



Can Service Quality Explain Why Users Switch from Free to Premium Services? The Moderating Role of Free Mentality

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ABSTRACT

The current study mainly aims to identify the role of free mentality as a moderator variable in the relationship between service quality and intentions to switch from free to premium services.

The study relied on the analytical descriptive approach, using a questionnaire directed to a sample of (290) academic researchers in public and private universities in Egypt. The results showed that there is a direct positive significant effect of service quality and its dimensions (Assurance, Reliability, responsiveness) on purchase intentions. It also showed that there is a direct negative significant effect of free mentality on purchase intentions, Finally, Results was shown that free mentality moderates the positive effect of service quality and its dimensions (Assurance, Reliability) on purchase intentions.

Keywords: Switching from Free to Premium Services Freemium Model - Purchase Intentions - Service Quality - Free Mentality.

ملخص البحث :

سعت الدراسة بشكل رئيس للتعرف على دور العقلية المجانية كمتغير معدل للعلاقة بين جودة الخدمة ونوايا التحول من الخدمات المجانية إلى الخدمات المميزة، وقد اعتمدت الدراسة على المنهج الوصفي التحليلي، وذلك باستخدام قائمة استقصاء موجهة لعينة قدرها (٢٩٠) من الباحثين الأكاديميين بالجامعات الحكومية والخاصة في مصر. وقد توصلت النتائج إلى وجود تأثير معنوي إيجابي مباشر لجودة الخدمة بأبعادها (الأمان، المصداقية، الاستجابة) على نوايا الشراء، كما تبين وجود تأثير معنوي سلبي مباشر للعقلية المجانية على نوايا الشراء، فيما تبين وجود تأثير معنوي معدل للعقلية المجانية في العلاقة الإيجابية بين جودة الخدمة وبعدها (الأمان، والمصداقية) ونوايا الشراء.

المصطلحات الدالة: التحول من الخدمات المجانية إلى الخدمات المميزة، نوايا الشراء، جودة الخدمة، العقلية المجانية.

1. Introduction

Freemium is becoming one of the most adopted business models in today's businesses, especially the digital business world or as Anderson (2010) phrased it "a country-sized economy". According to Liu et al. (2014) and Kumar (2014), freemium is a business model through which a service is offered for free, but a premium is charged for advanced service features or functionality. The Freemium business model has prevailed in several sectors such as music, games, data cloud storage, online meetings, and social networking (Wagner et al., 2014; Gassmann et al., 2014). This business model has gained popularity over the past few years and seems to be the long-awaited answer to the question of how to earn money from

content on the internet (Wagner et al., 2014). The conversion of a free user into a paying client is crucial for digital service providers to improve overall financial performance (Yan & Wakefield, 2018).

Despite the high demand for the free and basic freemium services, the developers of these services have struggled to generate interest in the additional premium features. Making the core service as high-quality as possible while also attempting to generate demand for premium services has become necessary as a result (Hamari & Keronen, 2016; Hamari et al., 2017).

Previous research has shed light on various reasons why users may convert from free to paying customers. For instance, Wagner & Hess (2013) have investigated the role of the perceived premium fit on users' decision to convert from free to premium, Hamari et al. (2020) analyzed the role of perceived value on continued use and intention to purchase freemium online games. Moreover, Ericška et al. (2022) analyzed the effect of performance expectancy, effort expectancy, and social influence on the purchase intention of freemium online mobile games. Nonetheless, so far, no research has considered the role that service quality can play in making users switch from free to premium services, especially when it comes to academic users.

This study aims to address the question of how the perceived quality of freemium services is associated with the intention to purchase additional premium services. Adding to this purpose, the study also seeks to introduce a possible moderator to this relationship which is free mentality. This empirical survey study is conducted in

the context of software apps used in academic research where the freemium model is widely used.

2. Research Problem and Questions

Since freemium services are basically used for free, many suspicions have been made about the ability of the companies adopting this business model to provide adequate service quality (Hamari et al., 2017). Moreover, researchers have raised many concerns about the inequality that users may feel due to disparate freemium/premium services they get (Alha et al., 2014). Based on prior literature, this discrimination can possibly lead free users to perceive the quality of the service they get as inferior (Mayser & Wangenheim, 2013; Yu et al., 2015).

It is argued that free users usually expect the free service to bring negative experiences to them such as too many advertisements, low service quality, misuse of personal information in forms of breach and unfairness (Alha et al., 2014; Hamari, 2015; Paavilainen et al., 2013). Liu et al. (2014) and Hamari (2015) both emphasized that the dilemma in a freemium business is the fact that without a valuable and high quality core (free) service, users are less likely to continue to use the service, which further reduces the possibility of users switching to premium services. Moreover, when online users highly embrace a free mentality, they are less likely to give much attention to the premium product features even though they believe that the quality of the premium version would outweigh this of the free version. Put simply, users with a strong free mentality tend to be less affected by high perceived service quality of freemium digital products when considering to purchase their premium versions.

The problem of this research can now be expressed through the following questions:

- **R.Q.1:** Does service quality dimensions lead academic users to switch from free to premium services of freemium software/applications they use mostly in their academic research?
- **R.Q.2:** Does free mentality prevent academic users from switching from free to premium services of freemium software/applications they use mostly in their academic research?
- **R.Q.3:** Does free mentality moderate the relationship between service quality dimensions and the intention of academic researchers' switch decision from free to premium?

3.Literature Review and Hypotheses Development

3.1. Freemium Business Model

Anderson (2013) argued that "free" is a multifaceted concept holding several meanings that can be boiled down to four basic categories; direct cross-subsidies in which the company tries to entice people to pay for something in exchange for getting something else for free, the three-party market where a third party (advertiser) pays to be a part of a market created by a free exchange between the first two parties (a producer and a consumer), nonmonetary markets which represents anything people choose to give away with no expectation of being paid back, and lastly freemium which is one of the most common business models used in web businesses.

