

A Review Study of Technology Acceptance Model in Service Industry: 2017



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Abstract

With boom in mobile and 4G internet technology, nowadays service offerings and processes are attached with frequent advanced technology up gradations. Technology Acceptance Model (TAM) proposed by Fred Davis is considered to built a conceptual framework and construct for explaining the technology acceptance and its main determinants and moderators. This secondary data based research paper aims to compare & highlighting main variables and their sub-variables in Technology Acceptance Model (TAM) which determine choice & adoption of advanced technology in three main areas driving the service sectors viz. tourism, e-retail and healthcare. These three areas constitute the major portion of GDP of any country. The study concludes that identified variables in each sector show a specific relationship pattern of user to accept advanced technology. Through identification of dominating variables this paper adds a further scope to this study by emphasizing over electronic word of mouth of communication.

Keywords: TAM, Advanced Technology, Service Sector, Electronic Word of Mouth Communication.

Introduction

Service industry in India contributes as a biggest contributor in economic development. It is a dominant industry sector in catalyzing Gross Domestic Product (GDP) growth, foreign investment and employment generation for the country .As per the Central Statistics Office the expected growth rate of service sector is accorded to about 8.8 % in 2016-2017, and a mark able 66.1% growth in Gross Value Index in 2015-2016. Apparently the IT sector is also booming and contributing in India's GDP rising from 1.2 % in 98 to 9.5 % in 2015. The technology sector in India is likely to generate a market of US\$ 160 billion in 2016 compared to US\$ 146.5 billion in 2015, a growth rate of 9.2 %.(IBEF, 2017) As statistics suggest service sector and information technology is on the developing curve for Indian economy and intervention of Information and internet related technology in service sector can result in more superior growth and enhanced acceptance by the service users. This paper focuses on three main sector of service industry – Retail, Tourism and Health, as this entire sector indulge maximum user experience, usage frequency and technological advancement. Speaking about technological intervention, e-commerce and online retail are the next paradigm in retail sector. E-commerce is expected to attain US\$ 100 billion by 2020 growing from US\$ 30 billion in 2016 while online retailing is projected to reach US\$ 70 billion by 2020 from US\$ 3 billion in 2014. Tourism sector in India stands third for acquiring foreign exchange and contributes 7.5% in GDP estimated to be US\$47 billion. Healthcare services are also flourishing high with a compound annual growth rate (CAGR) of 16.5% till 2020 and expected to grow US\$ 160 billion by 2017 and US\$ 280 billion by 2020. (IBEF, 2017) Various technological advancement are targeted for treatment of disease like cancer and TB. Growth of mobile technologies in India is also playing an important role in improving the health care access, clinical care and health awareness among the people. Main factors and variables exists which determine the acceptance of such technological advancement in these service sectors. All these variables are dynamic in nature and vary with consumer demographic profile. Technology acceptance model (TAM) given by Fred Davis is a robust framework which allows the study of these external variables summing all the factors defining the acceptance of technology system.

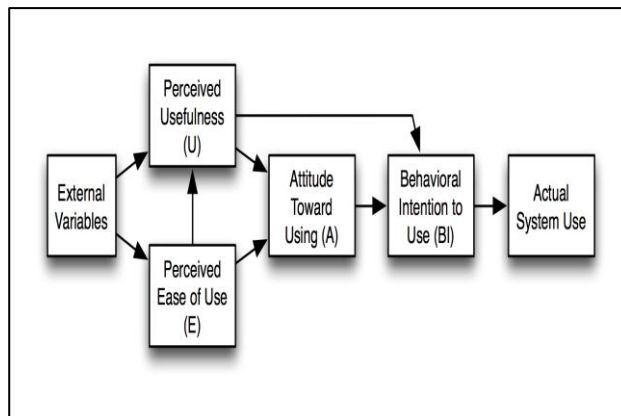
Review of Literature

Brief History of Technology Acceptance Model (TAM)

