



**CROSS-CULTURAL COMPARISON IN THE ADOPTION OF EMERGING
TECHNOLOGIES IN CONSTRUCTION INDUSTRY**

MSc. Thesis

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FINAL APPROVAL FOR THESIS

This thesis titled “ **CROSS-CULTURAL COMPARISON IN THE ADOPTION OF EMERGING TECHNOLOGIES IN CONSTRUCTION INDUSTRY**” has been prepared and submitted by Amir Bashir in partial fulfillment of the requirements in “Anadolu University Directive on Graduate Education and Examination” for the Degree of Master of Science in Civil Engineering Department has been examined and approved on 22/11/2019.

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ABSTRACT

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Anadolu University, Graduate School of Sciences, November 2019

Supervisor: Assoc. Prof. Dr. Serkan KIVRAK

All zones worldwide are working through a once again industrial revolution which is called “Industry 4.0”. It is proposed to have a huge impact on engineering, commercial, standards of livelihood. With the rise and spread of technologies, companies are investing in Construction Technologies (C-techs). Still, the success of construction technologies relies on engineers’ acceptance and adoption of technologies. Not much exploration has recently been done to confirm the procedure of in what way corporate engineers use and take up construction technology. This study makes known the significance of cultural comparison and adaptation of emerging technologies.

The study aims to investigate the problem of culture’s role in using and agreeing to take innovative technologies in construction companies. The research investigates the influence of an individual’s role in agreeing to use emerging technology in establishments which is not being done much to our knowledge within the construction context. Previous investigations reveal culture is the significant obstacle in acceptance of novel techs. Technological Acceptance Model (TAM) was applied as a prototype for approving of emerging techs, even though cultural measurements a prominent philosophy by Hofstede were applied. The outcomes of the data analysis disclose that most of the hypotheses are supported. The study recommends that pass on of emerging techs are most to be expected to be effective if the groups are culturally associated. The results of the research illustrate that culture has a significant influence on the intention to use emerging techs.

Overall 600 questionnaires were circulated 300 engineers from India and 300 from Turkey respectively, out of which 490 returned signifying 81% comeback percentage. Subsequently repeated comebacks diagnosis for misplaced data, retained 462 questionnaires for examination. These contained 248 Turkish participants and 214 Indian participants.

Keywords :- Cross-Culture Comparison, Construction Technologies, Structural Equation Modelling.

ÖZET

İnşaat Sektöründe Gelişmekte Olan Teknolojilerin Adapte Edilmesinde Kültürlerarası Farklılıkların İncelenmesi

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Dünya “Endüstri 4.0” olarak adlandırılan bir sanayi devrimi üzerinden çalışmaktadır. Mühendislik alanlarının, işletme ve geçim standartları üzerinde büyük bir etkisinin olduğu ileri sürülmektedir. Teknolojilerin artması ve yaygınlaşmasından dolayı şirketler inşaat teknolojilerine yatırım yapmaktadır. İnşaat teknolojisinin başarısı, mühendislerin teknolojilerin kabulüne ve benimsenmesine dayanmaktadır. İnşaat teknolojisini uygularken şirket mühendisleri tarafından kabul edilmesi gereken prosedürler konusunda son zamanlarda çok fazla araştırma yapılmamıştır. Bu çalışma, yeni teknolojilerin adaptasyonundaki kültürel etkileri incelemektedir.

Bu çalışmanın amacı, kültürel farklılıkların inşaat şirketlerine yenilikçi teknolojilerin adaptasyonu ve dahil edilmesine etkisini araştırmaktır. Bu araştırma, bireyin yeni ortaya çıkan teknolojileri inşaat geçmişinde kullanmayı kabul etmedeki rolünü incelemektedir.

Önceki araştırmalar kültürü, yeni teknolojilerin adapte edilmesinde önemli bir engel olarak ortaya koymaktadır. Gelişen teknolojilerin adapte edilmesi için prototip olarak Teknoloji Kabul Modeli (TAM) uygulanmış ve Hofstede’nin kültürel boyutları ele alınmıştır. Bu araştırmanın sonuçları, kültürün geliştirmekte olan teknolojileri kullanma niyeti üzerinde önemli bir etkiye sahip olduğunu göstermektedir. Analiz sonuçları, hipotezlerin çoğunun desteklendiğini ortaya koymaktadır. Bu çalışma, ortaya çıkan teknolojilerin uygulanmasının, gruplar kültürel olarak ilişkili olduğunda en etkili olmasını önermektedir.

Araştırma kapsamında 248’i Türk ve 214’ü Hintli olmak üzere toplam 462 mühendis arasında anket çalışması yapılmıştır.

Anahtar Kelimeler :- Kültürlerarası Karşılaştırma , Yapı Teknolojileri, Yapısal Denklem Modellemesi.

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Amir Bashir
November 2019

22/11/2019

DECLARATION OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

It is my original work of this thesis; my work in preparation, data collection, analysis and presentation of information at all stages in accordance with the ethical principles and rules; that I am referring to all the data and information obtained within the scope of this study and include these resources in the bibliography; I declare that this study was screened by the “scientific plagiarism detection program” used by Anadolu University and in no way includes plagiarism. At any given time, I know that I accept my legal and legal consequences in the case of an offence against my host.

Amir Bashir

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LIST OF ABBREVIATIONS

AGFI	Adjusted Goodness-of-Fit Index
AMOS	Analysis of Moment Structures
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Critical Ratio
DF	Degree of Freedom
DTPB	Decomposed Theory of Planned Behaviour
D2	Mahalanobis Distance
EFA	Explanatory Factor Analysis
C-TECH	Construction Technology
GFI	Goodness-of-Fit Index
HCI	Human-Computer Interaction
IDH	Innovation Diffusion Theory
MI	Modification Index
R2	Coefficient of Determination
RMSEA	Root Mean Square Error of Approximation
SD	Standard Deviation
SEM	Structure Equation Modelling
SRMR	Standard Root Mean Square Residual
SCT	Social Cognitive Theory
SPSS	Squared Multiple Correlation
TAM	Technological Acceptance Model
TPB	Theory of Planned Behaviour
UTAUT	Unified Theory of Acceptance and Use Of Theory
X2	Chi-Square
X2/df	Normed Chi-Square

1. INTRODUCTION

This unit presents the master's study named "Cross-Culture Comparison in the adoption of Emerging Technologies in Construction Industries on emerging intelligent C-Technology Acceptance in India and Turkey: A Structural Equation Modeling Method". A comprehensive outline of the hypothetical context and investigation problem is as followed- Subdivision 1.1 Theoretical Context and Investigation Setback, Subdivision 1.2 will explain the study aim and purposes, Subdivision 1.3 will explain the scope of the investigation, Subdivision 1.4 Significance of research, Subdivision 1.5 has put forward Investigation design and methodology, Subdivision 1.6 Framework of the study.

1.1 Theoretical Context and Investigation Setback

Throughout the last decades, extensive use of intelligent technologies as a generalization of smart structures in construction industries and other institutions have been investing in emerging technologies such as Internet of Things (IoT), building information modelling (BIM), virtual reality (VR) to support both paces of work and delivery of resources (Jeong et al., 2013; Pasini et al., 2016). To facilitate at large training for engineering students, Information and communication technology (ICT) at large has provided reinforcements, to lower cost of conveyance and increase institutional budget (Pasini et al., 2016). As stated by Christie (2004) to develop training knowledge and effectiveness for engineers the payments has also been provided.

Regardless of the immense development of construction technologies in industries and its perceived benefits, researches indicate that lack of success still exists. In case if the users are not willing to implement a kind of tools the value will not be entirely consumed in the structure. Consequently, the effective execution of c-techs depends if engineers are keen to take on the techs. It turns out necessary for designers and users to comprehend aspects influencing user approval of c-tech intelligent structures to improve the engineer's (Liaw & Huang, 2011). In this context, numerous previous investigations have exhibit novel Construction technology implementation is not only explanation, but procedure for numerous diverse social aspects (Schepers & Wetzels, 2007), organizational aspects (Sun & Zhang, 2006), individual aspects (Sun & Zhang, 2006), in accumulation up to behavioral and cultural aspects.

In the area of construction, Technology Acceptance Model (TAM) had been implemented for conducting behavioural examination of different technologies e.g., BIM

(Zhang, Teizer, Lee, Eastman, & Venugopal, 2013), scanner technology (Sepasgozaar, Shirowzhan, & Changxin, 2017), and sustainable technology, Big Data, the Internet of Things, cloud computing, artificial intelligence and intelligent theories (Hu, 2016; Zhong et al., 2017).

Numerous academicians have criticized (TAM) being biased for its cultural influence particularly when verified in non-Western. Still, the descriptive power of (TAM) is not clear and the results of individuals, social and impacts of culture on the adoption of these technologies (Straub et al., 1997; Bagozzi, 2018). Even though the internet is a universal instrument, the competence of applications must be calculated locally for these users which function in native/countrywide (Li and Kirkup, 2007).

In the meantime, emerging countries such as Turkey and India, are particularly not much investigated in connection to the applications of c-techs. Among the numerous of the emerging nations follow old methods for training due to lack of funds and resources not having skilled staff (Nasser and Abouchdid, 2000; Tarhini et al., 2016), Therefore it is remarkably vital to comprehend the elements which may inspire to choose c-techs.

The most broadly pragmatic model of culture used has been that of Hofstede (1984); Bhagat (2011) which classifies countries along the subsequent dimensions:

- Power distance (high / low)
- Masculinity/femininity
- Collectivist / individualistic
- Uncertainty avoidance (high/low)

It has been verified that differences in cultural context may explain few variances in TAM results, in this way most of the work is restricted, the dimensions used by Hofstede were implemented at the (country) macro scale, in their method it presents limits for findings which were considered direct examination of cultural factors. As stated by Srite and Karahanna (2006) have overcome this difficulty by drawing procedures and methods that were unfailing when implemented at the individual stage.

