Improving Mobile Value-Added Services (MVAS) in Yemen Mobile Companies

Mohammed A. Hajar[1], **Daing Nasir Ibrahim**[1], **Mohd Ridzuan Darun**[1], and **Mohammed A. Al-Sharafi**[2]

Eng.mohammed.hajar@gmail.com; daing@ump.edu.my; mridzuand@ump.edu.my; alsharafi@ieee.org

[1] Faculty of Industrial Management, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Kuantan, Pahang, Malaysia

[2] Faculty of Computing, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Kuantan, Pahang, Malaysia

Abstract. Mobile Value-Added Services (MVAS) is a general expression for any services added to mobile phone networks other than voice services. However, the difficulty of identifying and promoting the appeal MVAS to the individual customer is vague and often confusing. This empirical study aims to reduce this vague by assisting service providers in targeting the right customer with the right services. The purpose of this paper is to propose guidelines to efficiently improve the value-added services of Mobile Companies in Yemen through the promotion of customer satisfaction and loyalty. Accordingly, a questionnaire survey was conducted, and data were collected over 1000 mobile users in the Republic of Yemen. Also, market observations were undertaken to define difficulties and limitations. The results showed that MVAS has positive effects on customer satisfaction and loyalty, and hence on company's performance and profitability. Finally, the study provides some recommendations to improve MVAS in Yemen telecommunications companies.

Keywords: *Mobile Value-added Service, MVAS, Mobile companies, Telecommunications, Customer satisfaction, Customer loyalty, Yemen.*

1. Introduction

In the past decade, the mobile telecommunications market witnessed tremendous growth, especially in the use of mobile voice communications, which became the major resources of the service providers (Chen and Cheng 2010, Ahn, Ahn, Byun and Oh 2011). However, due to the intensive voice tariff competition and subscribers growth saturation, the mobile telecommunications market is now experiencing a new phase whereby the average revenue per user (ARPU) of mobile service providers continues to decline, thereby severely affecting their total revenue and portability (Chen and Cheng 2010, Shim, Lee and Fomin 2019). As a result, unable to rely solely on the conventional voice services, telecom service providers have been seeking for other opportunities to increase their business revenue (Ahn, Ahn et al. 2011, Farooq and Raju 2019, Shim, Lee et al. 2019, Al-Saedi, Al-Emran, Ramayah and Abusham 2020).

Thus, the telecommunications industry shifted its strategies to improve customer value by offering new products, not to attracting new customers, but to retain existing customers through the promotion of customer loyalty (Ahn, Ahn et al. 2011, Hajar, Ibrahim and Al-Sharafi 2018). To counter this challenge, mobile telecommunications service providers are moving from tariff competition to service competition (Hajar, Ibrahim et al. 2018, Kwizera, Mico, Nayebare, Garba, Saint et al. 2018).

The rapid advancement of Information and Communications Technology (ICT) enables mobile service providers to provide better mobile Value-Added Services (MVAS) which expected to be the next source of growth for mobile service providers (Zhao, Lu, Zhang and Chau 2012, Kwizera, Mico et al. 2018, Al-Sharafi, Arshah, Abu-Shanab and Alajmi 2019). MVAS are digital services added to mobile phone

networks other than voice services, such as games, icons, ringtones, messages, web browsing, SMS (short message service) coupons, and electronic transactions (Kuo, Wu and Deng 2009). Such MVAS have attracted much attention as a complementary source of revenue, where more than 15% of the revenue of the telecommunications industry comes from them (Saxena, Conti, Choo and Chaudhari 2019).

Moreover, by entering the next-generation network (NGN) era and issuing highly advanced smartphone generations, the internet protocol (IP) becomes the basis of communication networks which enhanced the network bandwidth and transmission speed dramatically. This enables mobile service providers to provide content-rich, multimedia MVAS to create new service value, meet the demands of customers, and increase ARPU (Chen and Cheng 2010, Gupta, Raghav and Dhakad 2019).

In contrast, the difficulty of identifying and promoting the preferred MVAS to the individual customer is vague and often confusing. Unlike traditional mobile services, which concentrated on targeting the right customer with a single service, MVAS must target the right customer with the right service (Ahn, Ahn et al. 2011). Hence, this paper aims to determine and develop the MVAS in Yemen based on customers' preferences and needs. This study employs descriptive analysis to answer the research questions of; what are the most mobile value-added services of needs and preferences to mobile users in Yemen? and How do these MVAS influence the company's performance and effectively improve its revenue and sustainable development?