The term “freemium” which is comprised of two words; free and premium (Gu et al., 2018) is a business model that is widely utilized with digital products or services, including software, games, and web services (Gassmann et al., 2014) and refers to a business strategy in which customers can get a basic version of a product or service for free and switch to a premium version with additional features by paying a price (Anderson, 2013; Liu et al., 2014; Holm & Günzel-Jensen, 2017). As stated by Gassmann et al. (2014), the free version of the product is intended to help the company establish a wide initial customer base, from which it is hoped that a sufficient percent of customers will want to make the switch to the premium product version. Pujol (2010) set an umbrella definition to freemium as he described it as a business model that relies on a free version of a product or service, and within the design of this product, there are complements that can take various forms and are exchanged for a price.

According to Panda (2020), there are five different types of freemium; the time bound where the product is provided for X number of days for free, and then users have to pay to be able to continue to use it, the feature bound where only the basic version of the product is free, the seat bound in which X number of users may use the product for free, however, anyone beyond that number has to be charged for using the product, the customer-type limited where small-sized companies use the product for free but bigger companies have to pay, and finally, Capacity/storage bound in which X amount of capacity or storage is for free and what exceeds this amount requires the user to upgrade to a paid version of the product.

The adoption of freemium business model is argued to be a strategic choice that needs continuous innovation and R&D investment (Holm & Günzel-Jensen, 2017; Strategic Direction, 2017). For digital firms to succeed with freemium they have to sustain a highly appealing and desired product to the mass market and they must satisfy an existing or a potential need of all users. Companies also must continually be driven by customer need (Gassmann et al., 2014). Therefore, it is crucial for businesses to assess whether they can pursue the innovation and growth strategies needed before adopting fermium otherwise, it may be a costly trap (Holm & Günzel-Jensen, 2017).

3.2. Service Quality

Service quality is argued to be the most investigated concept in services marketing (Cronin, 2003; Fullerton, 2014). Service quality can be defined as an overall judgment of the level of the performance of a service firm (Zeithaml et al., 1996). In the same vein, Parasuraman et al. (1988, p.3) defines service quality as “the overall judgment of a firm’s precise service that results from comparing that firm’s performance to consumers’ general expectation of how firms in that industry should operate”. High service quality was proven by many empirical studies to have a key role in achieving key business goals such as customer retention, the attraction of new customers, costs reduction, a strong corporate image, positive word-of-mouth, and, consequently, profitability (Cronin et al., 2000; Ladhari, 2009; Fullerton, 2014; Dam & Dam, 2021; Gontur et al., 2022).

A considerable amount of literature has been dedicated to the development of reliable instruments for the measurement of service quality (Parasuraman et al.,

1988; Frost & Kumar, 2000; Luk & Layton, 2002; Brady & Cronin, 2001). Perhaps the best known and commonly most used of these measures has been the “SERVQUAL” scale, which was originally developed by Parasuraman et al. (1985, 1988) and later refined by Parasuraman et al. (1991, 1994). SERVQUAL has been used to measure service quality in a wide variety of service provision fields (Ladhari, 2009). In their model, Parasuraman et al. (1994) defined five dimensions that determine customers’ perceptions of service quality: tangibles, reliability, responsiveness, assurance, and empathy. The actual evaluations of quality in this model are based on the discrepancy between experiences from receiving the service and customer expectations on these dimensions.

There have been a few extensions and modifications of the SERVQUAL scale to meet the requirements of those types of services that are not physically bounded (Hamari et al., 2017). For instance, the E-SERVQUAL extends the original scale by measuring service quality perceptions in a situation when the customer interacts with a digitally provided service (Zeithaml et al., 2002). However, this modification mainly focused on the area of website quality (Hamari et al., 2017). Another modification of the original model is the SaaS-QUAL which was refined to measure the quality of applications running on a cloud infrastructure (Benlian et al., 2011). Nevertheless, this modification focused more on certain types of apps that are provided on the cloud via a subscription model (Wen & Dong, 2013). Therefore, for the research at hand it was decided to remain with the original SERVQUAL dimensions as it has previously been used in an e-commerce context (Hamari et al., 2017).

Carrillat et al. (2007) argued that the original formation of SERVQUAL scale can lead to inaccurate and probably misinterpreted results because it is developed to measure the gap between expectation and actual performance. As a result, Cronin & Taylor (1994) suggested to reduce the scale to only actual performance as it reflects customers attitudes, and eventually makes it easier to adequately capture consumers' perception of the service quality. In this current study, therefore, instead of investigating the service quality by comparing the expectations with perceptions, it was decided to use the adapted perceptions-only instrument similar to the work of several researchers (e.g., Cronin & Taylor, 1994; Hamari et al., 2017).

3.3.Free mentality

Free mentality is a concept first established by Dou (2004) and refers to a user's fundamental perception that all content on the internet should be provided free of charge. He argues that content on the Internet is perceived as a public good, where no one should be excluded from consuming it. This perception was due to online service providers focusing on providing free online content and services in order to attract more users and expand their market share. As a result of increased market share, online service providers could charge more advertising fees with more people accessing their websites and apps which means more exposure opportunity for advertisers. As an outcome, many Internet users have embraced a belief that online businesses should not charge customers since they have generated significantly large income from advertising. Free mentality can be considered as a significant factor that acts as an impediment for the efforts to monetize online

content which means converting nonpaying users to paying ones (Lin et al., 2013; O'Brien, 2022).

3.4. Hypotheses development

This study investigates the original dimensions of service quality: assurance, empathy, reliability, and responsiveness in freemium services; particularly in four freemium apps used by academic researchers.

