

Analysis of Trend of IPTV Penetration in Iraq

Husam Abdulhameed Hussein

Department of Computer Science, College of Education, University of Samarra, Iraq

Abstract: Internet Protocol Television (IPTV) has been described as fusion of television and the internet, thus breaking the barrier in the traditional television. IPTV usage is growing frequently in Iraq as a result of accessibility to the internet. However, there has not been study to reveal the status of the IPTV penetration specifically in Iraq. Therefore, this research intends to visualize the trend of IPTV penetration in Iraq. The identified issue was addressed through the quantitative research approach, while the obtained results were achieved by visualizing adapted determinant factors; Performance Expectancy, Effort Expectancy and Social Influence against the cities. This research would serve as platform for both government and IPTV service providers towards knowing the state of IPTV in Iraq.

Keywords: Effort Expectancy, Internet Protocol Television, Performance Expectancy, Social Influence, Trend of IPTV.

I. INTRODUCTION

The rapid growth of the internet and the increase in computers usage has brought changes in the type of televisions that the societies are watching (Muraina et al., 2013a; Regina & Michael, 2014; Muraina et al., 2016). People have diversified from traditional cable TV and satellite TV to Internet Protocol Television (IPTV). Thus, IPTV had been viewed as a needed service to consumers. Moreover, IPTV had been described as an invention of the amalgamation of television and the internet (Sedano et al., 2017). On the other hands, IPTV has led to creation of specialized film and audio which has brought not only the countless changes to the broadcast television industry, but also produced a new television consumption revolution for viewers (Harrison et al., 2011), which is as results of quality of service obtained from the sourced internet (Muraina et al., 2012).

Studies have shown that advancement in information technology is the most innovatory strength that can change the world. This leads to evolving of media which signified by IPTV and creates fusion between media in the modern world as shown in Figure 1.

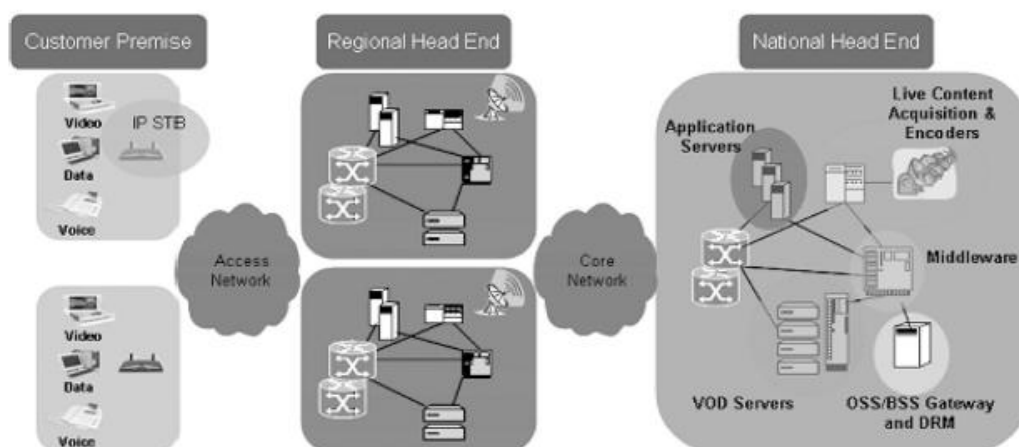


Figure 1: Infrastructure of IPTV (Source, Patrick, 2006)

In recent time, IPTV solution turned out to be generally accepted as it provides multiple services such as multicast TV, Video on Demand (VOD) and Pause Live TV (PLTV) taking advantages from the IP network development (Dong-Hee, 2009). The issues of huge needed of bandwidth in outmoded TV with low video streaming distribution to consumers have been addressed in the IPTV service delivery to the consumers.

Furthermore, IPTV usage have shown a reliable record in Iraq due to the high penetration of internet in their major cities. Therefore, there is high significant in the usage of internet in Iraq comparing with their neighboring Arab countries. Despite the usage and benefit of IPTV in Iraq, there has not been a study to measure the trend of IPTV penetration in Iraq. Knowing the trend of IPTV penetration would assist in determine the success of the IPTV in Iraq. Hence, this research will present the state of the trend of IPTV penetration and the metrics to use as its determinants.