Technology acceptance model (TAM) given by Davis in the year 1986, Technology acceptance model helps to evaluate user acceptability for a newer technology taking in consideration their decision making, perception building and benefit realization. As defined by Fred Davis, the acceptance of technology by user is affected by external and internal variables. Internal variables constitute – perceived ease of use, perceived usefulness, user’s attitude and behavioral intent, while external variables carries either mixed or significant relationship with the internal variables, depending upon the type and nature of the technology. TAM Model since its emergence has been undergone various addition and changes. Researchers have identified extended relationship between the internal & external variables and among the internal variables also, constructing a specific behavior for accepting the various types of Information Systems and communication technology. (Lee, Y, ea.tl. 2003). Prior to Davis many researchers have derived the relation between human behavior and perceived usefulness. In the year 1975, Schultz and Slevin explored through their research that perceived usefulness act as reliable prediction for self predicted decision model. Proceeding further over the research Robey in 1979 found a high correlation between perceived usefulness and usage of the system. This relation was further explained in the meta-analysis done by Tornatzky & Klein’s in 1982, where they defined usage of new technology through the level of complexity in its innovations, whereas Bandura explained the perceives usefulness as an outcome judgment and perceived ease of use as self efficacy. Swanson’s through its research says that perceived usefulness is more about the quality and perceived ease of use is measured against the associated cost for access of new system or technology. As per Fred Davis, TAM Model incorporates the user motivation and explain that user acceptance is influenced by (i) Perceived usefulness (PU) –The degree to which user seek benefits from the particular system or the amount by which its job gets enhanced and (ii) Perceived ease-of-use (PEOU) –The degree to which a user believes that using a particular system would be easier, with lesser efforts. The final Attitude of the user is greatly influenced by the perceived usefulness and perceived ease of use (Chuttur, M, 2007).

TAM Model explains the acceptance of newer technology as an output of user’s cognition, reasoning power and though process, it highlights socio-psychology theory. User are more comfortable towards a technology if its supports their operational performance and job efficiency in a longer term. Users always follow their personal beliefs to construct their perception against a technology. Personal beliefs get influenced by consequences due to gap between actual and expected usage, purpose of intent and attitudinal diversity. External variable such as political factors, professional experiences, organizational environment, and social constraints also affects the

user intent for the technology acceptance. (Reza, M et.al, 2011)



TAM Model Implication over Technology

Two important social learning construct- (1) Cognitive building and (2) Social Influence also play a vital role for building individual intention for the usage of technology. Task efficiency is a critical matter for defining an individual usage in context to a particular technology. Determinants for task are relevancy with usage profile, hands-on modules and output consistency (Chismar, W et.al, 2002). Acceptability of technology also depends on the reliability of the internal variables of TAM model also frames the usage of technology, i.e. perceived usefulness and ease of use must be reliable for defining the stability of the technology system. (Khan, A et.al. , 2011). Repeat usage of technology by an individual also constitute as an important factor for its acceptance. Repeat use behavior act as an indicator to determine the loyalty of the user against technology and for developing strong user intent. A loyal user will always build a positive perception (Lorente, M et.al, 2013)

Technology Acceptance Model in Tourism Industry

In Thailand, health tourism constitutes 9% of the total tourism, marking a huge growth worth US 1325 million in 2009 to US4 billion in 2012. But still the usage of internet for electronic marketing and online purchase in healthcare tourism sector is less than 3%. Framework was designed using TAM to depict the variables defining the user purchase intent for health care services. Major variables identified were services image, perceived benefits and perceived ease of use. (Phatthana W & Mat N, 2011). Intervention of internet based Information technology have gave rise to applied tourism in China i.e. Tourism electronic commerce (TEC). It comprises of two levels , firstly the increased usage of electronic commerce by tourist companies for transaction services, while the second levels explains the individual behavioral intent for acceptances of e-tourism services such as online purchase, ticketing and booking. Adoption of TEC has been framed under various sections (i) impact of tourism website on decision making of tourist (ii) adoption rate of online reservation (iii) motivation for repurchase generated by online reviews (iv) customer satisfaction and loyalty. TAM model was used to evaluate the impact of tourism website under perceived usefulness,