Assurance is defined in service quality literature as the trust and confidence of the customer toward the service provider and the service (Ramya et al., 2019). Suryawirawan et al. (2022) argued that it's crucial to maintain consumers trust for service-oriented companies, especially those utilizing the freemium business model. The ecosystem of digital services has its own risks and uncertainties compared to traditional services (Wu et al., 2010). Therefore, providing a perception of assurance toward problems with freemium applications could determine consumers' intention to pay. Thus, hypothesis was proposed as follows:

H1a: Perceived degree of assurance positively influences freemium application's purchase intention.

Empathy is described by Zeithaml et al. (2000) as the degree to which a service can be adjusted toward a customer's needs. In a freemium service, the feature to customize is usually available as a form of premium service. Therefore, customers need to buy premium services to customize the application according to their preferences (Suryawirawan et al., 2022). Zeithaml et al. (2000) argued that the ability of an application to cater to customers' personal preferences would increase their satisfaction. Thus, hypothesis was proposed as follows:

H1b: Empathy positively influences freemium application's purchase intention.

Reliability is defined as a service's technical functionality and accuracy (Zeithaml et al., 2000). Because technical functionality significantly affects the experience of using freemium applications, reliability is also a factor in deciding consumers' intentions to use freemium services and also their evaluation of the app's quality (Lin et al., 2013; Suryawirawan et al., 2022). Customers' perceptions of an application's reliability may be significantly impacted by technical issues like system faults or application crashes. Therefore, the service companies need to provide accurate and reliable services to enhance customer satisfaction. Building on this, hypothesis was proposed as follows:

H1c: Reliability positively influences freemium application's purchase intention.

Responsiveness refers to the degree of reactivity of the service company to its customers, and provision of assistance in case of problems or questions (Zeithaml et al., 2000). In the context of online or digital services, various channels are used for providing assistance to customers, such as social media channels, websites, forums, and FAQs. Suryawirawan et al. (2022) stated that the availability of options that the customers could use when encountering problems is a crucial factor in both usage and purchase intention toward the freemium applications. Thus, a hypothesis was proposed as follows:

H1d: Responsiveness positively influences freemium application's purchase intention.

Free mentality refers to a phenomenon where Internet users believe that all online content should be free (Dou, 2004). This belief is argued to be more eligible to digital content or digital services than to physical products. Niemand et al. (2019) states that the more a user holds this belief and more strongly embraces a free mentality when making decisions in the digital world, the greater the value of a free product when offered is perceived. Wisarutnart & Tseperis (2019) argued that free mentality among other variables such as attitude and subjective norm may have negative effects on online users' purchase intentions. Thus, a hypothesis was proposed as follows:

H2: Academic users' free mentality negatively influences freemium application's purchase intention

As for the moderating role of the free mentality, Yan & Wakefield (2018) investigated the moderating role of free mentality in the relationship between perceived value and the willingness to subscribe to the music-streaming app (Spotify). Therefore, for the study at hand, a hypothesis was proposed as follows:

H3 (a→d): Academic users' free mentality moderate the relationship between service quality dimensions and freemium application's purchase intention.

Research Model

Based on the supporting studies that were discussed in the previous section, purchase intention could be affected by the dimensions of service quality. In addition, free mentality could moderate the effect of service quality dimensions on

purchase intention. The model that depicts the proposed hypotheses above can be seen in Figure (1).

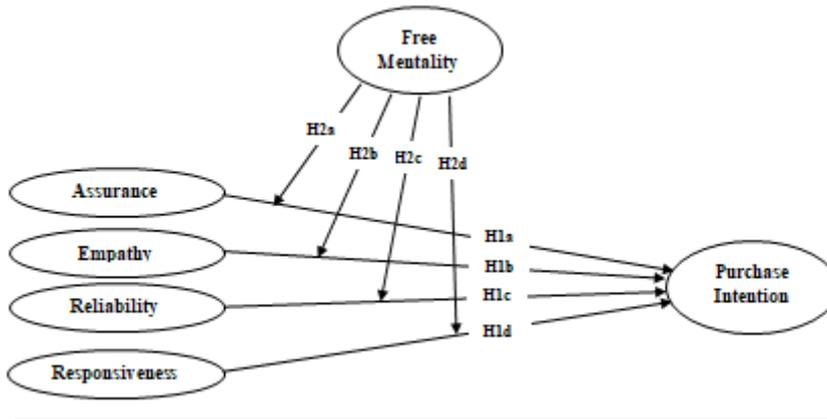


Figure 1: Proposed Research Model

4. Research Methodology

The quantitative approach is the most appropriate approach for the research objective and the nature of the data being analyzed. The quantitative approach refers to the study of phenomena based on a number of statistical methods appropriate to the nature of the data, in order to develop or test theories and hypotheses. The current research also relies on the descriptive approach to describe the reality of the research variables and the relationships between them. Accordingly, the methodology includes several elements, which are as follows:

4.1. Population, Sample, and Data

The target population of this study is academic researchers who are registered in post-graduate academic programs in public and private universities in Egypt. Given the large size of the population, it was decided to rely on a sample of 384 researchers (ref). A purposive sample was adopted to select the respondents. Empirical data were collected via a self-administered questionnaire survey and the process of data collection took roughly 10 weeks. Of the 384 distributed questionnaires, only 290 were returned, which constituted an overall response rate of 75.5%.

A minimum sample size estimation was determined based on the work of several researchers that were concerned about statistical power and sample-size adequacy for Structural Equation Modeling (Barrett, 2007; Kline, 2016). Kline (2016) argued that most SEM studies in different research areas depend on a median sample size of 200. In the same vein, Barrett (2007) stated that reviewers of journal submissions often reject the publication any SEM analysis where $n < 200$. Thus, it could be assured that the collected questionnaires were sufficient for testing the significance of the hypothesized relationships.