II. LITERATURE REVIEW

Characteristics of the IPTV Industry:

IPTV is a digital television service that is distributed through a broadband IP connection by means of data communications. Indeed, IPTV is usually bundled with other services such as video on demand (VOD), voiceover IP (VOIP) or digital phone, and Internet services (Pi-Tzong, 2012; Junghee et al., 2015). In other words, IPTV is a mode of distributing content over broadband that supports an extra modified and communicating users' experience.

Previous studies have argued that emergency of IPTV service has given users the opportunities to view the program of their choice (Patrick, 2006). Thus, interactive content in the approach of double-way connection enhances IPTV over traditional television services. The double-way IPTV connection is also unique by delivering person-to-person communication services. This shows that instant messaging services will permit viewers to converse through voice and exchange text messages simultaneously while viewing the television. IPTV supports the safe sharing of video recordings, photos, and music, for instance, users will also be able to share content with family and friends through the Internet. Moreover, IPTV service providers naturally depend on small and medium enterprise content providers so as to be able to provide a variety of distinguished content services.

Furthermore, IPTV is empowered by the accessibility of network technology used for providing essential services (Ahmed, 2014). However, network convergence occurs whenever the electronic communications networks such as fixed and mobile broadcasting are capable of offering all the digital services. Presently, telecommunication networks are capable of delivering television services by means of IPTV networks. Indeed, IPTV is characterized with interactive network by providing the services like video-on-demand, gaming, shopping and voting (Shengnan et al., 2016; Wen-Chang et al., 2017).

Researchers have characterized assessment of IPTV as interactivity, content and convergence (Khabbiza et al., 2016; Matej & Andrej, 2017). Thus, IPTV advancement can make more content accessible, achievable and movable while retaining safety. The use of an internet protocol (IP) network can permit applications to be run over multiple end-user devices through the convergence technology. Hence, double-way nature of the IP network allows interactions between the subscribers, content providers, and service providers.

IPTV Business Model:

Studies have revealed that IPTV is an industrial aiding of convergence of some Information and Communication Technologies (ICT). Therefore, an effective IPTV business model does focus on the active utilization of a company's proficiencies in all the steps of the value chain. Indeed, the studies of Zott and Amit (2013) argues that a business model is created by the central company's administrators so as to satisfy its consumers' supposed needs. In other words, the central company's business model does extend companies and its industry borders to some market opportunities. On the other hands, many studies have conceptualized business models on digital information system as undeniably significant towards value formation of boundary-spanning activities. Hence, a business model is said to be the activity system designed to generate and capture value through the manipulation of business opportunities.

In the aggregation of IPTV model, IPTV players comprises of network providers, platform providers and content providers. Thus, a network providers are projected to directly offer IPTV service to subscribers in which the operator serves as a service provider (Dong-Hee & Yongsuk, 2011). On the other hands, operators do support IPTV services

indirectly through the establishment of network services. Hence, content providers comprise of both key media producers, such as TV channels, motion picture studios and other professional and amateur content originators similar to peer-to-peer content sharing.

In addition, IPTV business model can follow one of the four alternatives in the IPTV delivery value chain like Korea (Zott & Amit, 2013; Dong-Hee & Yongsuk, 2011). First, service providers act as the key liable player for the subscriber which is necessary to procure network access and transport services from the network operators as an instrument for its business. Besides that, network operator is a player who runs both the access and the core portions of the network architecture that enhances the services on extra roles of a content aggregator (KISA, 2014). However, service provider is the key player with a direct connection to the subscriber base, providing content through a portal and billing the subscriber for the services. Hence, content provisioning is prepared by content aggregators which offer content to the subscribers over service provider's network capacity.

Measurement of IPTV Status:

The level of acceptance and use of technology have been addressed through the UTAUT model, which could infer state of penetration of the technology in use (Muraina et al., 2013b). Thus, some of the determinants variables in UTAUT model could be used to address the penetration of technology or a specific system in the organization. Hence, performance expectancy, effort expectancy and social influence were used as determinants factors to measure the trend of IPTV penetration in Iraq.