adoption of online reservation under perceived ease of use, online reviews and customer satisfaction was summed under technology and trip experience, validated under external variables. (Xu X. et.al, 2012). Tourism business is greatly proportionate to the various transaction methods available. With increase in the mobile internet technology M-commerce is gaining popularity among tourism defined as the use of electronic methods, means and procedures to conduct various forms of tourism business activity in cyberspace. Tourism business activity means the transfer of money done between tourist and the agent with or without presence of any middle agency. And under m-commerce such transaction is done using a mobile device. To understand the variables for seeking the adoption of M-commerce among tourism TAM model was used integrating perceived destination complexity and destination m-payment knowledge with tourist behavioral intent under a second set of variables of perceived security and compatibility. (Peng, R et.al, 2012). Considering the tourist intent for the measuring overall benefit gets defined by a single term "Enjoyment". As above discussed regarding the intervention of mobile and internet technology in tourism electronic commerce or m-commerce the major variable which govern the acceptance of such technological advancement is tourist joy, broader reach and cost incurred. Tourist joy is governed by the mood swing developed due to the travel experience gained by accessing the mobile travel booking or highly interactive mobile tourist application. If tourist can sense enjoyment in using mobile payment then their acceptance for the technology will be more. Speaking about broad reach and mobility, tourist experience get nourished in a more efficient manner if the integration between time and place, service access and use is smoother in nature. Basically mobility showcases the merits of technology which simultaneously act as beneficial indicators for tourist good experience also. Direct and positive correlation exists between mobility of mobile technology services and perceived usefulness. Cost factor is also an variable which affects the tourist acceptance of mobile payment and ticketing. TAM model is used to investigate all these factors predicting tourist intention against m-commerce, factors were empirically tested using data collected from a survey of tourists from Guangzhou and Shenzhen famous tourist attractions. (Yang, Y et.al, 2013). Tourist always ensure that while planning a trip their travel plan, ticketing, accommodation and leisure activities must be confirmed with lesser hassle and accomplishing all expectation with timely delivery while travel. Augmented reality (AR) is another aspect of tourism sector which enables a better tourist experience making it interactive and simple. With the usage of mobile and internet technology AR allows mobile ticketing, booking of hotels, commutation management, and navigation while travel, events and excursions. TAM model was used as a base model to evaluate all factors – external and internal, leading the tourist acceptance of AR mobile and internet technology. Identified external factors were e (i) quality of information (ii) System quality (iii) Cost (iv)

Relatedness (v) security (vi) innovative quotient. (Diek, M & Jung, T 2015). Considering the fact that M-commerce loaded with boom in mobile and internet technology provides an enormous pool of information for tourist and a wide spectrum of facilities over a click for an efficient trip, but it also add up a some degree of risk or uncertainty in their decision making. Some of such factors of concern for tourist are (i) lack of trust (ii) floating of personal and financial information (ii) absence of human affinity (iv) Authenticity of available product and services. Risk factors can be summarized under two heads – trust between tourist and online service providers and confidence over mobile interface. TAM model was used to study the effect of perceived risk over the acceptance of mobile and internet technology in tourism. (Sahli, A 2015)

Technology Acceptance Model in E-Retail Industry

Online shopping defines the behavioral intent of customer over online portal or mobile application. It provides various benefits to the user such as 24x7 shopping experience, cashless payment modes, schemes, reduction in time for store visits and decreased travel expense. Variables under TAM model that represent the acceptance of online shopping are (i) Perceived ease of use (PEU)- It shows the degree of reduction in users expense and efforts (ii) Perceived usefulness (PU)– the benefits user experience while shopping in comparison to traditional in-person shopping techniques and (iii) Perceived enjoyment (PE) – It covers the pleasure, stress release measure and happy mood which user attain while doing online shopping. PE is the third extended external variable included to weight the individual connects with online shopping experience. (Cheema, U et.al, 2007) Despite of the fact that online shopping and e-commerce poise the future of e-retailing their lies certain troops which decrease its acceptance among consumer, the concerning issue is security of personal information. As mentioned above PEU, PU and PE was taken as driving variables in TAM model for studying customer acceptance of online shopping considering but to address the security risk and extended variable was taken – consumer demographic profile (CDP). CDP include all demographic parameter such as age bar, literacy level and income slab.CDP carries a direct relationship in building consumer intent against e-retailing and online shopping. (Johar, G et.al, 2011). Another issue which leads to diminishing online sales adoption among consumers is improper infrastructure and hassled implementation of online shopping process , an enhanced user experience (EUE). EUE is directly related to all the variables of TAM model which we have seen earlier for depicting consumer adoption of online shopping. For increasing Perceived ease of use (PEU) and EUE the ambience of online marketplace must be (i) user friendly- easy to route and access to the site should be smooth (ii) LIVE customer support ,HELP support and query handling options (iii) product and services comparison assisting their decision making (iv)online portal's aesthetic value like colors and font styles. For providing higher EUE and perceived usefulness (PU) factors are (i)

Optimization of time and money invested by consumer in online shopping, by providing updated information about product & services with schemes & benefits (ii) proper delivery processes. (Lim, W & Tim, D 2012) Another segment of technological advancement in retail is self service checkout (SCOs) in a big or medium sized grocery retail store. SCOs allow the customer to exit a retail store by self processing their purchase. The driving variables for studying its acceptance under TAM model are (i) Processing speed – the ease of use for customer to process and exit the store faster, there must be lesser waiting time (ii) process reliability and control – to carry out the listing, scanning and payment process without any confusion and repetition (iii) Social interaction -avoiding the unnecessary interaction with service employee. One of the variables which led to decrease in adoption of SCOs is the customer dependency on customer. At a given point of time, though the SCOs are equipped with best features but due to in-efficiency of customer to access the SCOs create unwanted waiting time for others which decrease process speed, reliability and waiting time. (Kahila, T 2013).