Table (1) outlines the demographic details of the respondents. The gender distribution of the data was unequal, with female respondents representing over 65.9% of the sample. Regarding age, most respondents (43.3 %) were under 40 years of age while the experience of most of the respondents ranged from 10 years to less than 20 years at a rate of 39%. Most of the respondents were doctoral researchers at a rate of 43.9%, and as for the income level, the average income of

most of the respondents ranged from 6,000 to less than 10,000 pounds at a rate of 50.8%.

Table (1): Descriptive analysis of the study sample characteristic

Demographic Variables	Sub Variable	Frequency	Percent
Gender	Male	128	34.1%
	Female	162	65.9%
Age	less than 30	43	14.8%
	30 – less than 40	126	43.4%
	40 – less than 50	87	30%
	50 and more	34	11.8%
Experience	Less than 10 years	93	32%
	From 10 to less than 20 years	113	39%
	From 20 to less than 30 years old	66	22.8%
	30 years and over	18	6.2%
Academic level	Master's Researcher	95	32.7%
	PhD Researcher	127	43.9%
	Assistant Professor Researcher	49	16.9%
	Professor Researcher	19	6.5%
Monthly Income	Less than 6000 pounds	86	29.6%
	From 6000 to less than 10000 pounds	147	50.8%
	From 10000 to less than 15000 pounds	41	14.1%
	More than 15000 pounds	16	5.5%

Source: Statistical analysis results

4.2. Measurement

The survey instrument used in this study consists of the constructs of the SERVQUAL scale: assurance, empathy, reliability, and responsiveness, as the independent variables. Furthermore, items on purchase intentions were used as the dependent variable and free mentality was employed as a moderator variable. All of the constructs used in the instrument were adapted from prior literature and the individual items were further adapted to fit the freemium context. See Table (2) for the constructs included in the instrument and the sources from which the constructs have been adapted. All items that were included in the constructs were measured on a five-point Likert scale (strongly disagree – strongly agree). The survey was conducted in Arabic language. Therefore, the items adapted from prior research literature were translated from English to Arabic by the researcher and subsequently checked by a professional translator to verify the correspondence of the translations with the original items.

Table (2): Constructs and Measuring Items

Construct		Adapted from
Service Quality	Assurance	Parasuraman, Berry, and Zeithaml, 1991 Iwaarden et al., 2002
	Empathy	
	Reliability	
	Responsiveness	
Intention to switch from free to premium		Purnami & Agus, 2021
Free Mentality		Dou, 2004

4.3. Statistical Analysis Methods

To analyze data and test the research hypotheses, the researchers relied on statistical programs (Smart PLS V.3 & SPSS V.23) to apply a number of statistical analysis methods, including Cronbach's Alpha, which was used to verify the degree of reliability and validity in multi-content scales. This statistical method was chosen because it focuses on the degree of internal consistency between the variables that make up the scale under test. Pearson Correlation was also used to determine the type and strength of the relationship between the variables under study. Finally, the Partial Least Squares (PLS) method was used to test the current research model and hypotheses, which is one of the methods of Structural Equation Modeling (SEM) using Smart PLS v.3. This is to estimate the parameters of the path model in a way that leads to maximizing the value of the interpretation coefficient (R^2) for the dependent variable. It is also one of the most prominent methods for verifying the validity of discrimination and validity of convergence.

5. Validity and Reliability

Before starting to test the study hypotheses, the validity of the study scales was confirmed to examine the researched phenomena by assessment of the measurement model. To assess the measurement model, the validity and reliability of the scales used in the current study were examined by adopting the Partial Least Squares –Structural Equation Modeling (PLS-SEM). Hair et al. (2019) stated that it is possible to measure the reliability of the study scales through Cronbach's alpha (α) > .70 and Composite Reliability (CR) > .70. As for the validity, it can be measured through the convergent validity using the Average Variance Extracted (AVE) > .50 values and discriminant validity using the Fornell-Larcker coefficient, which is calculated through the square root of the average value of the variance extracted (AVE), where it must the value of the Fornell-Larcker coefficient is greater than the correlation coefficients between the same variable and other variables.

Table (3) shows that all the measurement model loadings (Cronbach's alpha and composite reliability) were greater than 0.70 thresholds and the Average Variance Extracted (AVE) was greater than the 0.50 value. As shown in Table (3), the Factor Loadings were all greater than the 0.60 this means that all the measurement scales are considered valid and reliable.

Table (3): Means, standard deviations, reliability and convergent validity

Variables	Items	Factor Loading	CR	AVE	Cronbach's alpha	Mean	SD
Assurance	I think there are unexpected risks when using money in the app.	0.696	0.910	0.719	0.927	3.641	1.311
	I feel safe using the app.	0.938					
	I trust the app to keep my personal information safe.	0.796					
	I feel safe about using money in the app.	0.938					
Empathy	The app provides me a personalized experience.	0.735	0.864	0.614	0.710	3.775	0.961
	I think I can modify the app experience to my needs.	0.793					
	I am satisfied with the customization options in the app.	0.792					
	It is possible for me to tailor my app experience	0.813					
Reliability	The app is of good quality.	0.867	0.883	0.657	0.759	3.828	0.971
	The app is well made.	0.665					
	I believe that the app works reliably.	0.866					
	I think that the app works as I expect it to.	0.828					
Responsiveness	I believe the company running the app would be responsive to my needs.	0.943	0.895	0.687	0.932	3.499	1.507
	In case of any problem, I	0.723					