Within the c-tech intelligent system, comparatively slight notice has been put forward about moderation of cultural constructs, and findings which examine culture at the individual stage are mostly insufficient. Therefore, in this investigation enlargement of TAM to include a measurement of cultural constructs for moderation at the individual level. The criticism for TAM in a few contexts has been made for having less ability for illustration.

TAM has largely brought into being to have tolerable power of illustration, the insertion of moderators may perhaps get better. In Extended Technology Acceptance Model (TAM 2) when

integrating experience and gender, the descriptive ability improved from 36% to 54 %. Inside this framework, several studies have referred the prerequisite to integrate a number of moderators which mostly stay unverified like as experience (Venkatesh et al., 2008), age and cultural background. According to Conselman (1964). In the enlargement of TAM by integrating constructs of moderation to check variations of individuals and cultural aspects, the analytical strength will get improved.

Whereas annexation of moderation of cultural constructs could report the restriction of TAM to a certain degree, a balancing method to this difficulty is the annexation of supplementary forecaster variable in this model. As stated by Chen and Zhou (2016) in Unified Theory of Acceptance and Use of Technology (UTAUT) model the term facilitating conditions is the base concept. Within this framework, conditions of facilitating are explained as the degree to which corporation staff consider that infrastructure for techs occurs to develop the use of intelligent tech system. Conditions of facilitation fundamentally develop industries and enhance the way of thinking by launching a new example of robust implication in the use of the system. The example makes conditions of facilitation (infrastructure) to continue as an explanation of technology sustained and deployed by reliable corporations which assurance of maintenance and excellence of the facility proposed to operators. Conditions of facilitation simplify the comprehension of emerging intelligent c-tech system. It signifies the logistics and technical backing required to use intelligent tech system by a company of operators in. As stated by Teo and Milutinovic (2015) are well-known writers they have promoted conditions of facilitation, as outward constructs to the TAM to inspect the purpose of technological usage.

There are several gaps attempted to be suggested in this study. As indicated directly above, short of emphasis has been made on the individual, organizational, social and elements of culture that influence the adoption and agreeing of emerging intelligent construction technologies. Even though a lot of investigations have said at national stage cultural. Although many findings said cultural standards at the national stage, few investigations take into account cultural individual-stage importance. Meanwhile, culture at the national stage is a stage at macro which is essential; even, it is debated that take in and acceptance by technological operators is unease at the stage of macro (Srite and Karahanna, 2006). Lastly in the context of emerging and advanced nations a minor exemplary nation which takes into account individual approval of such kind of novel intelligent c-techs. The approach of this study is to fill the gap.

Therefore to report the above problems, the study goal is to put in conditions of facilitation as straight forecaster additionally to level of individuality of culture and other moderation features of demography; the research for the model of TAM is to check these

constructs influence on engineers' to select and implement intelligent emerging c-tech functions and examine if variations amongst these elements in diverse emerging nations, specifically Turkey and India. Prolonging the TAM framework to incorporate social, organizational and elements at the individual stage in two cultures permit us to discover the generalizability and applicability of the recommended model in the framework of c-tech in two cultures and allow investigation of where variations may lie between the cultures involved. This will also support procedure makers and practitioners to accomplish a deeper comprehension of the engineers' acceptance of emerging intelligent construction technologies.

1.2 Study Aims and Purposes

The principal purpose of this research is to create and analyze an integrated intellectual prototype of taking in of techs that describe how organizational and individual elements influence the engineers' behaviour of usage and recognition of the emerging intelligent c-tech systems in Turkey and India. This study purposes to provide to the stream of literature on emerging intelligent c-tech, acceptance and culture. Moreover, it is expected that this study will support the guiding principle to create an enhanced comprehension of the purpose of accepting or rejecting the emerging intelligent structure of cultures across c-tech. Based on framework, this study ambition is to respond to the subsequent two queries:

- What will be the limit to which organizational and individual elements influence the engineers' behaviour to select and implement the emerging intelligent c-tech structures in India and Turkey?
- What will be the limit of cultural elements level of individual (power distance, masculinity\femininity, uncertainty avoidance, and individualism\collectivism) and variations of individuals (gender, educational level, experience and age) — as moderators of sets of two—influence the association amongst the core forecast and intentions of behaviour and utilization of emerging intelligent c-tech applications?

The occasion of the subsequent goal will support to unite the whole study and response the overstated study queries:

1) Comprehend background and present status.

(a) To find out the present usage of emerging intelligent c-tech systems in Turkish and Indian background.

(b) To check the literature associated with the invention of diffusion and acceptance of techs framework and philosophies, emerging intelligent c-tech applications, and culture.

2) Build up and assess an intellectual structure that apprehends the prominent factors affect

the operator select and take in of including of structure:

- (a) The Belief of behaviour.
 - (b) Role of internal and external support.
 - (c) Actual usage.
- 3)** In the model observe the influence of moderation of two groups.
- (a) Hofstede's elements of culture at the level of the individual (PD, M/F, I/C, UA).
 - (b) Variations of Individuals (age, educational level, gender and experience).
- 4)** To factually authenticate the prototype in the background of a European/developing (Turkey's perspective) and Asian/developing (i.e., India's outlook) countries, and analyze the similarities and variations among the two locations, this will support the study to analyze the external validity of two developing group-20 countries.
- 5)** Grant proposals that come into view from the study for procedure and guidelines as to how to select difficulties might be stated.

1.3 Investigation Scope

It is essential to outline the range of these findings as taking into detailed examination the principal purpose and empirical objectives of these findings and the obtainability of resources such as schedule and cost. This research examines the very significant factors that affect the user's behaviour towards using the emerging intelligent c-tech systems in the Turkish and Indian environment.

1.4 Significance of the Research

This study makes available constructs insightful evidence not only about the impact of a specific c-tech environment but also its influence on engineers in diverse cultural backgrounds. Particularly, this study supports compared the variations and likeness between Turkish and Indian engineers regarding their c-tech experiences. The research can support educators, policymakers, experts and investigators within the background involved in cultural to be enhanced equipped with wisdom about the precise constructs linked to culture. Constructs of engineers like as attitudes and intentions, the context of culture and other features of demographics are vital constructs that impact engineers training, remarkably in a collective c-tech environment. Comprehending these constructs is now supportive for trainers to draw significant training activities to encourage engineer's wisdom construction and make tannings more efficient and likeable.

This can support the management succeed in doing the highly efficient instalment of such

procedure and supports them enhance their tactical process of choosing coming techs, they will be able to select the finest method that suits their engineers before executing any novel technologies.

As from the scholar perspective, this investigation established an assimilate prototype that unites both technology acceptance philosophies and cultural philosophies at the microlevel (level of the individual) rather than the level at nationals in a diverse background of culture which can clearly exhibit psychological and private traits. To our wisdom, not many other studies have calculated features of culture at the level of the individual in Turkey and India.

1.5 Investigation Design and Methodology

The description and background of this study will mark it highly appropriate to use the optimist method with a quantitative scheme of investigation to respond to the study queries. This study purpose is to examine assumed associations within the background of technology acceptance in a factual method. Moreover, the associations amongst the variables explained in theoretical outline were advanced and authenticated in the theories about the technological approval and acceptance (unit 2). Accordingly, a survey of the cross-section was established the highly suitable method to gather the information. By implementing the method of survey, the gathered data from a mass figure of contributors all together in a robust, effortless, well-organized and cost-effective compared with other procedures such as interviews. SEM (Structural Equation Modelling) technique will be implemented to verify moderators and hypothesis to do a lot of tests like cluster contrasts which demand the huge number of respondents. Accordingly, using data-gathering technique is fitting from the metaphysical, epistemological and procedural idea of vision. Additionally, this study employ hypothesis and self-managed questionnaire as a data-gathering approach for the subsequent purposes: it is without difficulty designed and managed; advanced confidentiality of answerer since problems such as anonymity and privacy were organized with in the cover letter; gathering the questionnaires instantly after being accomplished will assure a greater reply speed; answerer can strive simplicity and accordingly could comprehend the concepts on any question they are responding which in turn curtail the outliers in the research of Obeidat (2016). To check the validity and reliability scales and items of the questionnaire a pilot study was examined, and a pre-text qualitative & quantitative method for the questions with the professionals in the field was also done. It is significant observing that a homogeneous huge population of engineers from Turkey and India were put to use and permitted the overview of the findings to the engineer's populations in those two nations. In actual, an overall of 600 questionnaires were

circulated to 300 engineers from the India and 300 from Turkey individually, among which 470 were given back signifying a 78.3% rate of the comeback. After that screening for missing information and outliers were conducted and 462 questionnaires were retained check (Appendix B). The output of the analysis showed 214 Indian respondents and 248 Turkish respondents.

1.6 The framework of the study

Both the countries India and Turkey, are members of emerging nations and were selected for this research for the reason that they exemplify approximately contrary stance on all Hofstede (1984) insights of culture, as made known in Table1.1.

Table 1.1. *Hofstede's dimensional differences of Culture amongst Indian and Turkish*

Country	Power Distance	Masculinity	Individualism	Uncertainty Avoidance
India (as a part Of the Asian world)	77	48	56	40
Turkey (as a part Of Euro-Asian world)	66	37	45	85

As stated by Abdullah and Toycan (2018), India and Turkey remained relatively unexploited in conditions of huge investment with respect to techs and acceptance of techs in academic institutes are still immature with respect to nations in west, while due to the deficiency of monetary resources and skilled staff in institutions still emerging nations are suffering from old traditional styles which may influence the technological acceptance in such states.

The next unit will discourse and evaluation the utmost applied theories and models of acceptance of technologies, as well as, theories of culture in the literature of IT/IS, on which the foundation will shape of the planned model of investigation.