Advancement in e-retail application is self-service technologies (SST's). SST's are the intervention of internet and mobile technologies at retailing part such as kiosks, websites, and mobile apps. Main objective of SST's in retail is to decrease the overhead and increase the revenue generation. The acceptance of SST's among consumer can be studied under TAM model by grouping variables under three segments – Cultural-self perceptive, internal motivational factors and external motivational factors. Cultural self perception is developed by consumer considering its self likings, relational benefits with its family and friends and group and societal liking. Internal motivation factors are the enjoyment by consumer and comfort level while accessing SST's, while external motivational factors are Perceived usefulness and the time saved. All these variables contributes in behavior making for the consumer for accepting SST's. (Srinivasan R, 2014). Consumer commitment and loyalty also act as key variable for deciding the acceptance of technological advancement in retail sector. (Renko, S & Popovic D, 2015) While discussing the various factors of technology acceptance in retail sector under TAM model two more variable are identified (i) consistency of the technological advancement – Perceived compatibility(PC) (ii) Social influence (SI) – degree of group acceptance also suggest individual acceptance. (Betkovic I, 2015).

Technology Acceptance Model in Health Industry

Initial technological intervention in healthcare delivery was available to the access of the user over internet technology only. As it was the start of the transition of health services over internet so the key drivers for its acceptance were derived benefits. Considering the variables under TAM model PU was the strong variable in predicting the user intention while PEU was the passive variable. (Chismar W & Patton S, 2002). Health care IT acceptance can be categorized either subjective or objective in nature.

Here subjective states individual satisfaction and objective is more oriented towards technology effectiveness, accuracy and efficiency. TAM model is a subjective approach to study acceptance of health care IT acceptance with in depth evaluation of perceived ease of use and perceived usefulness. These variables are rational notion which drives the user intent for adopting and accepting IT in health care services. They do not follow a given pattern but integrates such rational notion at each incident, getting affected by social influence and user attitude also. (Khan A & Woosley J, 2011). Healthcare IT has taken a bigger leap with inclusions of mobile technology, now it is understood as Mobile health services. Studying the variables explaining the acceptance of IT and mobile services in healthcare it's seen that proposed TAM model focuses on expected performance and efforts only, but some essential drivers are response rate, self efficacy and potential threat identification also formulates in building the behavioral intent for accepting the IT and mobile based health care services. Response rate is termed as amount of money users pay over the new technology and time invested by them to be equipped with such technological advancement. Self efficacy is the internal driver for mapping the competency and ability of user for adopting a technology. Threat identification refers to probability of being harmed by the technology and the degree of harm suffered due to such acceptance. (Sun Y et.al. 2013) Understanding the behavioral intent of health care service provider towards newer technology in healthcare delivery is also very essential because they are boundary spanners and largely affect the behavioral intent of users. Apart from existing variables in TAM, the health care worker or physicians intent to accept technology also include vendor support, training & hands-on and their literacy level. (San A, Yee C, 2013) Considering the mobile health technology, another key variable which affect its acceptance among users is portability factors (PoF). PoF includes smooth access to mobile data, proper awareness among Mobile health services among health care professional, timely updating of the healthcare mobile apps. (Wajeeh M et.al. 2014) Major application in health care IT services is Electronic Health Record. Through electronic records of health records doctors and health professionals can provide treatment more quickly, with enhanced precision, with proper safety measures, in required synchronization with supporting health care teams and reduced costs for patients also. While exercising the TAM model in acceptance and propagation of Electronic health Record the determinants are PEU, PU and data ownership (DO). DO is the major variable which states the privacy of the personal health data and its timely updating the repository. In process of stacking the electronic health files individually and tracking ones health record. (Losova V, 2014). In this era of 4G mobile services, the shift of health services over the mobile technology. As defined by Robert Istepanian that "m-Health is emerging mobile technologies for health care system m-Health services allow usage of Mobile for health practices with use of information

and communication technology (ICT), such as computers, mobile phones, communications satellite, patient monitors, etc, increasing affordability, and quality of healthcare.(Jain, A et.al 2016) The major variables in TAM model for increased usage of m-Health services are PEU, PU, DO and perceived trust (PT). PT covers individual and social quotient of mobile commerce for the users. It reflects the behavioral intent due to previous. (Alloghani M, A et.al 2016)