The structure of this paper is organized as follows: section 2 highlights the literature review on mobile value-added services, service quality, and customer satisfaction and loyalty, respectively. Section 3 presents the employed research methodology, while section 4 describes the obtained results. In addition, the recommendations for improving MVAS in Yemen telecommunications companies are discussed in section 5, and finally, the conclusion of the paper is summarized in section 6.

2. Literature Review

2.1. Mobile Value-added Services (MVAS)

Value-added is an economist term meaning that the service offered will have additional value to the user compared with more basic telecommunications (or other) services (Collins 1986). In telecommunications, MVAS refers to the digital services added to mobile phone networks other than voice services in which the contents included can be either self-produced by mobile telecom service providers or provided through strategic alliances with content providers (Kuo, Wu et al. 2009). According to IAMAI & eTechnology Group (2008), MVAS are not part of the basic voice offer and are availed separately by the end-user, whereas these services are used as a tool for differentiation and allow mobile operators to develop another stream of revenue. However, offered MVAS by telecom service providers can be categorized into four types: mobile communication services, mobile entertainment services, mobile transaction services, and mobile information services (Kuo, Wu et al. 2009, Chen and Cheng 2010, Ahn, Ahn et al. 2011).

According to Kuo, Wu et al. (2009), MVAS may become a new opportunity for telecommunications services providers to enhance competitiveness and generate revenues. MVAS are expected to form telecommunications service providers' strategy to compensate for the dwindling of revenues due to the intense voice competition and subscribers' growth saturation (Ahn, Ahn et al. 2011, Zhao, Lu et al. 2012, Saxena, Conti et al. 2019). Hence, MVAS have become part of the network operators' core business and one of the major sources of their income (Anandpadmanabhan 2011, M'itonga 2019).

IAMAI & eTechnology Group (2008) related the high increase of MVAS importance to three major reasons, which are the decrease in ARPU, the need for differentiation, and increasing need and demand from consumers. It is foreseeable that MVAS could enable a ubiquitous communication society in the future (Chen and Cheng 2010, Sathye, Prasad, Sharma, Sharma and Sathye 2017). In this society, not only can people connect to each other using a device at any time and location, but information can also be shared at the discretion of the users. This ubiquitous communication can profoundly change the future development of economies and the social interaction behavior of people (Chen and Cheng 2010).

2.2.   Service Quality

Service quality, as defined by Parasuraman, Zeithaml and Berry (1988), is the consumer's judgment about the superiority or excellence of a product or a service. Thus, Service quality is closely related to consumer satisfaction as it reflects the customers' evaluation of the performance of service providers (Zhao, Lu et al. 2012).

Previous studies examining mobile phone services have pointed out that Service quality positively influences customer satisfaction and loyalty in mobile value-added services (Lin and Wang 2006, Kuo, Wu et al. 2009, Chen and Cheng 2010, Lee 2010, Zhao, Lu et al. 2012, Al-Refaie, Al-Tarawneh and Bata 2018, Alhakimi and Ghaleb 2019). According to Lee (2010), Service quality not only entices new customers away from competitors but also induces customers' repurchase intentions; Hence, It considered being a key factor in service providers' financial performance.

The evaluation of MVAS quality is essential to identify its effects on customers' perceptions of MVAS. According to Khan (2010), this will enable mobile service providers to identify and undertake necessary initiatives to improve the aspects that customers value the most. Khan (2010) shows that service quality is the most dominant dimension in affecting the customers' perception of mobile phone service quality.

2.3.   Customer Satisfaction and Loyalty

Customer satisfaction, according to Fornell (1992), is the customers' cumulative impression of a firm's service performance. In telecommunications, customer satisfaction is customer's post-purchase evaluation and affective response or feeling to the overall product or service experience (Lin and Wang 2006, Kuo, Wu et al. 2009, Hajar, Ibrahim, Darun and Al-Sharafi 2020). Lin and Wang (2006) consider customer satisfaction as a strong predictor for behavioral variables such as repurchase intentions, word-of-mouth recommendations, or loyalty.