The performance expectancy is viewed as state in which individual believes that using a system or device assist to achieve one's job performance (Venkatesh et al., 2011). This believe could be applied to measuring trend of penetration of IPTV towards how it assists users in achieving their targeted performance on their respective jobs. Moreover, researchers have agreed to the outcome derived from some studies conducted using UTAUT model and concluded that effort expectancy was found to be enabler of ICT usages. Effort expectancy is the degree of ease of use of information system or devices felt by a user without exhibiting much pressure (Muraina et al., 2013b). Besides that, degree to which an individual user feels that other people believe that he will be using the ICT devices towards understanding and obtaining information about its immediate societies is known as social influence (Venkatesh et al., 2012). This implies that social influence as a factor could be used to understand users of IPTV's state of mind in terms of its penetration trend in Iraq. Hence, all the three determinant factors were used to measure the trend of IPTV penetration in Iraq in the context of this research.

III. METHODOLOGY

This research uses data analytic tool to visualize the trend of IPTV penetration in Iraq. There are different forms of data analytics tools that have been validated for using in big data research, such power query, power pivot, power BI (Clark, 2017). Due to the study of trend of IPTV penetration in this research, we choose power BI as the tool to ensure ease of visualization of IPTV trend as our main objective. Prior to the use of analytical tool, many steps were taken to ensure gathering of reliable and useful data in this research like, designing of instrument for data collection, location and selection of participants, and instrument distribution.

Design of Data Collection Instrument:

All the adapted three factors that were used for measuring the trend of IPTV penetration in this research were measure through 5-point likert scale online survey questionnaire, ranging from strongly disagree (1) to strongly agree (5). The designed instrument based comprises of two sections; demographic and factors to measure the IPTV trend in Iraq. Moreover, the adapted three factors performance expectancy, effort expectancy and social influence found their basis from Venkatesh et al. (2011, 2012), Muraina et al. (2015). Hence, designing of online survey questionnaire considered the time participants should spend while administer the sent questionnaire which was estimated to be five to eight minutes.

Location, Participants and Data Collection Approach:

The research was conducted in the selected urban areas in Iraqis' major cities tagged A, B, C, D, E, F and G in five regions, due to their accessibility to the internet and previous awareness they have on the benefits of IPTV. The research covers all the major cities with availability of internet in the entire regions. Thus, the participants were contacted through their profiles in their population agency and place of works. Hence, 2,220 participants were engaged with respect to the

major urban centers in Iraq during the data collection process. The online questionnaires' links were sent to the participants through their emails and WhatsApp application for immediate attention. The data collection took 12 weeks with presence of early and late respondents, and there were 2,200 respondents that attended and submitted the online questionnaire, representing 99.10% response rate.

IV. DATA ANALYSIS AND RESULTS

Data Preparation:

Before the use of Power BI to determine the trend of IPTV penetration in Iraq, the collected data through the online survey questionnaires was screened properly for missing values by using SPSS version 24. The analysis performed comprehensive check outliers which can turn the outcome of the research to unacceptable issue. The gathered data successfully screened for both error and interesting outliers while 20 cases failed to certify influential outliers, leading to discarding of 20 cases from 2,200 receive online questionnaires. Thus, the remaining 2,180 were found fit to use for subsequent analysis.

Background Check of Respondents:

Of all the 2,180 cases of questionnaires that valid for the analysis, 1,860 are from male respondents which are 85% of the valid questionnaires, and 320 questionnaires are from the female's respondents as shown in Figure 2.

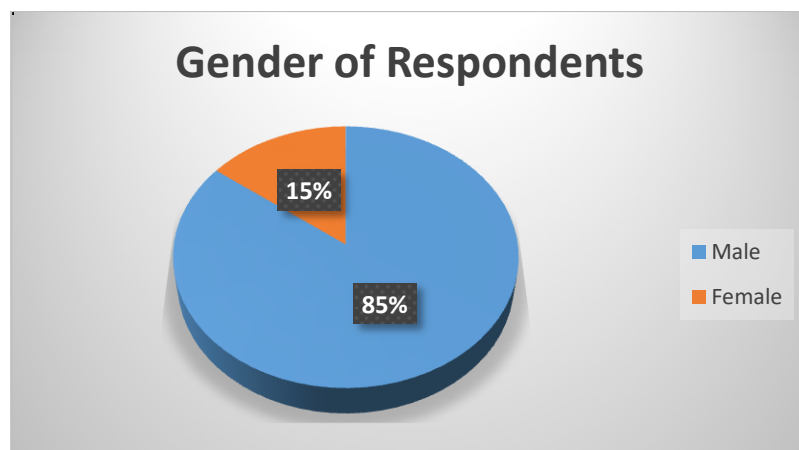


Figure 2: Gender Distribution of Respondents

Furthermore, analysis on the level of education of respondents shows that 720 respondents have diploma certificate as shown in Figure 3. 815 of the respondents possesses bachelor degree, 577 are with master degree and 68 of respondents are PhD holders.