2. EMERGING INTELLIGENT CONSTRUCTION TECHNOLOGIES, TECHNOLOGY ACCEPTANCE AND CULTURAL MODELS

2.1 Introduction

This chapter evaluates the literature linked to emerging intelligent construction technologies, concepts of adoption of technologies and cultural models and theories. Section second shows evaluations of IS (Information Systems) previous researches and models. In the end, evaluations of different theories of Hofstede's culture and the importance of its measurement are conducted.

2.2 Emerging Intelligent Construction Technologies

As per the research of industrial information technological Canadian construction sector says that the major hurdles industries are facing are the adoption and acceptance of the new technologies. As for the speedy progress, growth and development of novel techs, intelligent system of construction can extensively ascend in management of engineering construction assets and can be built intelligent by enlarging ability of networking, processing, computing, sensing, and reacting, by implementing mentioned system i.e., Virtual Reality, Augmented Reality, Wearable Technologies, Machine learning, thermal imaging ZigBee, Bluetooth, ubiquitous computing, RFID, near-area of communication, & onward. This finding furthermore points out that the latest construction immediately wants intelligent supply, but regrettably, area of construction is even now in its toddler period these days.

There is not at all uncertainty that emerging intelligent information technology is the essential motivating strength of influence to put forward intelligent construction technology system structuring and system growth. Additionally, based on the theoretical groundwork of the previous study, specifically stated by Skibniewski and Zavadskas (2013; Wang et al., (2018), a recommended structure of emerging information technology functions to the growth of intelligent construction system. It can support us enhancing the comprehensibly principal position of emerging information technology in an intelligent construction system.

2.2.1 Design of Virtual Reality

The ability of this application is to enhance design and pictures of buildings, but in the sector of engineering, it's still not reached the prime of life. The profits of virtual reality (VR) has presented will entirely make changes in cost and schedule efficiency. This application is

competent in providing ample of experience which will be very beneficial in construction firms. In reality, the construction arena is set to be transformed by implementing VR.

A number of VR descriptions have been put forward by investigators & experts. As stated by Onyesolu and Eze (2016) to make very difficult data easy to visualize and act together VR is the best set of example. Norm (2006) explained “VR as an illustration of the databank, which may be collaboratively professional and biased virtual environment”. Boman (2009) illustrates that VR as interactive, virtual pictures show advanced by extraordinary processing, haptic, touch, to persuade users that are engaged in synthetic space.

2.2.2 Augmented Reality

Architecture Engineering and Construction (AEC) organization has multiple numbers of augmented based applications. It has categorized application of augmented reality (AR) within zones of usage in the industries of AEC as under (1) virtual reality, (2) exchange or cooperation, (3) data modelling, (4) assessment of data (5) controlling development (6) training, and (7) scrutiny.

Construction contestants practice augmented reality machinery to relate diverse positions of a venture. Articles that “mention” to the contrast position of Augmented reality (AR) technologies are split into two groups; (1) comparison frameworks:(a) reality versus certainty, for instance., relating 360 degree views of 2 construction locations at different diverse periods for virtual reality documents (b) Contrasted with actuality model, e.g., integrating in order as per-erect and as per-strategic depiction with D4AR apparatuses and (c) prototype as opposed to prototype, e.g., the use of Experimental Virtual Environment (EVE), Messner (2006) and (2) comparison objective, e.g., development monitoring, defect recognition, authenticating the framework, bring up-to-date model, and assessing the model.

2.2.3 Cloud Computing And Cloud-founded BIM

The emerging cloud-BIM technology is thought to be permitting device that might manage the independent character of old-style BIM. This might indicate greater points of collaboration and alliance which offer an efficient actual-time exchange of information stand for project crew associates. This application is quickly developing that might be useful for the mechanism of communication like computers, phones and tablets. Even though the model was initiated by Peixoto et al., (2010), and later was improved in November 2008, when Google & IBM publicized an alliance mission Alsanea (2015; Clohessy and Acton, (2013) set up beyond

20 descriptions of calculating of cloud, amongst description granted by the NIST, (Mell and Grance, 2011) is highly well-known.

As stated by Porwal and Hewage (2013) recommended incorporation of calculating of cloud joining BIM context possibly will simplify the pre-preparation of maintainable projects of construction life span. Though Wang et al., (2015) revised 6 BIM-based structures, BIM 360 Autodesk, Cadd Force, BIMServer, BIM x established that only these schemes reinforced clouds & recognized IFC documents. (Wang et al., 2015) moreover sustained that present BIM software possibly will not be appropriate for minor workers and five categories of software get-up the requirements of great workers.

2.2.4 Wearable Technology

These machineries are built of diverse structures varying from radio frequency identification (RFID), ultra-wide band (UWB), Global Positioning System (GPS), Global Navigation Satellite System static camera (GNSS), electrocardiogram and electromyography Sensors (EMG) like gyroscopes, magnetometers, Global System for Mobile and accelerometers (GSR) create a physique structure. The development of digital techs has changed numerous features of our lives with numerous cases up-to-date and probable implementation of above-mentioned techs in the area of health sector Sultan (2015).

The peak degree of loss of life in the engineering of construction stays a most important worry for experts and scientists. Overall 4686 employee mortality rates in the private sector, 899 were in erection, representing one in six employee losses are construction linked. Amongst industry disunions, labour force through erection confronts the full hazards of work-related complaints and illnesses. Irrespective of the acceptance of security strategies i.e., those innovative & vital by the Occupational Safety and Health Administration (OSHA), the responsibilities of deadly and nonfatal building damages & sicknesses in the previous years. Supposed upward measure of lethal & non-lethal changes taking place in the construction engineering, construction firms uninterruptedly explore for novel methods that inspire protection. As a result of uncertain constructional surrounding places, often workforce confronts probable security & well-being jeopardies all over the whole development of construction. Construction safety has persisted frequently determined and accomplished responsively by taking efforts in reply to contrasting inclinations in injuries (Khaled and Aziz, 2015).

Among the present monitoring of the project, a satisfying quantity of robust safety

applications. The intention of checking health & safety is to safeguard the actual dimension & supervision of the workforce's performance of safety contrary to the remaining safety strategies & values. Diverse groups of technologies remained functional throughout manufacturing such as wellbeing, trade, mining, and training. A few of these technologies revealed symbols of optimistic profits (Fortmann & Philis-tsimikas, 2016) and energies are being made by both scientists and industry professionals to advance on these machinery and study from their preliminary operation.

2.2.5 Machine Learning

Machine learning has remained to be used in many activities i.e., commercial, computer engineering, industrial engineering, bioinformatics, health, medicines, physical science, and data to collect information and forecast upcoming measures. With new arise in the construction market, it may perform a significant part to predict the value of an asset. Nevertheless, some scientists have tested on the vending cost for real estate assets by machine learning set of rules.

As stated by the United States Department of Commerce, construction and substructure plans include trillion-dollar commerce with a nonstop yearly rise in pace. Even though there must have been numerous attempts to raise the efficiency of construction and infrastructure plans of late years, the industry is even now distressing from little efficiency development (Gong and Caldas, 2010). Numerous significant may affect efficiency in the construction and infrastructure industry, as well as the indeterminate, self-motivated, and transient nature of most construction plans. Throughout the pre-construction stage, and due to the lack of data, it is customary to make engineering assumptions about the obtainability of utensils, funds, data, resources, equipment, construction approaches, and flow of events. Even though a level of adaptability is frequently well-thought-out for such norms, the dynamic forces tangled in maximum projects as they come in the construction stage makes it obligatory to review preliminary development plans and choices, which can in turn outcome in probable delays and revise. As infrastructure projects progressively become bigger and to greater difficulty in nature, old-style manual quantitative analysis approaches typically be unsuccessful to efficiently and precisely take crucial project productivity presentation pointers (M. et al., 2010). Therefore, a is the necessity that manual data gathering methods i.e., direct examinations and field analysis are not competent habits to attain huge sizes of first-class data on time Vinson (2001). Therefore, robotic data gathering by utilizing sensors, vision-based structures, and laser scanners have expanded reliability in quantitative analysis of construction activities.

2.2.6 Connected Job Sites

The United States (NIST) National Institute of standard and technology printed research Gilday et al., (2004), that recognized and assessed the competence damage of \$16 billion in 2003 in the US assets services business outcoming insufficient within operationality amongst computer-aided plan, business, and software structures. Of these amounts, two-thirds are accepted by holders & workers, who experience budgets mostly throughout continuing facility operation and maintenance.

According to the report of IT Canadian erection organization Thoma froesa (1386)“the utmost commonly recognized problem linked to the association (together with communications, managing of documents, and interoperability)”.

Due to speedy variations in technology, demographics, commercial, the budget, and the all God's creatures, we are passing into an innovative age where individuals take part in the global economy as it never happened in the past. A new commercial decree for contesting is to “work in partnership” (Tapscott and Williams, 2006). This put into all the social order and commerce together with organizations of constructions, or the FM or AEC engineering. By means of the speedy development of statistics and technologies of communication, mainly Web-based and internet machinery throughout the previous ages, numerous classifications incorporation and association of techs have been technologically advanced and installed to diverse areas, including an (FM and AEC), Jyiidu (2017).

For the reason difficulties of the engineering, as numerous stages of project construction life span, the participation of many crews (together with contractors, consultants, engineers, owners, subcontractors, architects, and suppliers), with implementation of diverse structures/apparatuses, classificational amalgamation turn out to be an significant precondition to accomplish competent and effective association.

Systems incorporation and relationship are alleged to be the significant permitting technologies that get-up-and-go the construction industry in enlightening efficiency and effectiveness.

2.2.7 Thermal Imaging

Much of concrete substructure was constructed with techs late in 1900. Worsening & disaster charges intensifying structures remain to the stage of development, it is serious, improved non-destructive procedures enhanced to permit primary recognition of the worsening course that appropriate restoration approaches may be pragmatic. Procedures make available

statistics that positioning bars for strengthening, the grade of breaking in the reinforced concrete, the dispersal of chlorides, moisture slopes in concrete, the deterioration phase, and cover for steel, are required.