According to Zhao, Lu et al. (2012), he stated, "As the market becomes more and more mature, MVAS become more homogeneous, and the competition for acquiring new customers and retaining existing customers becomes more intense. In this environment, customer satisfaction is a critical factor for mobile service providers to maintain or improve their market share and profitability". Previous studies have pointed out that customer satisfaction contributes to firms' profitability and customer retention (Lin and Wang 2006, Kuo, Wu et al. 2009, Lee 2010, Zhao, Lu et al. 2012, Diaw and Asare 2018, Mahmoud, Hinson and Anim 2018, Chaudhry, Aftab, Arif, Tariq and Roomi 2019).

Moreover, prior studies have examined the mobile phone market and found that customer satisfaction has a positive effect on customer loyalty (Lin and Wang 2006, Kuo, Wu et al. 2009, Lee 2010, Zhao, Lu et al. 2012, Verma and Singh 2017, Diaw and Asare 2018). Understanding customers and establishing long term profitable relationships is essential for mobile service providers to enhance sustainability and profitability (Hajar, Ibrahim and Darun 2019). According to Zeithaml, Berry and Parasuraman (1996), satisfied customers may use mobile phone services more than those who are not satisfied, and they may be more likely to continue their use and recommend the service to their friends and relatives (Lee 2010). Therefore, higher customer loyalty depends mainly on higher customer satisfaction.

3. Methodology

This study investigates the nature of MVAS in the Republic of Yemen. In general, it uses a descriptive approach to study the customers' behaviors and willingness to use MVAS and its effects on company's performance. The data was collected by employing a questionnaire survey to distinguish the customers' needs and/or preference types of MVAS. The questionnaire was designed according to related literature and previous studies that have been conducted in other countries like Malaysia, Taiwan, India, China, and Korea (Lin and Wang 2006, Turel and Serenko 2006, Kuo, Wu et al. 2009, Chen and Cheng 2010, Lee 2010, Ahn, Ahn et al. 2011, Al-Sharafi, Arshah and Abu-Shanab 2019). The questionnaire was enhanced with brief explanations for the terms of MVAS and its abbreviations to ensure the respondent fully understands the questions in the formal survey and its content. Also, the study guaranteed the efficiency of the questionnaire to cover different segments and areas of mobile customers by developing an online survey in both English and Arabic languages and distributed through internet media such as Facebook,

Twitter, messengers, etc. In the context, the questionnaire website has been distributed through several company and organizations' websites and intranet emails such as MTN-Yemen, Y-telecom, Total Co., and Sana'a University. Further, a distinct Facebook group has been creating to promote for the questionnaire and discuss the aspects of the entire project.

Furthermore, a market observation was conducted to underlying the problem and difficulties regarding MVAS. It aimed to gather a concrete foundation of information and fact of the nature of MVAS in the Yemen mobile market in order to build up guidelines for more effective services and performance. The market observation processes were carried out based on secondary data and project involvement with MVAS in Yemen to understand the difficulties and limitations the companies face in implementing MVAS.

4. Results

4.1.   Questionnaire

4.1.1. Sample Characteristics

A total of 1032 valid responses were collected out of the 1249 questionnaires collected within about three months. In general, 217 questionnaires were invalid due to incompletion or duplication. This study used SPSS 17.0 software for data analysis and reliability test.

Table 1 represents the descriptive statistics of the respondents' demographic profile. Out of 1032 respondents, 52.8% of them were female, and 47.2% were male. The majority of the respondents are within the age ranges of 18 to 25 years old (37.6%) and 26 to 45 years old (40.7%) as the majority of the mobile service users, while only a minority of them are below than 18 years old (11.4%) and above than 45 years old (10.3%). Besides that, more than half of the respondents hold Bachelor's degree (51.4%), while 20.3% of them hold higher education of Master's degree and Ph.D. (15.9% and 4.4% respectively) and 22.5% hold Diploma and High School (12.7% and 9.8% respectively). These findings illustrate that the majority of the MVAS were young and well educated.

