acquire SaaS Quality on Customer Satisfaction views and expectations. Second, a longitudinal study should be done to examine the long-term relationship between SaaS Quality and Customer Satisfaction in the Egyptian telecom market, with the mediating role of Social Capital. Third, because the sample was limited to only Egyptian telecom market, a sample derived from other sectors, industries would improve the generalizability of the findings in the future. This would also aid in comparing the relationship between SaaS Quality and Customer Satisfaction, as well as the role of Social Capital in mediating the relationship between SaaS Quality and Customer Satisfaction, in other sectors and industries. It is also recommended to test another theory likewise TAM as a mediator in the relationship between SaaS quality and satisfaction.

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