The thermal technique for making imaging, or use of electromagnetic cameras, is technology actually approaching into its own in construction. Those who need to shape energy well-organized buildings or want to obtain outflows, thermal imaging might grasp the top-secret for the seminar and beyond values. For picturing of concrete, we implemented Electrical Resistivity Tomography (ERT), for three-dimensional view. Currents of alternating in ERT give a jab in the mark by means of cathodes involved in the surface of goal, while the resulting currents are computed by implementing similar cathodes. These limit dimensions are implied for rebuilding inner (3D) circulation of the mark. In RCC, the metal segments, cracks and airborne spaces, slopes of moisture, and the dispersal of chloride in the medium convey distinction in regard to conductivity. Even though electrical dimensions have remained to describe concrete properties, primary outcomes of implementing ERT to picturing of concrete technique available (Lipponen and Kaipio, 2009).

The implication of implementing ERT for assessing concrete features. A sampling of the concrete cast with polyurethane slab, flat iron bar, a vertical bar, and plates of plastic was calculated by implementing ERT.

2.2.8 Autonomous Equipment

“Robotic machines have to be well-thought-out part of design and manufacture “Robotics and self-governing systems can benefit with quite a lot of diverse responsibilities at the construction job site together with blasting, hauling, drilling, dozing, loading, and further.

The construction industry background for the progress and beginning of automation has been acquainting with and there are tough mechanical and administrative complications to be overwhelmed in any effort to make known to machines onto construction locations. The capacity decrease of direct manual procedures can be part of developments in quality, inspection, uniformity and security. It is these factors rather than the elimination of labour-severe procedures which are fundamental to the assessment of probable mechanical applications. We will not be able to say that mechanization and automation do not present the opportunity of dropping labour prices, but somewhat that there are other key reimbursements which will accumulate if automation is well thought-out as an essential rethinking and rearrangement of construction procedures.

The utmost remarkable growths to the day of the week are in the zone of earthmoving procedures wherever excellence governor devices and tools to reinforce the usefulness of earthmoving equipment operatives have been acquainted.

2.2.9 Internet of Things

As stated by Guo (2014) internet of things (IoT), is the integration of home-based utilizations, automobiles, devices. Correspondingly also hold various features rooted in physical science, software, radars, and assets. IoT turns out an example of plenty of cyber structures once engaged with actuators and beams. It overcomes techs such as smart grid-irons, virtual supremacy, cost-effective households, smart transference and intelligent cities.

IoT brings into being intelligent goals to raise certain queries with respect to progress, the participation of humans, fabrication and architectural works. For instance, what is the correct steadiness for spreading of usefulness amongst intelligent items and backup infrastructure? How do intelligent bodies be presented smartness? What programming models are proper? And in what way folks make logic and intermingle with intelligent physical items?

2.1 Technology Acceptance Models and Philosophies

This unit evaluates 9 of highly significant acceptance of technological concepts & frameworks that implemented zone of the system of informatics and investigation of information tech. The vital evaluation, an assortment of features of diverse be recognized. Features grant the foundation for suggested concrete framework submitted in the subsequent unit.

2.3.1 Diffusion of Innovation theory

This theory of (DOI) Diffusion of Innovation theory is measured as a foundation that reinforced acceptance of techs behaviour on every tech's acceptance framework may depend on. As shown in figure 2.1 the suggestion of DOI found to be as S-shaped dissemination curve research suggested by Gidding (2006) by which DOI prospered to established well-defined explanation to 'dispersion', 'inventions' and the development of 'transmission'. To begin with, the 'dispersion' can be measured as a process to permit a collection of inventions to interconnect for a specific period within the diverse public structure. 'Inventions' mentions that to any term of latest thoughts, theories or required apps to be acknowledged & distributed by individuals.

Inventors possess an enormous influence on the development of invention dispersion. Inventors can be organized in five categories: Inventors, at the beginning accepted, initial popularity, delayed popularity, stragglers Sahin (2006).

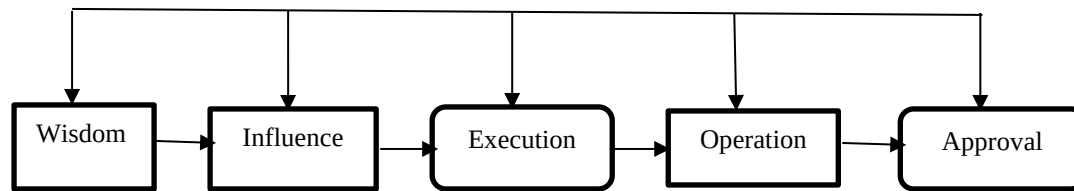


Figure 2.1: *Innovation-Decision Process*

2.3.2 Social Cognitive Theory (SCT)

Unlike DOI, SCT thinks through achievements & feedback of personality (i.e., human societies) developments of invention Albert Bandura (1999). Personalities with diverse in attitude. Sequentially, diverse attitudes have diverse consequences on the neighboring environment which influences the resulting behaviour. Specifically, SCT depends on reactions, indirect wisdom and recognition. In conditions of in reciprocal find out, SCT contains three sets of features: eco-friendly features, individual features and behaviours as represented in Figure 2.2 Albert Bandura (1999). Consider these features, the central point of SCT was effectively altered from public wisdom to social ‘cognitive’ in arranging to emphasize the significance of cognition in people comprehending and responses.

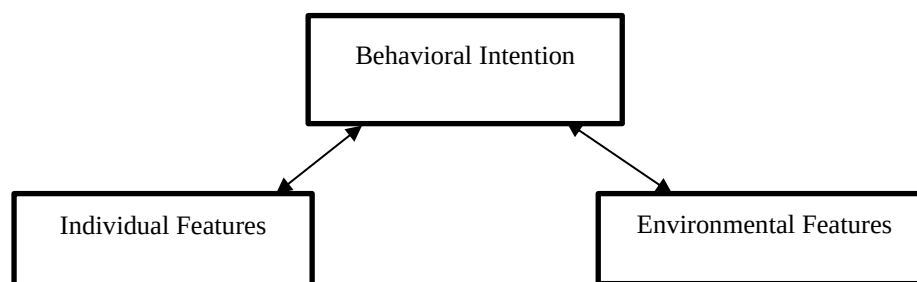


Figure 2.2: *Social Cognitive Theory (Bandura 1986)*

2.3.3 Theory of Reasoned Action (TRA)

The principles of Theory of Reasoned Action (TRA) puts the main emphasis on and provides perceptive perception concerning behaviour. TRA dogma is depend on a hypothesis that individuals typically ponder approximately their achievement effect prior to making any choice or behaviour.

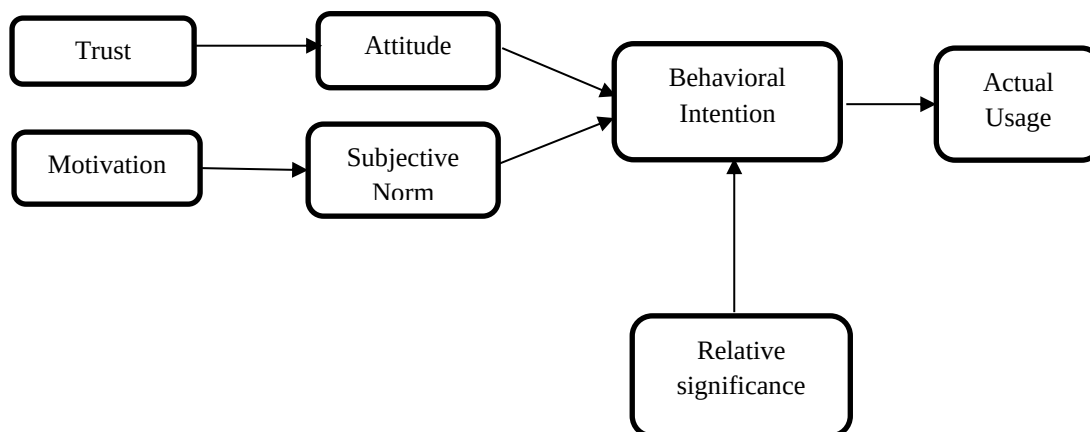


Figure 2.3: *Theory of Reasoned Action*

TRA includes 3 chief concepts as described in Figure 2.3: BI, A and SN. Initially, BI can be measured as an instantaneous existing section of behaviour. BI is diverse in behaviour as considered group of noticeable proceedings, BI systematical purpose or strategy in the direction of behaviour. Specifically, BI completely reliant individualistic method depiction or countering to particular behaviour Shah et al., (2008). Moreover, A will be measured rational characteristic to beings and may be expressed as ‘individual’s optimistic or pessimistic assessment of carrying out the behaviour’ Shah et al., (2008). Former knowledge has a dominant influence on A to be optimistic or pessimistic. Let’s say, the former understanding was not up to standard, A will have a pessimistic effect on BI. Lastly, SN may be measured as ‘the being’s awareness that highly people are significant to ponder he must or must not carry out behaviour in query’(Ajzen and Fishbein, 2004).

2.3.4 Rules and Techniques of Planned Behaviour

Accordingly, to rules of TPB was established to overwhelm an absence of ability in TRA to forecast behaviour in the circumstance to inhabit unfinished decision limits. Sheppard et al., (1988), defined decision limits as ‘behavioural intention will forecast the show of any charitable act, unless objective fluctuations earlier to the operation or without the intent to calculate not to agree to the behavioural standard in the expression of accomplishment, aim, background, time-frame and/or precise’.

The connections linking TPB variables like TRA either in BI is influenced by SN, A, & PBC (Defranc et al., 2008). Let’s say, A influences BI absolutely puts not SN, PBC mean to

spot high and individual BI also shows robust behaviour. Furthermore, TPB reports how human trusts be influenced by variables which are categorized into behavioural trusts, normative trusts and regulator trusts (Figure 2.4).