Among the 1032 respondents, 49.1% were Yemen Mobile subscribers, 29.2% MTN subscribers, 13.9% Sabafon subscribers, and only 7.8% Y-Telecom subscribers. A large portion of these respondents reported having from 1 to 3 years of experience with MVASs (44.7%), and nearly half of that (22.6%) having less than one year experience. This indicates a high growth of MVASs in Yemen in the last three years. 53.0% of the respondents reported having low and very low monthly income of 10,000 to 50,000 Y.R (36.0%) and less than 10000 Y.R (17.0%) respectively, while 25.7% have average monthly income of 50,001 to 100,000 and only 21.3% have high income more than 100,000 (1 USD is equal to approximately 500 Y.R). Accordingly, the majority of the respondents (73.5%) spend low on their monthly bills of 1000 to 5000 Y.R (51.4%) and less than 1000 Y.R (22.2%), whereas some of the respondents (21.0%) spend an average on their monthly bills (5001 to 10,000 Y.R) and just a few (5.4%) spend high on their monthly bills (more than 10,000 Y.R). Additionally, 45.7% of these respondents reported spending less than 10% of their monthly bills on MVASs, 30.2% reported spending 10% to 30%, 17.2% reported spending 31% to 50%, and 6.9% of them reported spending more than 50% of their monthly bills on MVAS. This interprets that the low performance and profitability of MVAS where the majority of the respondents spend less than 10% of their monthly bills on MVAS.

Measure	Option	Frequency	Percentage %
Gender	Male	487	47.2%
	Female	545	52.8%
Age	Below 18	118	11.4%
	18-25	388	37.6%
	26 – 45	420	40.7%
	46 and above	106	10.3%
Education Level	PhD	45	4.4%
	Master	164	15.9%
	Bachelor	530	51.4%
	Diploma	101	9.8%
	High School	131	12.7%
	Below High School	61	5.9%
Service Provider	Yemen Mobile	507	49.1%
	MTN	301	29.2%
	Sabafon	143	13.9%
	Y Telecom	81	7.8%
Length of Using MVAS	Less than 1 Year	233	22.6%
	1-3 Years	461	44.7%
	4-5 Years	207	20.1%
	6 Years and above	131	12.7%
Monthly Income	Less than 10000 Y.R	175	17.0%
	10000-50000 Y.R	372	36.0%
	50001-100000 Y.R	265	25.7%
	More than 100000 Y.R	220	21.3%
Monthly Spending on Mobile Bills	Less than 1000 Y.R	229	22.2%
	1000-5000 Y.R	530	51.4%
	5001-10000 Y.R	217	21.0%
	More than 10000 Y.R	56	5.4%
Monthly Spending in MVAS in %	None	42	4.1%
	Less than 10 %	430	41.7%
	10-30 %	312	30.2%
	31-50 %	177	17.2%
	51 % and above	71	6.9%

Table 1. Demographics of Questionnaire Respondents

4.1.2.   Reliability and Validity Test

As shown in Table 2, the reliability and validity of the measures are assured by using the Cronbach's Alpha scale through SPSS software. The measures showed high reliability and validity where the composite reliability values of each construct (Cronbach's Alpha) is above the recommended value 0.7 (Nunnally, 1978). Also, the Corrected item-total correlation, Table 2, shows that the existence of the internal consistency and reliability of the constructs with a strong and positive correlation (above than 0.5) between the scores of all items (Ferketich, 1991).

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Service Quality	12.80	16.724	0.762	0.606	0.875
Perceived Value	12.77	16.635	0.669	0.483	0.888
Customer Satisfaction	12.86	15.630	0.781	0.631	0.870
Customer Expectations	12.90	16.550	0.761	0.619	0.874
Service Price	12.71	16.341	0.649	0.434	0.892
Customer Loyalty	12.76	16.058	0.735	0.561	0.878

Table 2. Item-Total Statistics of Current MVAS Evaluation

4.1.3.   Customers' Perceptions

Table 3 shows the customers' perceptions of MVAS and its importance. The great majority of respondents were interested in using MVAS where 82% of them at least agreed that MVAS is very important to Mobile customers, and 71.5% may choose their service provider based on the quality and variety of MVAS. Also, MVAS demand had tremendous growth in Yemen lately, where 80.4% of the respondents agreed and strongly agreed that the MVAS had high demand in Yemen recently. In general, the great majority of MVAS users agreed with the project principles of the importance of perceived service quality and its effect on the customers' satisfaction and loyalty and hence to competitiveness and profitability.