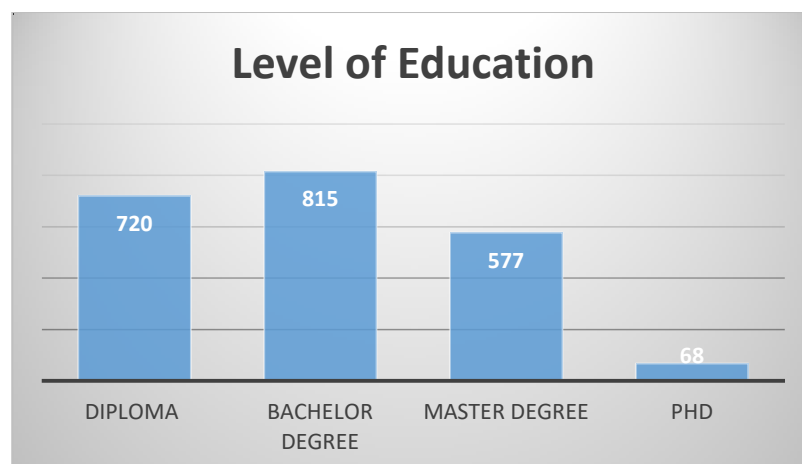


Figure 3: Level of Education of Respondents

The analysis takes care of the profession of respondents with 410 civil servants, 1,238 working with private establishment shown in Figure 4, while 532 respondents are self-employed or working with their personal businesses.

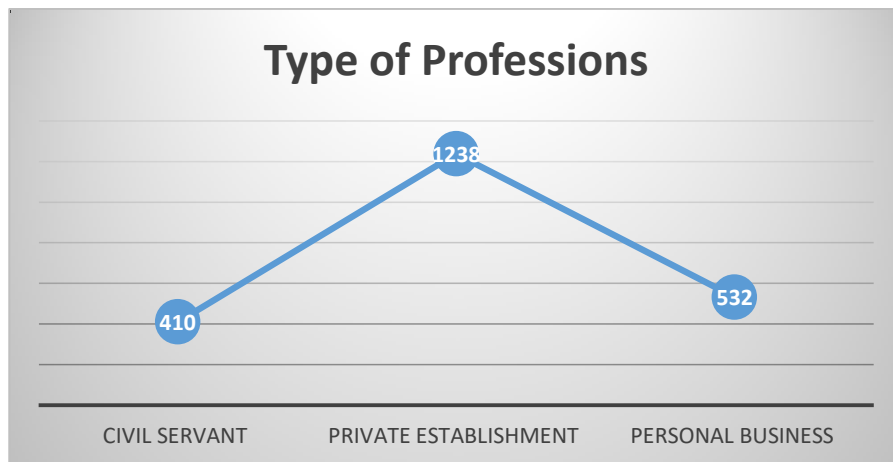


Figure 4: Professions of Respondents

Table 1: Levels of Internet Usage and IPTV Awareness among the Respondent

Usage level	Internet usage	IPTV Awareness
Low	26	57
Medium	342	1511
High	1812	612

In terms of level of internet usage, 26 of the respondents have at low level as shown in Table 1, 342 recorded at medium level and 1,812 respondents have high level of experience. Besides that, 57 of respondents have low awareness on IPTV, 1,511 respondents have medium level awareness and 612 of the respondents have high awareness about IPTV.

IPTV Penetration Trend:

The main analysis of the trend of IPTV penetration in Iraq was initially done by separately transform all the measuring items performance expectancy, effort expectancy and social influence factors in SPSS version 24. Thereafter, the data was imported into Power BI analytical tool to determine the individual trend of all the three determinant factors as shown in Figures 5, 6 and 7.