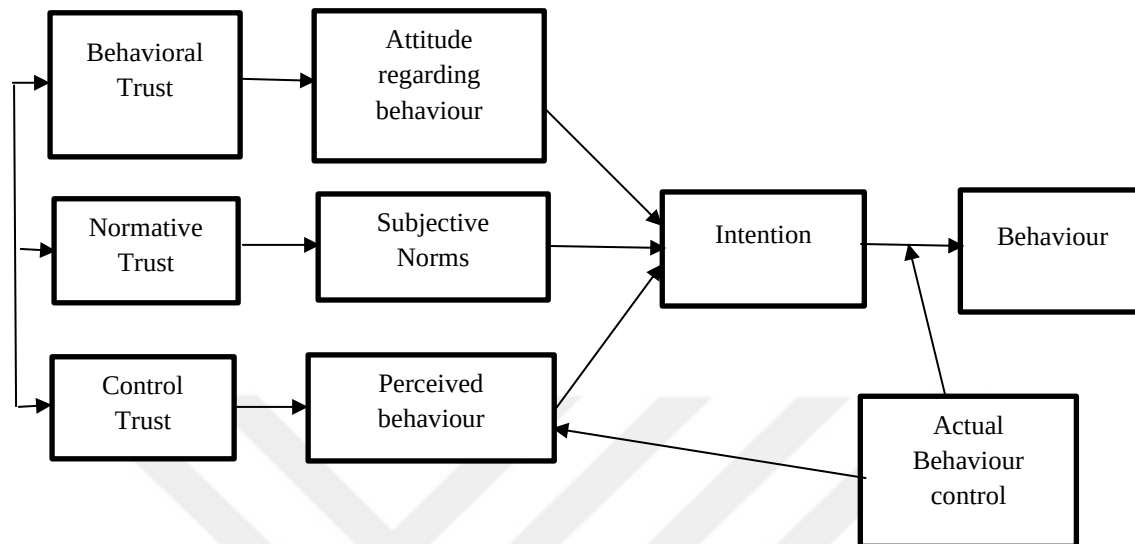


Figure 2.4: *Theory of Planned Behaviour*

2.3.5 Decomposed Concept of Planned Behaviour (DTPB)

Decomposed Theory DTPB was suggested by Taylor and Todd (1995) to develop the TPB prototype & resolve inadequacy functionalize of PBC reorganizing TPB disintegration framework. Dissimilar after TPB put forward trusts components, DTPB examines & make clear the multiplex-components of natural surroundings that trusts by either the normative attitudinal, and control trusts of PB as disintegrated, as described in Figure 2.5 Todd (2012).

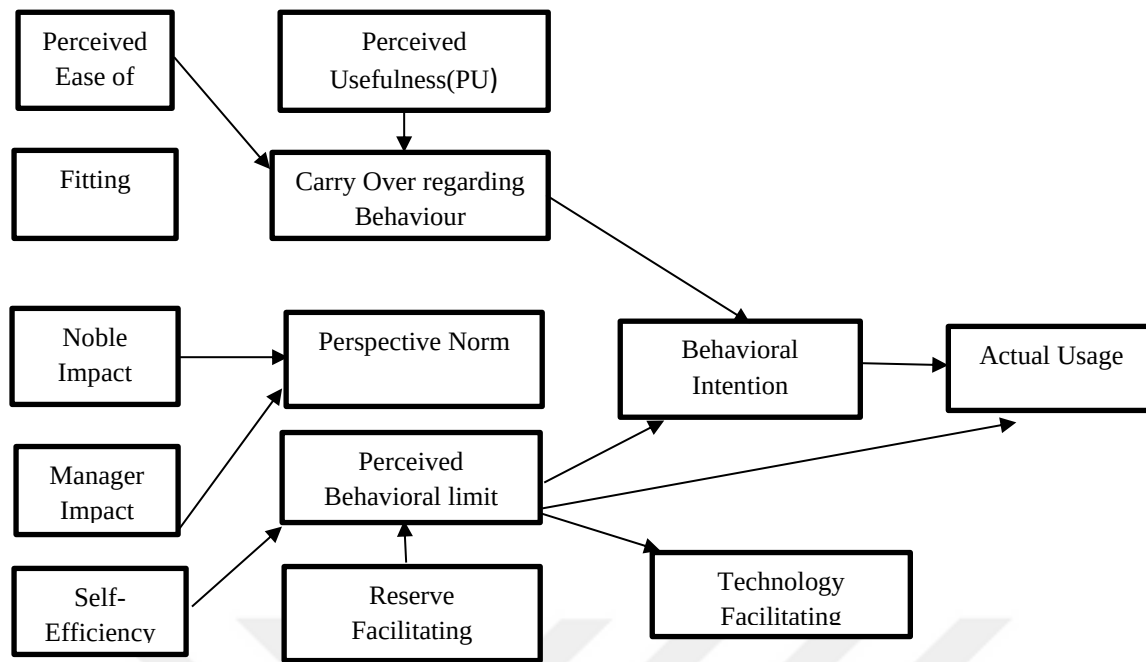


Figure 2.5: *Decomposed Theory of Planned Behaviour*

2.3.6 Technology Acceptance Model (TAM)

The philosophy called TAM is measured as TRA deviation in which AU & BI measured but SN unnoticed as a result to uncertainty in philosophies is at the back of its pragmatic complexity in using it David, (1989); Fishbein and Ajzen (1975). Furthermore, unlike from TRA, TAM depends on PU & PEOU forecasting entity trust & carry over in the direction selected techs.

In TAM, PU inclines to possess a straight & unintended effect on BI represented in Figure 2.6. At large, TAM includes subsequent essentials: A, BI, PU, PEOU and External variables.

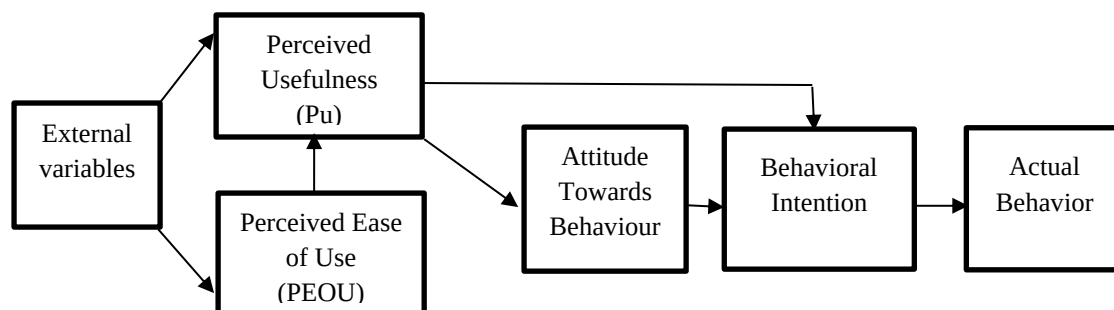


Figure 2.6: *TAM MODEL (Davis et al., 1989)*

2.3.7 Extended Acceptance of tech Model (TAM 2)

TAM indicates the presence of different extra concepts linked to social effect (Davis et al., 2000). In fact, mostly TAM 2 extra 2 key features: (1) influence of social development features and (2) perceptive method features, as represented in Figure 2.7 (Davis et al., 2000).

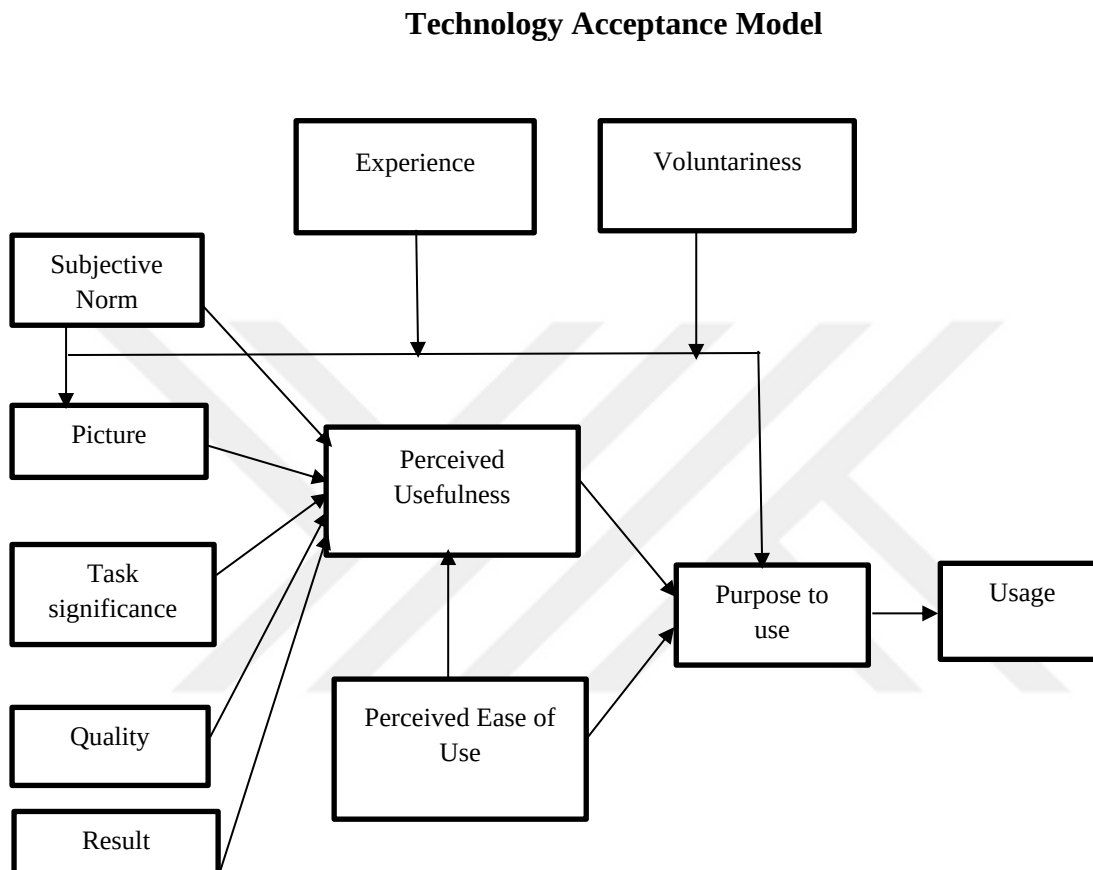


Figure 2.7: TAM2 (Venkatesh & Davis 2000)

The social impact management features contain any features which possess a straightforward effect on invention acceptance choice. Various variables can be classified below this set: Subjective Norms (SN), voluntariness (VOL), experience (EXP) and image (IMG).