Measure	Results				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Importance to Customer	3.1%	5.3%	9.7%	56.4%	25.5%
Demand Growth	1%	3.4%	15.2%	37.8	42.6%
Competitiveness and Revenue Generation	1.3%	2.2%	9.5%	38.6%	48.4%
The Effect of Service Quality on Company's Performance	1.6%	2.9%	9.6%	39.1%	46.8.%
The Effect of Service Quality on Customer Satisfaction and Loyalty	1.4%	1.7%	7.1%	37.7%	52.1%
The Effect of Perceived Value on Customer satisfaction and Loyalty	1.2%	1.5%	7.5%	46.3%	43.6%
The Effect of Customer Satisfaction on Company's Performance	0.8%	2.5%	9.1%	54.7%	32.9%
Service Provider Selection	1.6%	3.5%	23.4%	46.9%	24.6%

Table 3. Customers' Perceptions of MVAS

4.1.4.   Service quality and customer satisfaction evaluation

As shown in Table 4, 54.3% of the respondents were totally unsatisfied with the current MVAS at which 50.6% and 50.9% of the respondents reported that it has low service quality and low perceived value, respectively. That is due to the high expectation of customers, where 54.3% of the respondents reported that current MVAS does not meet their expectations. Thus, a large portion of users (41.9%) is less loyal and may not continue with the same service provider. Besides that, 43.4% of the respondents feel MVAS price is high and not acceptable. That is due to the low monthly income of the majority of the respondents, where 53% of them earn less than Y.R 50000 (1 USD is equal to approximately 215 Y.R) (see also Table 1).

Measure	Results				
	Very Low	Low	Average	High	Very High
Service Quality	9.7%	40.9%	34.3%	14.1%	1.1%
Perceived Value	11.8%	39.1%	30.9%	14.5%	3.6%
Customer Satisfaction	15.4%	38.9%	31.2%	9.4%	5.1%
Customer Expectations	14.0%	40.3%	32.7%	12.0%	1.1%
Service Price	15.8%	27.6%	37.2%	14.5%	4.8%
Customer Loyalty	17.5%	24.4%	40.8%	15.1%	2.1%

Table 4. Evaluation of Service Quality and Customer Satisfaction of MVAS

4.1.5.   Customers' needs and/or preference of MVASs

Targeting the right customer with the right service is essential in MVAS business to fulfill its objectives of satisfying customers, acquire loyalty, and maximize profit. Thus, the obtained results have eliminated the vague and confusion of identifying and promoting the MVAS of need and/or preference to the individual customer. Figure 1 depicts the types of MVAS that customers need or prefer to use. It shows that MMS service had the most rates of customers' need and preference to use of about 78.4% of the 1032 users. Then, the Internet service comes next with a high rate of 71.5% of customers' needs and preferences to use. Many other new MVAS, which are not provided in Yemen, had quite high percentage rates of customers' need and/or preference to use; like Facebook (59.4%), Games (53.1%), Mobile Banking (50%), GPS (49.5%) and Bill Payment (45.9%). This indicates that customers are eager to use more new and advanced MVAS that may facilitate and entertain their lives.

On the other hand, several available MVAS still having a slightly high rating of customers' needs and preferences such as SMS (67.3%), News (48.9%), chatting (37.7%), and Ringtones (36.8%). This interprets that customers are still interested in using these MVAS. The rest of the MVAS had between average and low rates of customers' need and/or preference to use. For example, Voice Mail, Email, Video Calling, Mobile Education and Mobile TV services got an average rating of the range between 30 to 35 percent, while others such as Movies, Music, Wallpapers, Booking Tickets, Hotels Booking, and Stock Trading had a low rating of 25 percent and below.
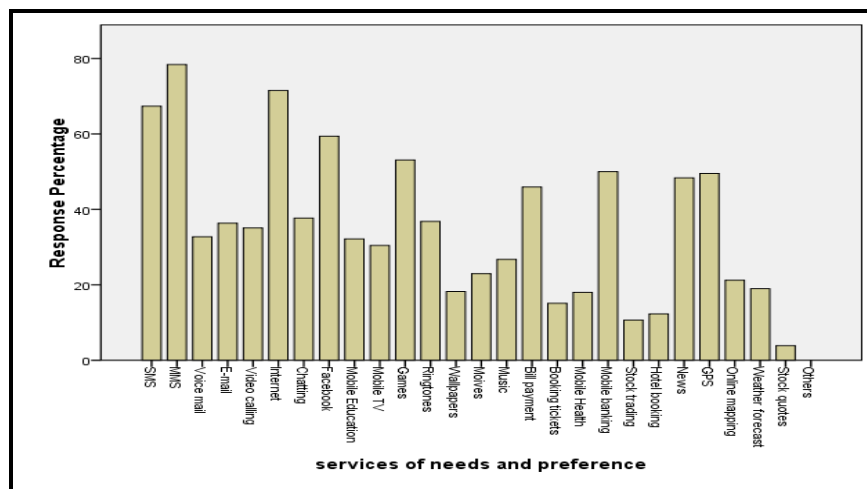