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Variables	Items	Factor Loading	CR	AVE	Cronbach's alpha	Mean	SD
	think the company running the app would give me prompt service.						
	The app's customer service will address any concerns that I have.	0.644					
	I trust the company behind the app to offer good customer service.	0.771					
Service Quality			0.968	0.660	0.906	3.685	0.948
Purchase Intention	I intend to pay for app features in the future	0.753	0.858	0.669	0.748	3.693	1.416
	I predict I would pay for app features in the future	0.908					
	I plan to spend more money to purchase app features.	0.785					
Free Mentality	The Internet should be free so that I never pay for the content available on it	0.848	0.868	0.687	0.770	2.684	1.376
	The main purpose of the Internet is to provide information to everyone, so the content should always be free	0.832					
	Advertisers should pay for the content available on the Internet instead of users	0.807					

Source: Statistical analysis results

As for the discriminant validity, the results of the Fornell-Larcker, showed, as shown in Tables (3) and (4), that the value of the Fornell-Larcker coefficient is greater than the correlation coefficients between the variable and other variables in the rows and columns, and this indicates that the study tool is characterized by Discriminant Validity, as it confirms that there is no overlap or common correlation between the study variables.

Table (4): Discriminate validity test results

Variables	Assurance	Empathy	Reliability	Responsiveness	Service Quality	Purchase Intention	Free Mentality
Assurance	0.848						
Empathy	0.629 ^{**}	0.783					
Reliability	0.643 ^{**}	0.753 ^{**}	0.810				
Responsiveness	0.546 [*]	0.607 ^{**}	0.683 ^{**}	0.828			
Service Quality	0.742 ^{**}	0.730 ^{**}	0.801 ^{**}	0.760 ^{**}	0.812		
Purchase Intention	0.561 ^{**}	0.623 ^{**}	0.585 ^{**}	0.611 ^{**}	0.726 ^{**}	0.818	
Free Mentality	-0.485 ^{**}	-0.519 ^{**}	-0.473 ^{**}	-0.461 ^{**}	-0.617 ^{**}	-0.635 ^{**}	0.828

Source: Statistical analysis results

6. Data Analysis and Results

Structural Model Assessment (Hypotheses testing)

The assessment of the structural model is considered the second step in the PLS-SEM analysis. The objective of the structural model assessment lies in assessing the path coefficients- β for confirming the study hypotheses (Hair et al., 2019). The first step of the structural model assessment included examining the direct effect of Service Quality dimensions on Purchase Intention and examining the direct effect

of Free Mentality on Purchase Intention separately from the moderating effect of Free Mentality on the relationship between Service Quality dimensions on Purchase Intention.

The results in Table (5) and figure (2) showed that Service Quality and its All dimensions (Except Empathy) positively affect purchase intentions, the most influential service quality dimension on purchase intentions was Assurance ($\beta = 0.309$, $p < 0.001$), followed by Reliability ($\beta = 0.194$, $p < 0.001$), then Responsiveness ($\beta = 0.143$, $p < 0.001$), while it was found that there was no significant effect of Empathy on Purchase Intentions Which -in conclusion- partially supports the first hypothesis of the study (*H1*) and its sub-hypothesis *H1-a*, *H1c*, *H1-d*. As for Free Mentality, it negatively affects purchase intentions ($\beta = -0.615$, $p = 0.000$), which supports the second hypothesis (*H2*).

Table (5): Direct and Moderating effect test results

H	Paths	β	T-value	P-value
Direct Effect				
H1-a	Assurance \longrightarrow PI	0.309	5.175	0.000
H1-b	Empathy \longrightarrow PI	0.089	1.677	0.072
H1-c	Reliability \longrightarrow PI	0.194	4.447	0.000
H1-d	Responsiveness \longrightarrow PI	0.143	3.294	0.000
H1	Service Quality \longrightarrow PI	0.726	5.681	0.000
H2	Free Mentality \longrightarrow PI	-0.615	-7.611	0.000
Moderating Effect				
H3-a	Assurance * Free Mentality \longrightarrow PI	-0.138	2.916	0.019
H3-c	Reliability * Free Mentality \longrightarrow PI	-0.179	3.871	0.000

H	Paths	β	T-value	P-value
H3-d	Responsiveness * Free Mentality \rightarrow PI	-0.066	1.896	0.092
H3	Service Quality * Free Mentality \rightarrow PI	-0.173	3.217	0.007