Alternatively, the cognitive process contains features linked to choosing method among a structured capability and structure usefulness in conditions of the proposed job as Job Relevance (JR), Output Quality (OQ), outcome Demonstrability (RD) and PEOU. Initially, like COMP feature in DOI, JR can be well-defined as an individual's opinion concerning the degree to which either the target structure is appropriate to, he or she profession (Viswanath Venkatesh and Davis, 2000).

2.3.8 Enlarged Type of TAM

The limits to computing direct elements Taylor and Todd (2019), proposed an enlarged technique of TAM and A-TAM mix of TAM framework and TPB Figure 2.8 shows A-TAM and TAM variables.

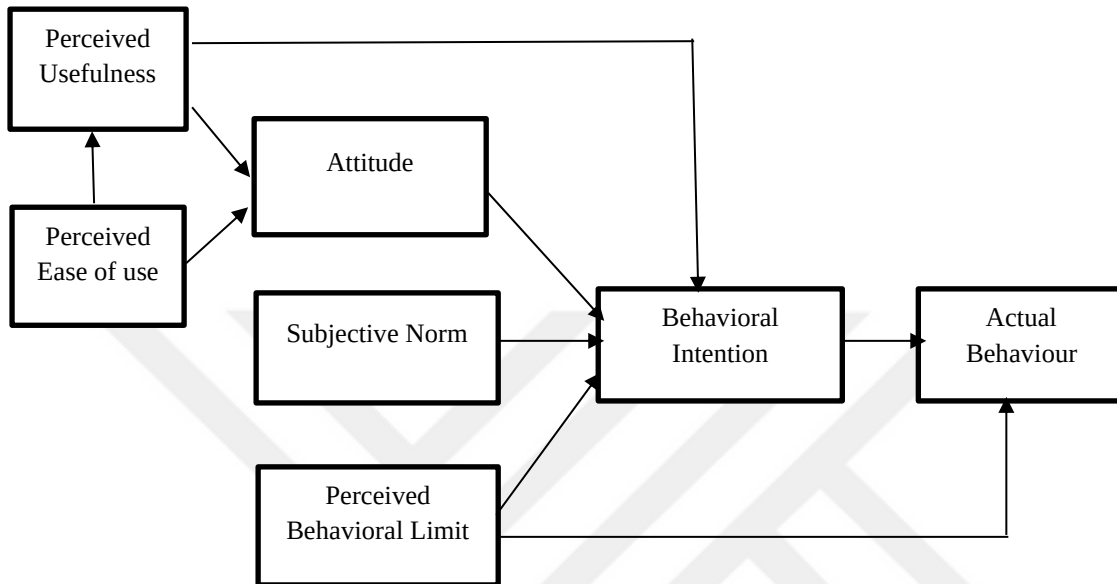


Figure 2.8: *Augmented TAM (Taylor and Todd 1995)*

A-TAM provides greater importance to the social parts (e.g., SN and PCB) remarkably in IT. Taking into account latest and skilled users within the framework can be measured one more cause for accepting A-TAM as shown in the Taylor and (Taylor and Todd, 1995) research handled between skilled and unskilled students. The outcome of the research reinforces the ability of A-TAM in forecasting the usage behaviour in relation to the users' experience level.

Oppositely, A-TAM also presents an insufficient limitation. Initially, the A-TAM framework slips other vital variables (e.g., age and gender) that are linked to user knowledge. Secondly, the result consequence might not be widespread as it was managed with the same technology.

2.3.9 Unified Theory of Acceptance and Use of Technology (UTAUT)

This theory was advanced to full fill the variations of other frameworks. The 4 main variables were built (see Figure 2.9); 1) expectancy performance that is calculated in TAM by PU, expectancy efforts contrasted to TAM in PEOU, impacts of social that is contrasted in TRA to SN and conditions of facilitation contrasted in TPB to PBC. These elements can affect

the BI and implementation of techs. This framework also holds 4 types of moderation gender, experience, voluntariness and age that may influence the associations amongst main elements and intentions of behaviour and implementation (Davis, et al., 2019).

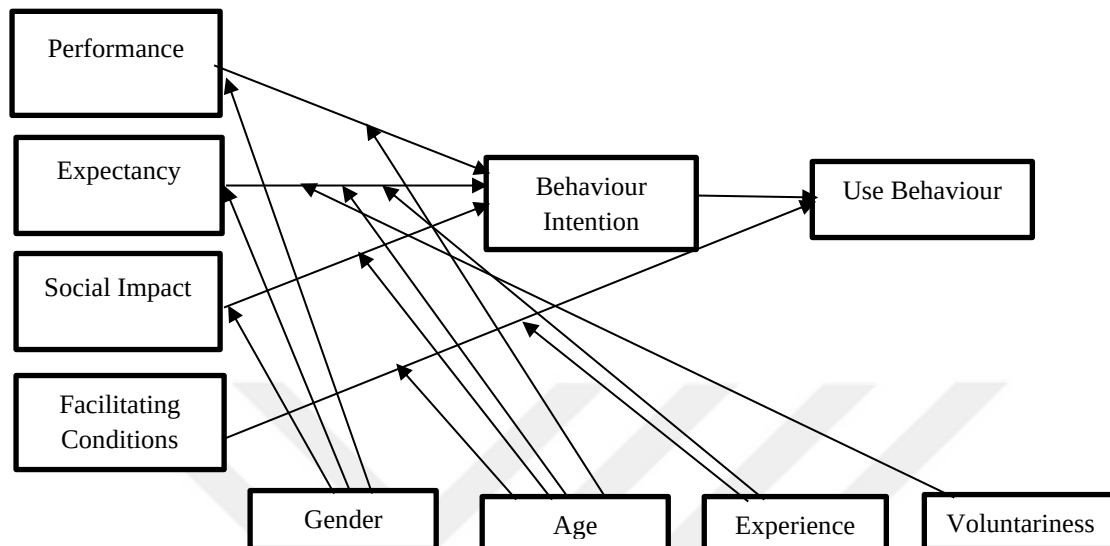


Figure 2.9: UTAUT MODEL

2.3.10 Contrast in Models

The reality of diverse operator adoption frameworks collected works provides an order of suppleness. Alternatively, selecting the finest framework that may achieve the case research necessities are measured and complex choices to formulate. Consequently, a number of reasonable studies bring to light the merits and demerits of every user adoption framework have been organized. The subsequent subdivisions bring to light contrast in models.

2.3.10.1 TAM and TRA

Diverse researches contrasted the functionality of TAM and TRA. In this research, merging of TRA & TAM directed robust system founded on (PU) perceived usefulness, (BI) behaviour intention and (PEOU) perceived ease of use, Despite significance as a determining factor of behavioural intention, (SN) Social Norms could not provide much notice to research.

To the point, contrasting TAM with TRA draw attention to easiness and pragmatism of TAM over TRA with a diversity of usage, despite the likelihood of leaving behind wealthy material taking into account SN (Hacke et al., 2003).

2.3.10.2 TAM, DTPB and TPB

According to Mathieson (2019) draw attention to various facts in contrasting amongst TPB & TAM. Initially, operators' intents were positively exemplified jointly TPB & TAM. Secondly, TPB further can be valuable than TAM in course of structure improvement sequence and post-operation assessment.

One more research of Todd et al., (1995) contracted TPB with TAM & disintegrated description of TPB (DTPB). Consider the practice of IT, DTPB outclasses TAM because of various features. First, like to TAM, DTPB can categorize trusts that can impact the implementation of IT i.e., perceiving usedness and perceiving easiness. Secondly, diverse of TAM, DTPB incorporate surplus inspiring features on intentions (i.e., Normative principles, self-efficacy, and facilitating settings) (Defranc et al., 2008). Facilitating conditions must present explanatory support throughout the execution stage. Counting such features enlarge the ability of DTPB to put together the studies of IT application with the impact of corporation choices on it.

2.3.10.3 UTAUT and Other Concepts

The model either have high quality frugal, i.e., the high forecasting potential as well as insufficient constructs. Alternatively Venkatesh et al., (2019) referred that in-depth considering the occurrence under exploration is under exploration than parsimony. Whereas Todd et al., (1996) disagree that the equilibrium among parsimony and their support to comprehend the thinking of when evaluating the models.

As a result, (Venkatesh et al., 2019), contrasted eight frameworks centered on the difference of calculation. They suggest the difference described in the purpose of users for 8 prototypes differed among 18% and 54%. Though, together with main factors moderation of 4 items in the UTAUT. They set up differences described 68% of behavioural intention and behaviour of users. The logic, of this research, accepts a few variables of UTAUT's in calculating moderation of 4 items.

2.4 Culture

In this unit related collected work relevant to the culture is evaluated. First, a description of the culture is put forward. This is monitored by a short-term description of the diverse cultural prototypes take account of their scope and critique. We then continued with a short description of Hofstede's cultural dimensions. In the end, we presented a defence for calculating the cultural dimensions.

2.4.1 Explanation of Culture

The findings have always been vital to clarify variations and intentions in individual, national and organizational culture. Though, culture is highly problematic and complicated conditions to describe Williams et al., (1986) in addition, so, complicated to functionalize and calculate.