The trend of IPTV penetration in Iraq was checked through the exploration of collected and transformed data in Power BI against the selected seven cities A, B, C, D, E, F and G as shown in Figure 5.

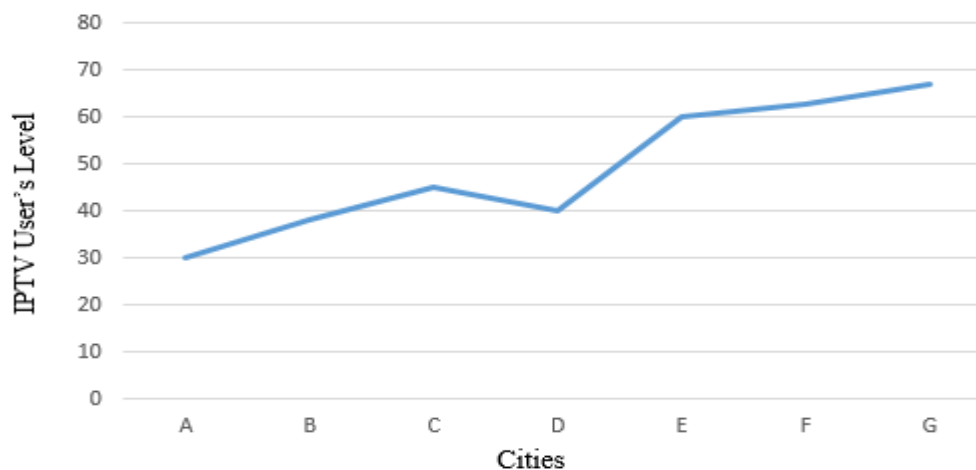


Figure 5: Trend of IPTV Penetration with Respect to Performance Expectancy Factor

The trend of IPTV penetration in Figure 5 represents the analytical status of performance expectancy of the users of IPTV in all the selected seven cities in Iraq with little problem in only one city.

In terms of measuring the IPTV penetration through the effort expectancy of users with respect to the seven cities as presented in Figure 6, the initial status at city A was lower to the performance expectancy factor in Figure 5. But, rises sharply with little drop in city D and rises again to the last city G which is similar to that of Figure 5.

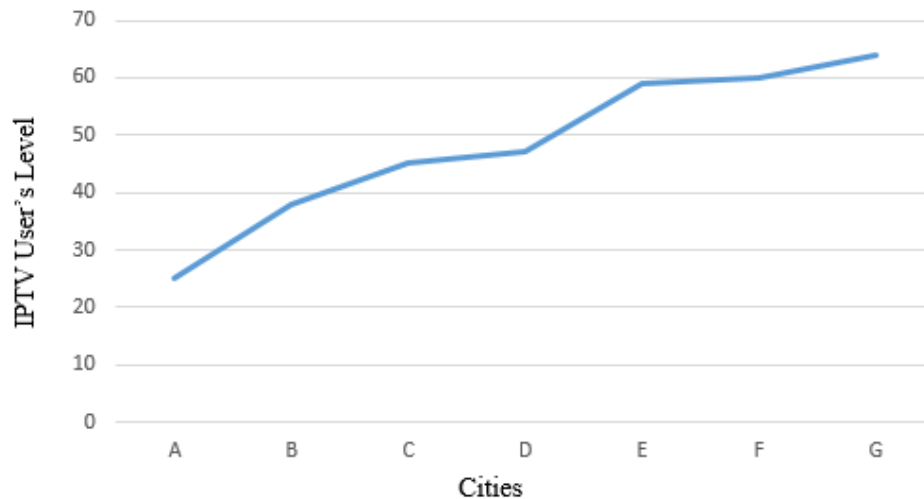


Figure 6: Trend of IPTV Penetration with Respect to Effort Expectancy Factor

Furthermore, social influence of users of IPTV in Iraq in Figure 7 shows highest initial status in city A and continues to trend higher till the last city G.