Figure 1. Percentage of MVAS Needs and Preference for Each Service

4.2.   Market Observations

Market observations have been conducted to obtain the difficulties and limitations that telecommunications companies face regarding MVAS. Hence, the difficulties and limitations of MVAS can be summarized as follows:

- There is no supreme body governing the MVAS market through the standard qualifications and regulations of service providers to monitor and control the quality and intellectual property for MVAS.

- Inefficient management for MVAS and related resources, where mobile companies suffer from a lack of strategic business plans regarding MVAS, low top management commitments, and less intention to invest in MVAS.

- Lack of capability of telecommunications systems which service providers sill using 2G or 3G technologies that do not support many of the MVASs applications and do not meet all of the criteria, standards, specifications, and standard protocols.

- The failure of the outsourcing strategy for MVAS to fulfill its objective of improving quality and enhancing competitiveness, where many service providers are not qualified and not up to the standard.

5. Recommendations for Improving MVAS in Yemen Telecommunications Companies

The effectiveness of a company's management team and its ability to integrate all environmental factors and resources smoothly is essential to maintain its sustainable development and successfully achieve its mission in leading the telecommunications industry in Yemen. Therefore, top management should realize the importance of MVAS to the company's performance and profitability as well as to its prolonged effect to customer satisfaction and loyalty; especially now with the world telecommunications market movement from tariff competition to service competition as a strategy to improve customer value, promote customer loyalty and increase business revenues (Chen and Cheng 2010, Ahn, Ahn et al. 2011).

In order for telecommunications service providers in Yemen to efficiently improve MVAS, firstly they need to define all the goals and objectives they would like to achieve, formulate compatible strategic plans, and determine all the policies, regulations and standards that could assure the fulfillment of the prospective goals, and accomplish the objectives of acquiring customer loyalty and increase profitability.

Secondly, companies should establish a specialized unit or committee to deal with MVAS affairs. The main duty of this unit is the implementation and evaluation of the MVAS's strategic plans to assure the accomplishment of all the predefined goals and objectives. It will be responsible for planning, monitoring, evaluating, and controlling all the activities concerning MVAS. Also, it will be the authorized communication channel to interact with other departments as well as service providers.

Thirdly, Yemen telecommunications companies must bound MVAS providers with a high-quality standard of services that cope up with the company's strategic goals and objectives. This could be established by formulating an effective quality control policy and reviewing the terms of contracts between the company and service providers to be obligated with a punitive clause for any deficiency or unfulfillment of the terms of contact.

Fourthly, mobile companies should also establish a strong business relationship with MVAS providers as well as with phone sales agents in order to optimize and improve the performance of MVAS, particularly in marketing, customer services, and availability of applicable phones in the market where the company found most difficulty. Hence, it is strongly recommended to provide training for MVAS providers and enhance phone markets with those smartphones which have high applicability with its MVAS.

Fifthly, mobile companies are advised to use an efficient marketing plan with powerful marketing strategies that can effectively motivate customers for more usage of MVAS and acquire their satisfaction

and loyalty; and not just relying on service providers' poor marketing. This can be efficiently achieved by reducing MVAS's prices, offering promotions and discounts, and motivating prolong subscriptions.

Sixth, mobile service providers are highly recommended to upgrade their telecommunications systems with 4G and 5G technologies in order to have the capability to support high data rates and very advanced MVAS such as real-time gaming applications and mobile TV.

6. Conclusions

6.1.   Implications

In conclusion, the customers' perceptions, customers' satisfaction and loyalty, and customers' needs and/or preference of MVAS have been investigated for over 1000 MVAS users. The results indicate the weakness of service quality, and thus, the failure of MVAS to satisfy the customer, meet his expectations, or acquire his loyalty.

Secondly, the difficulties and limitations of Yemen Mobile Company regarding MVAS have been defined through market observations and analysis. The results reflect the poor management commitments in controlling MVAS compares to the high availability and capability of the resources of mobile service providers.