Cultural models typically contrast the resemblance and variation of cultural constructs. The study pursues explanation & wide classification of presentation of culture by Bond (2017). The diverse sheets of culture contain: “(i) nationwide or nation state-stage; (ii) a provincial and/or ethnic and/or holy and/or language relationship level; (iii) a gender level; (iv) a societal period level; (v) an executive level; (vi) an individual level” Bond (2017). This investigation purposes to present a comprehension in a way individual-level of culture may influence engineers’ behaviour when applying emerging intelligent c-technology in developing states. The cultural constructs and frameworks adding together to the causes at the back in selecting the individual cultural stage as explained in a greater extent of subdivisions.

2.4.2 Cultural Models

Overall, models of culture normally examine resemblance variations of certain cultures by valuing constructs of cultural classes that arrange the information of culture (Kemp, Belshe, & Hoft, 1996). Several prototypes that research culture & every model to utilize its scope and constructs to recognize features of culture. The subsequent division describes the highest prototype culture.

2.4.3 Schwartz’s Cultural Model

According to Schwartz (1994) is one more model of culture to measure, contrast & research variations of culture among people sub-divisions. These constructs of culture were originated individually at different standards and levels of culture. In his model, the author proposed different 7 cultures of fields founded on global human significance categories where well-defined and marked by Schwartz (1994):

1. Conservatism
2. Intellectual autonomy
3. Affective autonomy
4. Hierarchy
5. Mastery
6. Egalitarian Commitment
7. Harmony

The author in this model mainly the center of attention on educators and scholars with 36000 answers and importance of culture or its constructs originated in theory with 60 queries in 51 diverse peoples that contained in 42 sets of culture, gathered from 1987 and 1993. He included 7 worth categories “competently apprehend the connection between national cultures” Schwartz (1999).

2.4.4 Hall’s Cultural Model

According to Luttge and Hall (1973), culture is not somewhat merely research, nevertheless "crucial spot of achievements of social and interferences, though potential associations are together with well-known and possibly undecided.” To be exact, the structure of cultural intentions. Hall established a procedure for testing of culture via explaining principal cultural factors. These elements are background, time & space. In case of Time, Hall distinguishes Polychronic and Monochronic directions of time; he disagrees for instance that nations with Monochronic time direction control the time in sequence, at the same time Polychronic-directed masses control with time in real-time methods. As for Space, this was one more filed that exposes vital cultural variations between the social order. For instance, Kemp et al., (1996) mentioned that nations of Latin such as Italy and Arabs appear to have a preference nearer affairs and are near together to the half distance of body one must discover in the United States or the U.K.

2.4.5 Trompenaars' Cultural Model

According to Patrick (2003) describes methods of culture a cluster of people resolving difficulties. He recognizes his cultural prototype making use of three prototype ways; he referred “Culture comes in levels, identical to orange. To comprehend one needs to open level by level”. The first level is the Outer level composed of obvious, outside & noticeable items behaviours and considers forms of mankind. The Middle-level layer as its deep aspects of nature and considers standards and worth of an individual cluster. McLoughlin (1999) stated that Trompenaars gathered his information from an international investigation that considers 16 queries crosswise 30 and 50 corporations by which the answers were 15,000 from bosses.

The prototype takes into account seven features and these features are functional in comprehending diverse dealings among nations from diverse cultures. Among them, key cultural constructs in the model are Universalism against exactness, in which Universalism describes principles and ethics and trusts that thoughts & carry out can be functional far and

wide in the globe without alteration. While Particularism is the trust that situation can affect how thought and process can be implemented.

2.4.6 Hofstede Model of Culture

Throughout 1961 and first in 1971, although employed for IBM, Hofstede started the analysis of the corporation's workforce throughout the globe. The prime goal of the job wasn't exactly to find cultural variations. Though, examining conclusions Hofstede commenced to recognize methodological differences in method collection of queries were responded in a diverse section of the globe. Afterwards continuation of work concentrated further thoroughly on recognizing those queries which presented difference among nations. Consequently, of his study, Hofstede recognized four dimensions of national culture dissimilarity :

- **Power distance** – magnitude to which individuals look forward to and adopt variations in power among diverse nations, in further terms it considers the attitudes to right to command and control and influence over the people and their actions.
- **Individualism-collectivism** – mentions to the magnitude to which individuals are incorporated into the collection. Specifically, Individualism well-defined as a condition in which nations are evidently to come across after them and their direct relations simply. However, in dissimilarity, Collectivism can be described as a condition where nations who have its place to a similar cluster must look behind respectively for trustworthiness. This can be measured to be a sign of carrying over to the party of association.
- **Masculinity-femininity** – mentions magnitude to which old-style conventional positions of gender are distinguished. Overall, Masculinity mentions to a circumstance however the principle significance the social order is successful, wealthy and additional belongings, in comparison, Femininity mentions the circumstance to which is the first choice of associations, gentle for poor, and standard of existence.
- **Uncertainty avoidance** – mentions to the magnitude to which vagueness, doubt and lacking self-assurance to endure something.

Hofstede's job has been very extensively mentioned (e.g., Hofstede is amongst the 100 highly mentioned writers in the Social Science Citation Index; Hofstede (2002). Though, even though Hofstede's effort has been vastly significant in several orders, it has remained deeply criticized. Some contested Hofstede's thoughts on the essential concern of just in case

variables of culture can be quantified & examined accurately. Criticisms from optimism institutions center point on the information of Hofstede's information collection procedure and mathematical properties of his dimensional levels. e.g., Schwartz (1994) disagrees that the investigation as an information gathering is not a suitable tool to determine cultural variations exactly when the variable being considered is worth which culturally delicate. Obstacles in the collected works disagreed to be occurred from unfitting Hofstede's dimensional usage to compute variables of culture at the individual stage somewhat at the country (collection) stage (Eckhardt and Houston, 2003).

Regardless of research results numerous e.g., usage of Hofstede's model Statistical structure collected works, established comparatively tiny philosophy modernize work in this field. They consequently make numerous suggestions for emerging an imaginary beginning for the combination between IS and culture. They mentioned that a study must possess a hypothetical foundation for counting Hofstede's framework in the research. (Ford, Connelly, & Meister, 2003) also purposed certain methods in which Hofstede's methods may be integrated into the plan of study. One recommendation is to imagine a moderating part for the measurements, specifically in the connection between things to prevailing principles practiced within IS that is as the technology acceptance framework David (1989). Our study method abides by these proposals.

2.4.7 Measurements of Culture at the Individual Level vs Country

Even though not many have to differ that cultural features are vital in concept, there is remarkably not much published in book form relating the influence of countrywide cultural attributes Authors (2008). Most of the influence of the cultural work in IS study founded on a countrywide or managerial position. The representative method makes usage of nationality as a cultural replacement, contrasting comparable experiments of contests from more nation-state & put together variations of supposed contradict of culture at each other from the one-to-one countries. This method is difficult for numerous explanations. First, the study frequently depends on formerly existing research result concerning the cultural attribute of nations or provinces (Hofstede's results). The study by Fairweather (2009) proposes that alteration possibly has raised from the previous 31 years & supposition founded on Hofstede's efforts could consequently not to be rational. Results disagrees that significance of right away determining contestant cultural significance with the latest investigation researches. Another difficulty is a few cultural contradictory things in Hofstede's framework and then covary among diverse nations. However, it can be problematic to conclude cultural features

accountable for distinction among models from diverse nation-state. Consequently, it can be a contest to obtain tests that practically separate the cultural variables that might catch your eye. A third difficulty is with the purpose same nation, individuals will alter on cultural measurements. Even though national culture is a macro-level occurrence, the adoption of technology by end-users is an individual level occurrence. Individual behaviour cannot be computed or forecasted make use of the countrywide computed while there are no ways to simplify cultural attributes about individuals within the similar nation remarkably for computing actual behaviour in the adoption and adoption of technology. Hofstede referred that level of country measurements could not forecast behaviour at individuality. This signifies difficulty to take into account cultural national variables in the stage of individuality models like as TAM

Bradley (2010) suggested that the level of individuality descriptions of apparatus of Hofstede's must be implemented with individual-level study frameworks. (Miguelanez et al., 2019) pursued this method in 2 types of research of widespread technological implementation (primary research is PCs and secondary research is PDAs). They disagree cultural effect of individuals rely on the amount sis keen at individuality to participate & involve the significance of he/her cultural personality. They obtained scales from the effort of Hofstede (1980) to calculate cultural standards at the level of individuality. The setup of the scales must possess enough properties of psychometric and capable to positively put together a model originated from TAM. The investigation so follows this method and computes individual stage, allowing influence of cultural moderation with prototype of TAM be significantly discovered. The computations of standards of culture in current Turkish & Indian sample permits examination in case of alteration in standard of culture monitored from past 3 decades.

2.5 Summary

In this unit, it has been described & debated existing works connected to emerging c-tech, take in of techs and various models of culture. The 3 vital divisions describe the hypothetical context. A summary of the emerging intelligent c-tech settings described in unit 1st. The view, merit, demerits as features influence adoption of techs were described. 2ndly, reconsideration of 9 highly effected frameworks are implemented to the behaviour of beings remained crucially reconsidered & contrasted. As of former important collected works, we can mention that certain of the frameworks have fine frugality example, TAM but the ineffectiveness of understanding cover of a lot of key features, however, different frameworks take into account further complicated features but negotiate model frugality. Even though,

contrasted different models, TAM was bringing into being adoptable descriptive power and fine frugality. By the way, TAM has generally accepted vast pragmatic reinforcement in the IS execution field. Though, critique about the speculative contributions, exactly capacity to wholly describe the acceptance of techs and operate. Furthermore, prevailing limiting factors of TAM disregarded examination of vital forecasters and features that can influence approval & adoption of techs like as individual cultural and social features. Significant overhead boundaries will prolong TAM to incorporate added features to upsurge its forecast ability.