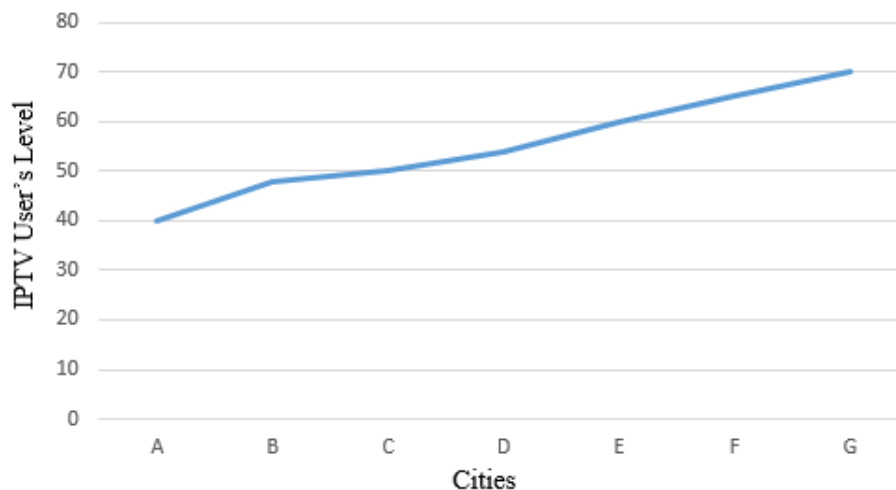


Figure 7: Trend of IPTV Penetration with Respect to Social Influence Factor

V. DISCUSSION

This research adapts some constructs (Performance expectancy, Effort Expectancy and Social influence) from UTAUT model so as to determine the trend of IPTV penetration Iraq. Previous researchers and studies have shown the impact of the adapted three constructs in obtaining the status of usage of systems or devices in different domains. The results of analysis of trend of penetration of IPTV as shown in Figures 5, 6 and 7 showed low initial status of IPTV in Effort expectancy factor (Figure 6) of city A. But, the trends rise in all the determinants factors until sharp drop in city D of performance expectancy in Figure 5. This may be caused by low expectation of some present users of IPTV, thus caused withdrawal of some subscribers from using the service. All-in-all, the results of all the trends in Figures 5, 6, and 7 showed that there is continuous trend in the penetration of IPTV in Iraq.

VI. CONCLUSION

This research was conducted to primarily determine the trend of IPTV usage in Iraq. The data gathering was achieved by including all the major seven cities in the five regions in Iraq, tagged as cities A, B, C, D, E, F and G. The collected data was analyzed through the use of SPSS version 24 and Power BI analytical tool. The present trends of IPTV penetration in Iraq show that the users found joy and satisfaction in using the services provided by their respective IPTV service providers. This could be traced to their level of educations, professions they engaged with and their internet usage experience. Therefore, this research reveals how IPTV services are to the people of Iraq. Hence, the research would be further studied in future by looking at how impacted were IPTV services on the professions of subscribers in Iraq.