Source: Statistical analysis results

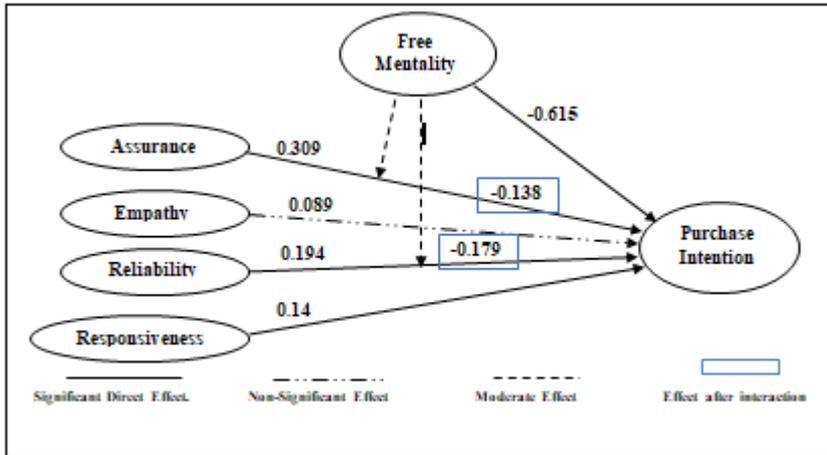
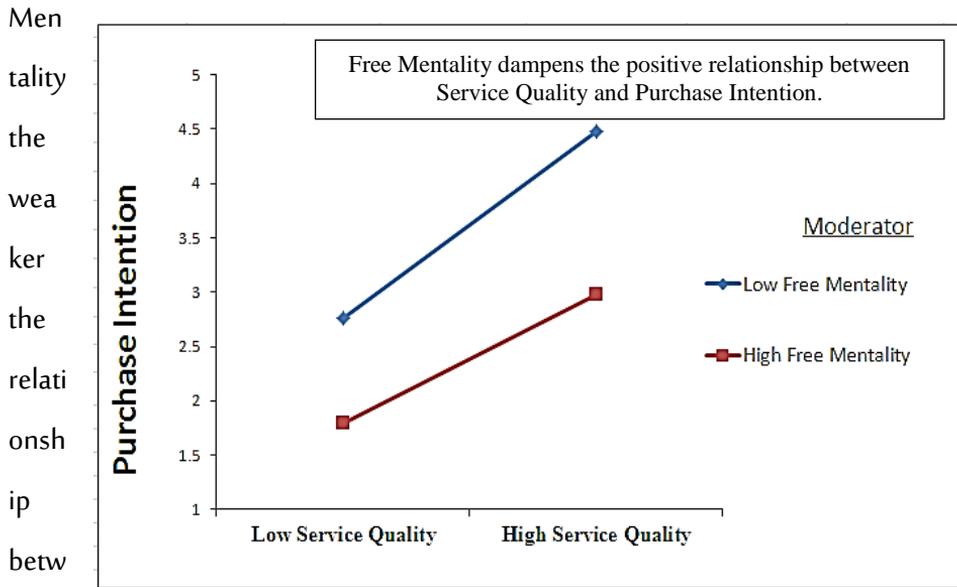


Figure 2: Study Results Model

In the second step of the structural model assessment, the moderating effect of Free Mentality on the relationship between service quality and its all dimensions except empathy and purchase intentions were examined. The empathy dimension was excluded as it did not positively influence purchase intentions.

The results in Table (5) and Figure (3) showed that Free Mentality moderated the relationship between Service Quality and Purchase Intentions where the path coefficient ($\beta = -0.173$) between the interaction term and purchase intentions was significant at $p < 0.01$. This result means that the higher the respondents' Free



Free Mentality dampens the positive relationship between Service Quality and purchase intentions. This supports the *H3* hypothesis.

Figure 3: The moderating role of Free Mentality in the relationship between service quality and freemium application's purchase intention

The moderating effect of Free Mentality on the relationship between Assurance and purchase intentions was also examined. The results in Table (5) and Figure (4) shows that Free Mentality moderated the relationship between Assurance and Purchase intentions where the path coefficient ($\beta = -0.138, p < 0.05$). This result means that the higher the respondents' Free Mentality the weaker the relationship between Assurance and purchase intentions. This supports the *H3-a* hypothesis.

We also examined the moderating effect of Free Mentality in the relationship between Reliability and purchase intentions was examined. The results in Table (4) and Figure (5) showed that Free Mentality moderated the relationship between Reliability and purchase intentions where the path coefficient ($\beta = -0.116, p < 0.01$). This result means that the higher the respondents' Free Mentality the weaker the relationship between Reliability and purchase intentions. This supports the *H3-c* hypothesis.

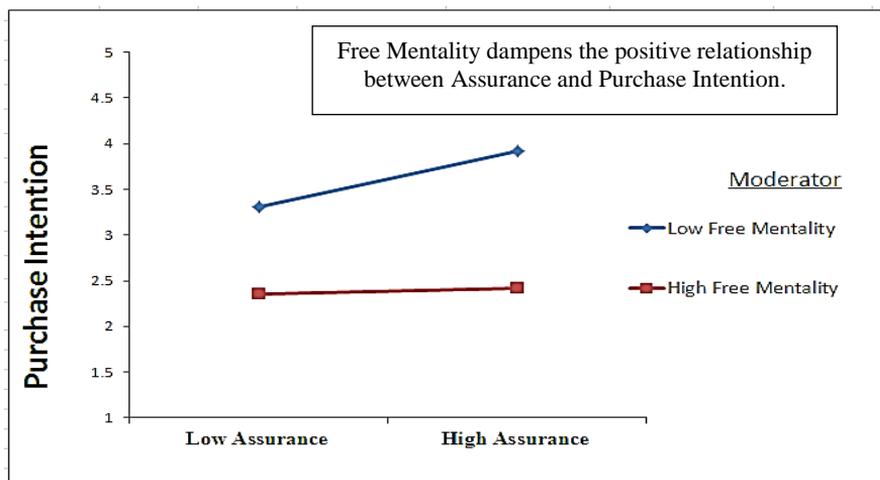


Figure 4: The moderating role of Free Mentality in the relationship between Assurance and freemium application's purchase intention

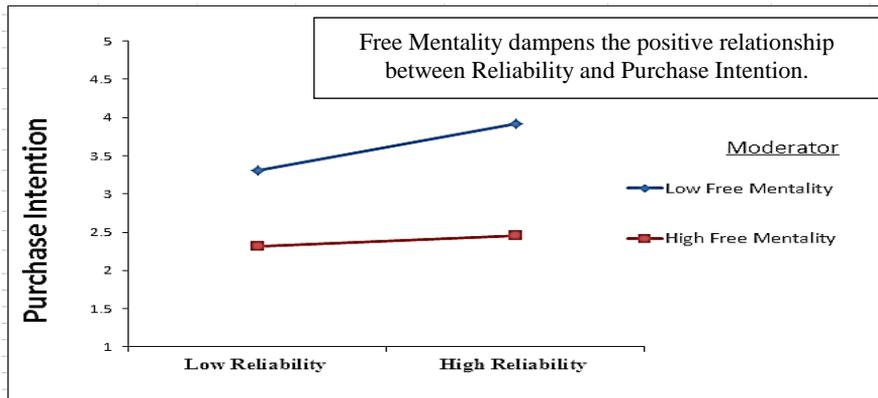


Figure 5: The moderating role of Free Mentality in the relationship between Reliability and freemium application's purchase intention

Finally, we also examined the moderating effect of Free Mentality in the relationship between Responsiveness and purchase intention. The results in Table (5) showed that Free Mentality didn't moderate the relationship between Responsiveness and purchase intentions where the path coefficient ($\beta = -0.066, p > 0.05$). This doesn't support the *H3-d* hypothesis.