Furthermore, this study provided some recommendations to improve the performance of MVAS. For instance, the mobile service providers were advised to establish a typical unit for MVAS to formulate strategic plans, set quality policies and standards, and control entire MVAS activates.

Finally, this study has managed to empirically reduce the vague between the mobile service provider in Yemen and their customers by determining their services of appeal and their willingness to continue using these services. Also, it proposed improvement guidelines to generate revenues, enhance customer satisfaction, and acquire loyalty.

6.2.   Limitations

Despite the positive contribution of this study, it has several limitations. Firstly, the number of respondents is limited compares to the large sector of Telecommunications users. Secondly, there is a scarcity of researches and related studies of the telecommunications market of Yemen, where there no even a single research regarding the MVAS. Also, telecommunications companies monopolize information on the grounds of confidentiality.

6.3.   Recommendations

MVAS will be the major factor of competitiveness and revenue generation for the next era of telecommunications businesses. Hence, understanding the antecedents and consequences of customer satisfaction regarding MVAS is essential. Therefore, it is recommended for further studies to deeply measure the service quality with the SERVQUAL model of tangibility, responsiveness, reliability, assurance, and empathy. This will promote better understanding and enhancement for customers and services, respectively. Besides that, some other factors may affect customer's loyalty like habit, trustworthiness, image, commitments, and the importance of a relationship. Follow up studies can also study the capability of improving the companies' systems and infrastructure with new technologies to cope up with the high advanced MVAS like mobile TV and real-times gaming.

References

Ahn, H., J. J. Ahn, H. W. Byun and K. J. Oh. (2011). A novel customer scoring model to encourage the use of mobile value added services. *Expert Systems with Applications, 38*(9), 11693-11700.

Al-Refaie, A., M. Al-Tarawneh and N. Bata. (2018). Study Of Customer Churn In The Telecom Industry Using Structural Equation Modelling. *Economy & Business Journal, 12*(1), 393-411.

Al-Saedi, K., M. Al-Emran, T. Ramayah and E. Abusham. (2020). Developing a general extended UTAUT model for M-payment adoption. *Technology in Society, 62*, 101293. doi:https://doi.org/10.1016/j.techsoc.2020.101293

Al-Sharafi, M. A., R. A. Arshah and E. A. Abu-Shanab. (2019). *Questionnaire Development Process to Measure the SMEs' Continuous Use behavior towards Cloud Computing Services.* Paper presented at the Proceedings of the 2019 8th International Conference on Software and Computer Applications, Penang, Malaysia.

Al-Sharafi, M. A., R. A. Arshah, E. A. Abu-Shanab and Q. Alajmi. (2019). *The Effect of Sustained Use of Cloud-Based Business Services on Organizations' Performance: Evidence from SMEs in Malaysia.* Paper presented at the 2019 5th International Conference on Information Management (ICIM).

Alhakimi, W. and A. Ghaleb. (2019). The impact of CRM components system on customer retention in the telecom industry: a case of Y-Telecom in Yemen. *Middle East Journal of Management, 6*(4), 378-409.

Anandpadmanabhan, N. (2011). <u>Value Added Services in India</u>. Master thesis, Royal Institute of Technology.

Chaudhry, N. I., I. Aftab, Z. Arif, U. Tariq and M. A. Roomi. (2019). Impact of customer-oriented strategy on financial performance with mediating role of HRM and innovation capability. *Personnel Review*.

Chen, P.-T. and J. Z. Cheng. (2010). Unlocking the promise of mobile value-added services by applying new collaborative business models. *Technological Forecasting and Social Change, 77*(4), 678-693.

Collins, H. (1986). Value-added services. *Facilities*.

Diaw, B. and G. Asare. (2018). Effect of Innovation on Customer Satisfaction and Customer Retention in the Telecommunication Industry in Ghana: Customers'perspectives. *European Journal of Research and Reflection in Management Sciences Vol, 6*(4), 15-26.

Farooq, M. and V. Raju. (2019). Impact of over-the-top (OTT) services on the telecom companies in the era of transformative marketing. *Global Journal of Flexible Systems Management, 20*(2), 177-188.

Fornell, C. (1992). A national customer satisfaction barometer: The Swedish experience. *Journal of marketing, 56*(1), 6-21.