REFERENCES

- [1] Ahmed, M. E. (2014). Private Personalized Social Recommendations in an IPTV System. *New Review of Hypermedia and Multimedia*, Vol. 20, No. 2, pp. 145-167.
- [2] Clark, D. (2017). *Beginning Power BI: A Practical Guide to Self-Service Data Analytics with Excel 2016 and Power BI Desktop*. Second Edition, Apress USA.
- [3] Dong-Hee, S. (2009). An Empirical Investigation of a Modified Technology Acceptance Model of IPTV. *Behaviour & Information Technology*, Vol. 28, No. 4, pp. 361-372.
- [4] Dong-Hee, S. & Yongsuk, H. (2011). Examining the Factors Affecting the Rate of IPTV Diffusion: Empirical Study on Korean IPTV. *Journal of Media Economics*, Vol. 24, No. 3, pp. 174-200.
- [5] Harrison, C., Benko, H., & Wilson, A.D. (2011). OmniTouch: Wearable Multitouch Interaction Everywhere. *Proceedings of the 24th Annual ACM symposium on user interface software and technology (UIST '11)*. NewYork: ACM, pp. 441–450.
- [6] Junghee, H., Changryul, K., & Kailash, J. (2015). Analysis of Internet Protocol Television (IPTV) Evolution in Korea: An Open Innovation Perspective. *Journal of Information Technology Case and Application Research*, Vol. 17, No. 2, pp. 93-107.
- [7] Korea Internet & Security Agency (KISA) (2014). *Survey on the Internet Usage Executive Summary*, pp. 11–14.
- [8] Khabbiza, E., El Alami, R., & Qjidaa, H. (2016). A New Method to Reduce the Bandwidth of IPTV Systems. *IEEE Explore*, 78-1-5090-5146-5/16, pp. 1-6.
- [9] Matej, K., & Andrej, K. (2017). Public Interest Analysis Based on Implicit Feedback of IPTV Users. *IEEE Transactions on Industrial Informatics*, Vol. 13, No. 4, pp. 2077-2086.
- [10] Muraina, I.D., R.S.O. Wan and Ahmad, A. (2013a). Efficacy of UTAUT Model in Continuation of Usage of Broadband in the Rural Areas of Northern Region of Malaysia. *Proceedings of International Conference on Rural ICT Development, Jun. 25-27, Malacca, Malaysia*, pp: 174-179.
- [11] Muraina, I.D., R.S.O. Wan and Ahmad, A. (2013b). Investigating the Readiness of Broadband Continuous Usage among Rural Dwellers in the Northern Region of Malaysia. *International Journal of Computer and Communication Engineering*, Vol. 2: pp. 679-683.
- [12] Muraina, I.D., R.S.O. Wan and Ahmad, A. (2015). The Roles of Some Antecedents of Broadband User Behavioural Intention among Students in the Rural Areas through PLS-SEM. *American Journal of Applied Sciences*, Vol. 12, No. 11, pp. 820-829.
- [13] Muraina, I.D., Wan, R.S.O., Ahmad, A., Ibrahim, H., & Md Yusof, S.A. (2016). Modeling The Behavioural Intention of Broadband Technology Usage Among Teenagers: Application of UTAUT Model. *Asian Journal of Information Technology*, Vol. 15, No. 3, pp. 593-601.
- [14] Muraina, I.D., R.S.O. Wan and Ahmad, A. (2012). Conceptualising Service Quality and Technology Factor as Drivers for Continuous Usage of Broadband Among Rural Dwellers in Malaysia. *3rd International Conference on Network Applications, Protocols and Services (NETAPPS)*, pp. 83-87.

- [15] Patrick, P. (2006). IPTV: Technology and Development Predictions. *Fiber and Integrated Optics*, Vol. 25, No. 5, pp. 325-346.
- [16] Pi-Tzong, J., Hsi-Peng, L., & Tzu-Chuan, C. (2012). Measuring the Perception Discrepancy of the Service Quality between Provider and Customers in the Internet Protocol Television Industry. *Total Quality Management & Business Excellence*, Vol. 23, No. 7-8, pp. 981-995.
- [17] Regina, B., & Michael, M. P. (2014). User Interface Guidelines for the Control of Interactive Television Systems Via Smart Phone Applications. *Behaviour & Information Technology*, Vol. 33, No. 8, pp. 784-799.
- [18] Shengnan, Z., Xin, W., Ruochen, H., & Zhilin, L. (2016). Data-Driven Objective Evaluation on IPTV User Experience. *IEEE Explore*, 978-1-5090-2860-3, pp. 1-5.
- [19] Sedano, I., Prieto, G., Brunnstrom, K., Kihl, M., & Montalban, J. (2017). Application of Full-Reference Video Quality Metrics in IPTV. *IEEE Explore*, 978-1-5090-4937-0, pp. 1-4.
- [20] Venkatesh, V., Sykes, T., & Zhang, X. (2011). Just What the Doctor Ordered: A Reviewed UTAUT for EMR System Adoption and Use by Doctor. *Proceedings of the 44th Hawaii International Conference on System Sciences, Kauai, HI, USA.*, pp: 1-10.
- [21] Venkatesh, V., J.Y.L. Thong and X. Xu, 2012. Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, Vol. 36, pp. 157-178.
- [22] Wen-Chang, T., Chih-Lung, K., & Chi-Shi, L. (2017). A Lightweight Personalized Image Preloading Method for IPTV System. *ICACT*, 978-89-968650-9-4, pp. 265-268.
- [23] Zott, C., & Amit, R. (2013). The Business Model: A Theoretically Anchored Robust Construct for Strategic Analysis. *Strategic Organization*, Vol. 11, pp. 403-411.