7. Discussion and Conclusions

In this study we investigated how perceived service quality predicts academic researcher' intentions to purchase from freemium applications and upgrade to premium content with the moderating role of free mentality. Responses were collected from freemium-services users who are registered as academic researchers in both public and private universities in Egypt (n = 290). The results indicate that - expectedly- the majority of service quality dimensions (assurance, reliability and responsiveness) positively predict the intentions to upgrade from free to premium services. However, one service quality dimension (Empathy) was found not to have

a significant effect on users' intentions to switch to premium service. These findings suggest that increasing the freemium service quality in totality increases sales of premium services.

Our interpretation for the lack of effect of empathy on the purchase of premium services especially with academic researchers could be that this category of users rarely requires product/service customization as their needs are rather standard when it comes to the apps that serve them in their research work. Therefore, it could be concluded that academic researchers as freemium-services users give little importance to the empathetic aspects of the services such as individualized attention and the adjustability of the services to their special needs.

Moreover, as noted in the results, a direct negative effect was found from free mentality on purchase intentions. We believe this finding potentially reflects the importance of the participants' core values on their purchase decisions as they believe that scientific research tools -among other online services- should be provided to them free of charge because of how significant they feel about their work to science and the society.

Free mentality was found to moderate the relationship between assurance and purchase intention. We believe this finding potentially reflects the idea that even though academic users put high value on assurance as a service-quality dimension to the extent that it can and probably will push them to take a switch decision from the free to the premium version of service, their free mentality and the way they are convinced that these apps are supposed to be granted to them for free can significantly take away from the importance of assurance to them.

In the same vein, free mentality was found to act as a moderator in the relationship between reliability and purchase intention. This can be explained by the potential of the free mentality that academic researchers embrace to dampen their emphasis on reliability as a service-quality dimension when intending to switch from free to premium version of the service.

The same couldn't be said for the relationship between responsiveness and purchase intentions. As no moderating effect of free mentality was detected this implies that free mentality doesn't alleviate the emphasis that academic researchers put on responsiveness when intending to switch to premium service.

In order to compare the findings of the present study to the findings in the existing body of literature on service quality and purchasing intentions especially in the freemium context, we systematically searched all articles on Google Scholar where the word 'service quality' and 'purchase intention' had appeared in title. We then analyzed all papers and chose all articles that investigated service quality dimensions and their relations to any kind of consumer value, perceived value, as well as the intention to use the freemium service and/or the purchase of premium version. Also, we searched articles that included the words free mentality, purchase intention, and willingness to pay as keywords (see table 6).

It can be concluded that the present study was perhaps the first to investigate the dimensions service quality as determinants for academic researchers' willingness to purchase premium content in the freemium applications they use in their research work with the moderating role of free mentality. In the existing body of literature, few studies have investigated service quality dimensions when it comes to

freemium services. Hamari et al. (2017) used the same set of quality dimensions as the current study to investigate their role in continuing to use and purchasing premium services among online gamers. Suryawirawan et al. (2022) also employed service quality dimensions (assurance, reliability, empathy, and responsiveness) to explore how they can predict customer satisfaction, continuous usage intention, and purchase intention toward freemium applications with the moderating effect of perceived value. No article was found to discuss the moderating role of free mentality on the relationship between service quality dimensions and purchase intentions within the freemium context. Kim et al. (2018) investigated the role of freemium application users' satisfaction on their loyalty intentions which includes continuance and purchase intentions with the moderating effect of free mentality. In their study, Lin et al. (2013) explored the role of free mentality in making online-music apps users willing to pay for premium music content.

Compared with results of the existing body of literature, it can be concluded across articles that tackled service quality in the freemium context that a consensus cannot be drawn over the role of service quality -or other variables associated with it such as perceived value- in predicting free users' switching to premium content though it was statistically proven in the study at hand. Although Hamari et al., (2017) investigated several dimensions of service quality, the general tendency in the findings came contradictory to the results of the present study in the sense that service quality in totality seems not to be associated with intention to purchase premium content. In the same vein, Suryawirawan et al. (2022) found that no service quality dimension could affect customer purchase intentions. On the other

hand, Liu et al. (2014) reported results that are consistent with what came in our results that higher service quality leads to higher intentions to continued usage, which further leads to higher intentions to switch to premium content. This finding implies that providing a high quality service in the freemium version is important for increasing the sales of the premium one. These results are consistent with those of our study which concludes that service quality leads to higher purchase intentions.

As for the direct effect of free mentality on purchase intentions, our study results came consistent with what was mentioned in prior literature -except for O'Brien (2022)-. For instance, in their article, Lin et al. (2013) found that free mentality influences an individual's attitude toward paying for online music streaming. Regarding the moderating effect of free mentality on the relationship between service quality and purchase intentions, no prior research has been conducted with the exact variables. However, the moderation of free mentality between purchase intentions and other variables was studied yet not proven to exist. For example, Kim et al. (2018) reported that free mentality did not moderate the relationship between satisfaction and loyalty intentions which include continuance intention and premium purchase intention.