Gupta, A., K. Raghav and P. Dhakad. (2019). The Effect on the Telecom Industry and Consumers after the Introduction of Reliance Jio. *International Journal of Engineering and Management Research (IJEMR), 9*(3), 118-137.

Hajar, M. A., D. N. Ibrahim and M. A. Al-Sharafi. (2018). *Value Innovation in the Malaysian Telecommunications Service Industry: Case Study.* Paper presented at the International Conference of Reliable Information and Communication Technology, Putrajaya, Malaysia.

Hajar, M. A., D. N. Ibrahim and M. R. Darun. (2019). *Value Innovation: The New Source Of Sustainability*. Paper presented at the Advances in Global Business Research, India.

Hajar, M. A., D. N. Ibrahim, M. R. Darun and M. A. Al-Sharafi. (2020). Value Innovation Activities in Wireless Telecommunications Service Sector: A Case Study on Malaysian Market Service Sector: A Case Study on Malaysian Market. *Journal of Global Business Insights, 5*(1).

IAMAI & eTechnology Group (2008). Mobile VAS in India. I. a. M. A. o. India. India.

Khan, M. A. (2010). An empirical assessment of service quality of cellular mobile telephone operators in Pakistan. *Asian Social Science, 6*(10), 164.

Kuo, Y.-F., C.-M. Wu and W.-J. Deng. (2009). The relationships among service quality, perceived value, customer satisfaction, and post-purchase intention in mobile value-added services. *Computers in human behavior, 25*(4), 887-896.

Kwizera, E., D. Mico, M. Nayebare, A. A. Garba, M. Saint and L. G. Deen. (2018). *The Impact of over the Top Service Providers in the Rwandan Telecommunications Market: An Analysis of Business Models*. Paper presented at the International Conference on Innovations and Interdisciplinary Solutions for Underserved Areas.

Lee, H. S. (2010). Factors Influencing Customer Loyalty of Mobile Phone Service: Empirical Evidence from Koreans. *Journal of Internet Banking and Commerce, 15*(2).

Lin, H.-H. and Y.-S. Wang. (2006). An examination of the determinants of customer loyalty in mobile commerce contexts. *Information & management, 43*(3), 271-282.

M'itonga, F. M. (2019). Influence of Value-Added Service Strategies on Performance of Telecommunication Firms in Kenya: A Literature Based Review. *Journal of Strategic Management, 3*(1), 69-81.

Mahmoud, M. A., R. E. Hinson and P. A. Anim. (2018). Service innovation and customer satisfaction: the role of customer value creation. *European Journal of Innovation Management*.

Parasuraman, A., V. A. Zeithaml and L. L. Berry. (1988). Servqual: A multiple-item scale for measuring consumer perc. *Journal of retailing, 64*(1), 12.

Sathye, M., B. Prasad, D. Sharma, P. Sharma and S. Sathye. (2017). Mobile Value Added Services in Fiji: Institutional Drivers, Industry Challenges, and Adoption by Women Micro Entrepreneurs. *Journal of Global Information Management (JGIM), 25*(2), 1-14.

Saxena, N., M. Conti, K.-K. R. Choo and N. S. Chaudhari. (2019). BAS-VAS: A Novel Secure Protocol for Value Added Service Delivery to Mobile Devices. *IEEE Transactions on Information Forensics and Security, 15*, 1470-1485.

Shim, Y., H. Lee and V. Fomin. (2019). What benefits couldn't 'Joyn'enjoy?: The changing role of standards in the competition in mobile instant messengers in Korea. *Technological Forecasting and Social Change, 139*, 125-134.

Turel, O. and A. Serenko. (2006). Satisfaction with mobile services in Canada: An empirical investigation. *Telecommunications policy, 30*(5-6), 314-331.

Verma, Y. and M. R. Singh. (2017). Marketing mix, customer satisfaction and loyalty: an empirical study of telecom sector in Bhutan. *Indian Journal of Commerce and Management Studies, 8*(2), 121.

Zeithaml, V. A., L. L. Berry and A. Parasuraman. (1996). The behavioral consequences of service quality. *Journal of marketing, 60*(2), 31-46.

Zhao, L., Y. Lu, L. Zhang and P. Y. Chau. (2012). Assessing the effects of service quality and justice on customer satisfaction and the continuance intention of mobile value-added services: An empirical test of a multidimensional model. *Decision support systems, 52*(3), 645-656.