Research Methodology

This is a secondary data based descriptive study done to review the various external variables of TAM model existing in service sectors which allows understanding the technological advancements. The sources of data would be the related books, internet, project reports of various agencies, programs and applications in mobile devices etc. tables and charts based on secondary data will be drawn with help of MS- office. Simple analytical statistical tools would be used

Rationale

Past literature had focused studying and application of TAM model or technological advancement in a specific sector only but no work is done to evaluate the Relative importance of variables, analyzing that which variable are more important in that sector and comparing varying TAM model application in respective sectors.

Aim of Study

To identify variables of Technology Acceptance Model which dominate the acceptance of advanced technology in different service sector like tourism, health and e-retail sector.

Finding & Observtions

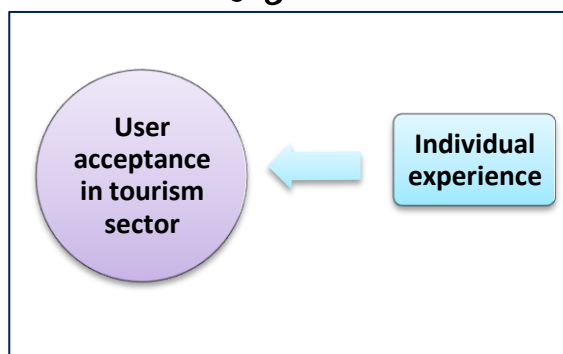
Findings 1

Chart showing various variables identified in tourism sector which affects technology acceptance:

Tourism	
Variables	Sub -variables
Perceived Usefulness	Quality of Information
	System Quality
	Cost
	Innovation
Perceived Ease of Use	Broad reach
	Mobility
Derived Enjoyment	Online reviews
	Customer satisfaction
	Trip experience
Perceived security	Authenticity and trust
Compatibility	Human affinity
	Relatedness

Observation

Among the identified extended variables for acceptance of advanced technology in tourism sector the dominating factors are individual user experience, benefits and information security. User experience is related with individual choice about the advanced technology.



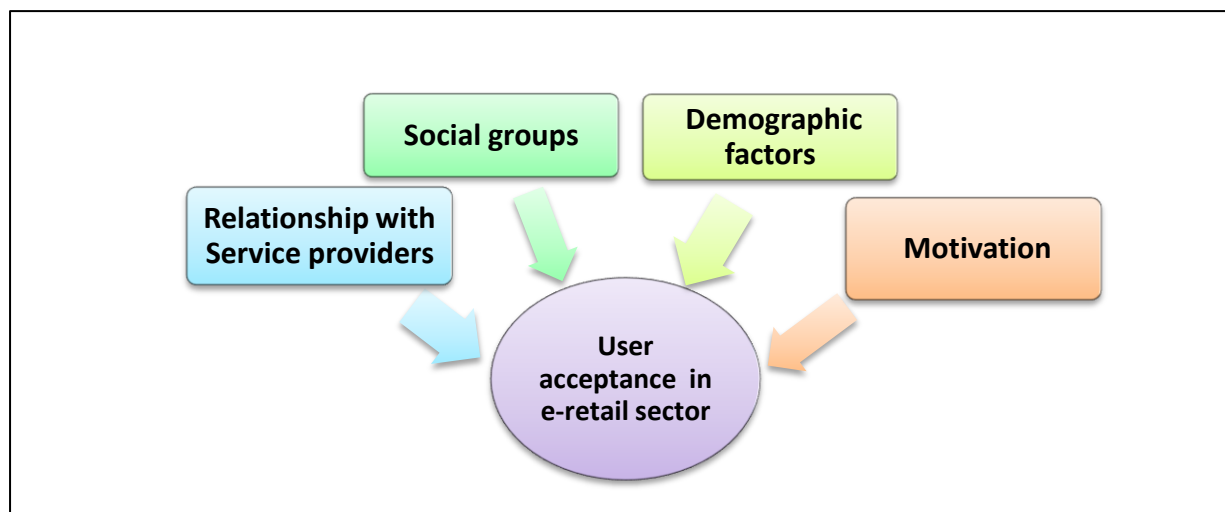
Findings 2

Chart showing various variables identified in retail sector which affects technology acceptance:

E-Retail	
Variables	Sub -variables
Perceived Usefulness	reduction in users expense and efforts
	benefits user experience while shopping in comparison to traditional in-person shopping
Derived Enjoyment	degree of pleasure, stress release measure and happy mood
Demographic factors	Literacy level
	Age
	Income slab
Enhanced User Experience or Perceived Ease of use	User friendly
	Customer support
	Product and services display
	online portal's aesthetic
	Delivery process
Culture perception	self-likings
	relational benefits with its family and friends
	Group and societal liking.
Internal Motivational factors	Comfort
External motivational factors	Time saved
Compatibility	consistency of the technological advancement

Observation

Social perspective, motivation, customer satisfaction and demographic value are the identified dominating variables in acceptance of advanced technology in e-retail sector. The user experience is determined by multiple factors for making individual choice .Here User experience carries one to many relationships.

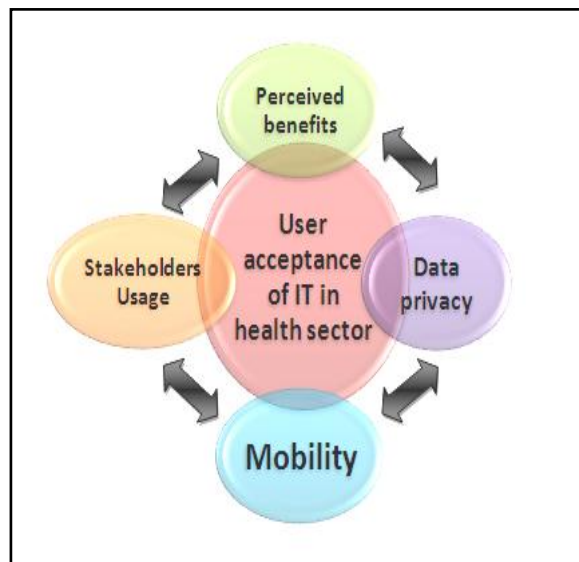


Findings 3

Chart showing various variables identified in health sector which affects technology acceptance:

Health	
Variables	Sub -variables
Perceived Usefulness	Faster and quicker to access the health care services
	Faster relief and precise line of treatment
Individual satisfaction	Effective health care services derived rationally as per each incident
Enhanced User Experience or Perceived Ease of use	Response rate - amount of money users pay over the new technology and time invested
	Self efficacy - internal driver for mapping the competency and ability of user
	Potential threat -probability of being harmed by the technology
	online portal's aesthetic
Stakeholders perception	Health care worker or physicians intent to accept technology also include vendor support, training & hands-on and their literacy level
Portability factors (PoF).	Smooth access to mobile data, proper awareness and timely updating of apps
	Individual and social quotient of mobile commerce
Data ownership (DO)	privacy of the personal health data and its timely updating of electronic health records

Observation: Perceived benefits, individual satisfaction, stakeholder usage, Data privacy and Mobility are the identified dominating variables in acceptance of advanced technology in health sector. User acceptance depends upon both one to one and one to many relationships.



Conclusion

Conclusively in this paper Technology acceptance model is studied and reviewed in context to different service sectors and the identified variables in each sector shows a specific relationship pattern of user to accept advanced technology. The pattern as follows:

- 1. Tourism**
User experience is related with individual choice about the advanced technology. User experience is individualistic choice.
- 2. E-retail**
The user experience is determined by dominating variables - Social perspective, motivation, customer satisfaction and demographic value for making individual choice about advanced technology. Here User experience depends on one to many relationships
- 3. Health**
Perceived benefits, individual satisfaction, stakeholder usage, Data privacy and Mobility are the identified dominating variables in determining

individual choice for accepting of advanced technology. So the individual experience depends on one to one and one to many relationships.

Further Scope of Study

Further this study can be progressed in evaluating the effect of electronic word of mouth of communication (eWoM) which plays an essential role in analyzing the various variables which affect the technological and IT advancements. eWoM advances the user perception building with proper know –how about the technology, complete information exchange and retention of meaningful data through blogs, online reviews, social media posts and messages posted on online groups. eWoM includes the interrelationship between four basic elements communicator, receiver, stimulus and response. It explains the reason of existence of dominating variables in TAM model in a respective service sector.

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