Table (6): Results compared to the existing body of literature

Study Citation	Context	Independent variable/s	Dependent variable	Mediator/Moderator	Results compared to current study.
Hamari et al., 2017	Free-to-play games	Service quality	Purchase intention	Play intention (mediator)	Similarities: reliability as a service quality dimension has a positive effect on purchase intention. Differences: service quality in totality doesn't significantly impact purchase intention.
Suryawirawan et al., 2022	Freemium applications	Service quality	Purchase intentions	Perceived value (moderator), satisfaction, usage intention (mediators)	Differences: no service quality dimension could affect customer purchase intentions.
Liu et al., 2014	Google play	Offering a free version and customer ratings of the freemium version	Number of downloads of the paid version	-----	Similarities: customer ratings of the freemium versions increase downloads of the premium versions.
Ericaska et al., 2022	Freemium mobile games	Performance expectancy, effort expectancy, social influence	Behavioral use	Purchase intention (mediator)	Similarities: performance expectancy and effort expectancy positively affect purchase intentions. Performance expectancy and effort expectancy are both associated with service quality (Rahi et al., 2019; Winata & Tjokrosaputro, 2022).
Hamari et al., 2020	Free-to-play games	Perceived value	Purchase intentions	Continued use (mediator)	Similarities: perceived value positively affects purchase intentions. Perceived value is found to be associated with perceived service quality (Sweeny & Soutar, 2001; Kuo et al., 2009; Malik, 2012).
Fernandes & Guerra,	Music streamin	Perceived value,	Purchase intentions	Age, gender (moderators)	Similarities: perceived value positively affects purchase intentions.

Can Service Quality Explain Why Users Switch from Free to Premium Services?

Study Citation	Context	Independent variable/s	Dependent variable	Mediator/Moderator	Results compared to current study.
2019	g services	perceived fee			
Kim et al., 2018	Freemium software applications	Satisfaction	Loyalty intentions (continuance intention & premium purchase intention)	User characteristics, relational characteristics, and marketplace characteristics (moderators)	Similarities: Free mentality has a negative direct effect on intention to purchase. Differences: Free mentality did not moderate the relationship between satisfaction and loyalty intentions. Satisfaction was found to be a function of perceived service quality (Ali et al., 2021; Supriyanto et al., 2021).
Lin et al., 2013	Online music	Free mentality	Willingness to pay	Attitude toward paying (Mediator)	Similarities: Free mentality significantly influences an individual's attitude toward paying.
O'Brien, 2022	Digital journalism	Free mentality	Paying intent for online news	Age, sex, education, income (moderators)	Similarities: perceived value increases paying intent. Trust in the media platform increases paying intent. Differences: only one aspect of free mentality was found to be significantly associated with paying intent. However, other aspects of free mentality were found to be insignificant.

Source: Compiled from literature

The results of this study imply a set of insights on developing and designing freemium and premium applications for academic researchers in Egypt. Given the finding that improving the total quality of the core (free) service has much to do with selling more premium content, the developers of these apps should strive for increasing the quality of the core service. The more academic users feel assured about the safety and confidentiality of their personal and research data and the more they feel they can trust the service provider, the more they are interested in upgrading to the premium version of services provided.

This result came consistent with the findings of O'Brien (2022) and indicate that enhancing trust and assurance of services provided can potentially lead to better sales of premium services. Also, the higher the technical functionality and accuracy of the core (free) service, the more academic users are willing to make the switch to premium services which agrees with the results of Hamari et al. (2017) and Ericška et al. (2022). This finding calls service providers to focus on increasing the reliability of their apps to draw more switching to premium. Service providers should also be aware of users' mindset that online services are basically taken for granted and having these services for free is their right. This way of thinking can potentially take away from the magnitude of the perceived quality of the core services and lead users to settle for the core (free) service or even search for other ways to get the premium service without paying that may be unethical or illegal such as piracy or hacking.

8. Limitations and Future Research

As with any study, there are limitations that must be taken into consideration when dealing with the data in terms of their representativeness and generalizability. Firstly, this study was conducted in the context of freemium applications users who are registered as academic researchers in both public and private universities in Egypt. While this category represents a large proportion of freemium-apps users, results may somewhat differ in other categories of users such as gamers or music streamers where most of freemium apps operate. Secondly, in our data more than 65% were female, most respondents' ages ranged from 30 and 40 years of age (over 43%), and more than half of respondents were PhD researchers. These respondents' characteristics are most likely due to the survey distribution channels chosen for our study (online, self-administered questionnaire) which would basically give more chance to younger researchers to take part in the survey. However, we are highly confident that these biases in our data have had minor effects on our results. For this study, we limited our approach to quantitative, cross-sectional survey where we acknowledge that qualitative data collection and analysis for consumer behavior in general and in the freemium context in particular would've led us to deeper and richer understanding. Up until now, only limited research has been conducted regarding the freemium business model more particularly for Arab customers. Therefore, numerous avenues for future research can be identified. Firstly, in order to get a better grasp of the concept of freemium business model, research should be conducted in an attempt to conceptualize freemium in the Arab context in order to provide the most suitable forms of free and premium versions to the Arab market. Secondly,

Secondly, as our study is the first to examine service quality dimensions in the freemium context for academic researchers/users, we would like to encourage a deepening of the understanding of this perspective in other contexts, exploring the mediating effects of personality types, cultural differences, different lifestyles which could lead to interesting insights for the design of freemium /premium services.

Thirdly, our study revealed that free mentality plays a part in academic researchers' intentions to upgrade. Therefore, we highly recommend more research in this area, especially on how freemium business models could be sabotaged by users' actions such as software piracy or hacking that may result from embracing this mentality.

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