After all, this unit submitted and debated the diverse cultural models that have been worthwhile in the collected works with importance on. Even though the adoption of techs by end-users is an individual stage occurrence, unexpectedly it established the largest part of works about the influence of culture in IS study is found on the national or administrative stage. So, to overwhelm gap, the study observes the impact of individual stage & culture in the background of emerging countries India & Turkey respectively. The subsequent unit will debate the hypothetical outline and theories of research.

3. THEORETICAL BASIS AND CONCEPTUAL STUDY

3.1 Introduction

The literature publication evaluation units debated the numerous concepts and models linked to the adoption of techs having modules & peripheral features that intendedly or unintendedly are benefit evolving a theoretical model for research. So, sketching preceding units, goals unit describes & debates the advancement of suggested theoretical model to research emerging intelligent c-tech acceptance. This unit also presents a beyond defence for including the facilitating factor as the key determinant, furthermore the combination of features of individuals and Hofstede's elements for moderation taking part in research model emerging intelligent c-tech implementation and taking. Furthermore, hypotheses of investigation are illustrated, and able to be used explanations are described. The recommended model will develop the foundation for pragmatic gathering and analysis.

This unit is partitioned into 6 Subdivisions. Subdivision 3.2 presents an evaluation of the academic contextual of the suggested theoretical structure. Subdivision 3.3 in brief debates and defenses the addition of the chief factors in examination research; these consist of PEOU, FC, PU, BI & AU. In sectors 3.4 & 3.5, moderation for 2 groups are put forward, exactly, Hofstede's elements of culture at the stage of individuality has been put forward in subdivisions (3.4.1, 3.4.2, 3.4.3, and 3.4.4), even elements of features are described in subdivisions (3.5.1, 3.5.2, 3.5.3 and 3.5.4). Lastly, Subdivision 3.6 brings about the unit.

3.2 Theoretical Study

Unit two has put forward systematic assessment of concepts often already use in interpretation behaviours linked to accepting and implementation of IT. Furthermore, this investigation recognizable as a group of features plunge in dissimilar fields i.e., private, social, behavioural, cultural & techs may influence usage & acceptance of emerging intelligent c-tech systems. As debated in unit2, these variables recognized study as noticeable forecasters of techs adoption.

So, the present unit debates the growth of suggested theoretical frames for the current study by describing dissimilar features in immense aspects (Todd et al., 1995). The improvement of suggested paradigm presents the effect of independent elements on importance of dependent elements benefits the researcher to assume & examine associations among the recognizable variables in arranging to prove if the hypothesized model is valid or invalid.

In specific, this research contains 3 groups of variables to be proved, the first group

comprises the chief determining factors (independent variables) that may affect BI and AU of the emerging intelligent c-tech structures. These variables are, PU, PEOU and FC. AU & BI are 2nd class constructs which take in 2 dependent constructs. The present research BI is probable to affect the AU of emerging intelligent c-tech system. As the third group put together two groups of moderators that might affect associations among chief elements and BI, 1st cluster brings together Hofstede's measurements of culture (UA, IC, MF, and PD) at the stage of individuality and the subsequent are constructs of demographics (gender, educational stage, experience and age). Figure 3.1 illustrates the suggested study model & thorough description of groups put forward the following subdivisions of this unit.

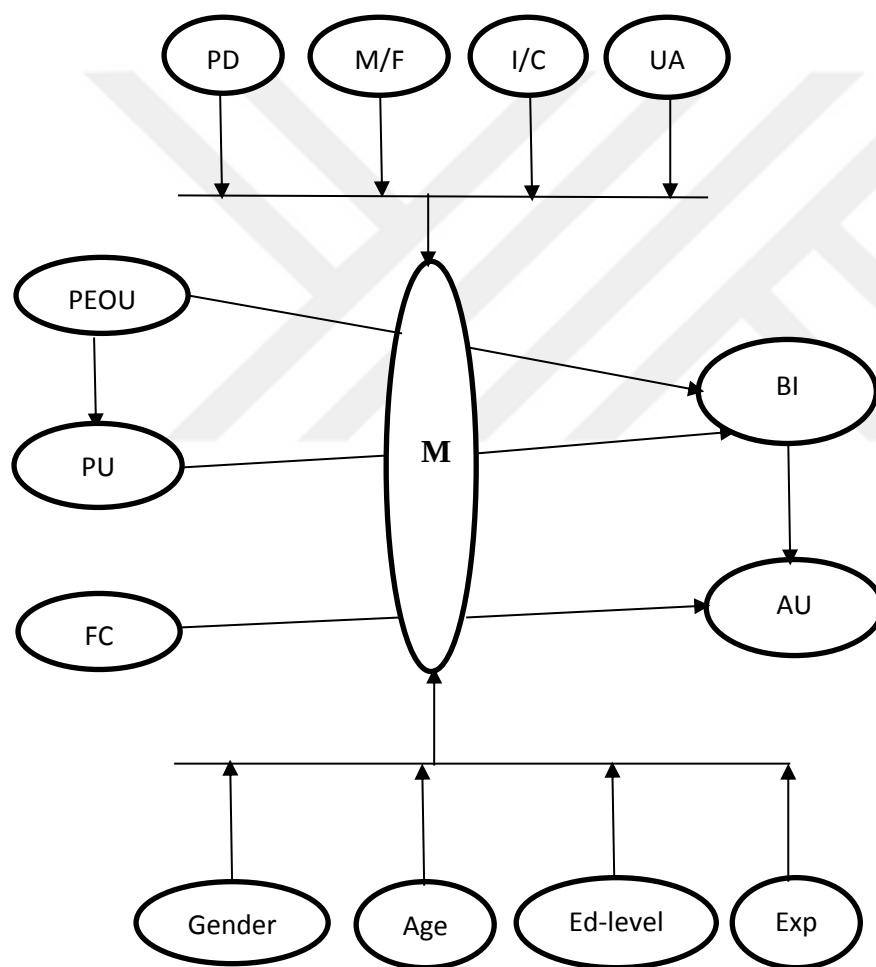


Figure 3.1: *The planned Theoretical Model*

3.3 Direct Determinants

Preceding unit suggested examination model included 3 of constructs that could mark the taking and implementation of emerging intelligent c-tech structures. In collections, this

unit, a thorough description of the main factors that might have an effect on BI and AU will be debated with an explanation for counting respectively of these paradigms in the projected model.

3.3.1 Perceived Ease of Use (PEOU)

PEOU is well expressed by way of ‘the amount to which an individual has self-assurance in an exact structure can function without much labour’s Davis (1989) then it is alike to effort expectation in UTAUT (Venkatesh et al., 2019). In TAM, TAM2 and DTPB, PEOU was hypothesized as the straight factor of BI. Furthermore, numerous scientists bring into being a reinforcement to the indirect association of PEOU on BI over PU. Robust confirmation reinforced the vital part that PEOU show in forecasting the BI (David, 1989; Venkatesh et al., 2019) is an essential feature that might have an impact on the handler's intention to use a specific technology.

Evaluating literature, widely held subsequent findings of engineers’ perceptions on consuming machinery support the significant part that PEOU plays in forecasting the BI (Gu et al., 2010), the following hypothesis were suggested.

H1a, b – PEOU will have a positive effect on the intention to use Construction technology structure in the Indian and Turkish background.

H1c – Engineers mean PEOU will be statically different in India contrasted to Turkey.

H2 a, b – PEOU will have a positive effect on PU of Construction technology structure in Indian and Turkish background.

3.3.2 Perceived Usefulness (PU)

It is expressed as “the amount to which an individual has faith in that an exact structure must develop his/her professional working effectiveness” Davis (1989). PU is alike comparative gain in the framework DOI & working effectiveness hope in UTAUT (Venkatesh et al., 2019). In other difference of opinion, it is the range to which profits are heavy charges. In the TAM, TAM2 and Improved TAM, PU was hypothesized as a direct factor of BI. Additionally, numerous investigators have presented proof of its direct factors on AU (Gefen and Straub, 2006).

In the current background investigation, PU was implemented to explore engineers’ principles about possible profits in implementing the emerging intelligent c-tech system. Several investigation revisions emphasized the significant rule PU plays on BI to implement

tools of techs (Amoako et al., 2007). In this cross-sectional research & its agreement with the TAM, TRA & TPB training, it is predictable that if engineers ponder emerging intelligent c-tech structure is beneficial & will increase worth to job and more expected to accept & practice the structure. Indifference, engineers may endure techs if disbelieving informative value. Thus, it is hypothesised that PU will have an optimistic significant effect on the intent to implement the emerging intelligent c-tech system. Consequently, the researcher hypothesised:

H2 a, b – PU will have a positive effect on the intention to use construction technology structure in the Indian and Turkish background.

H2 c – Engineers mean Perceived Usefulness will be statistically different in India, contrasted to Turkey.

3.3.3 Facilitating Conditions (FC)

The FC is expressed as “the extent to which a person accepts as true that a structural and methodological substructure is to encourage and bring into play practice of the system” (Venkatesh et al., 2019) Exactly, it takes in the approachability of external back up supply (effort, time and money), that is recognized as works as “RFC” (Ajjan and Hartshorne 2008) and likewise accessibility of resources of advancement, which is cited as the “TFC” (Fu et al., 2006; Todd et al., 1995).

The Combined BIM result Outline is used to facilitate BIM acceptance through an up-to-date collection of tools built upon plan collaborators’ willingness, device abilities and workflow dependencies and conscious of the probable to participate and cooperate crossways all segments of the task life cycle. The background of training, FC must be calculated as awareness of whether they are able to access the essential resources and the compulsory provision to use emerging intelligent construction technology.

H3 a, b – Facilitating conditions will have a direct positive effect on Intention Usage of Construction technology system in the Indian and Turkish background.

H3 c – Engineers mean Facilitating conditions will be statistically different in India contrasted to Turkey.

3.3.4 Behavioral Intention (BI)

Behavioural intention (BI) in TAM is one of the main variances with TRA. BI is well thought-out to be an instant predecessor of usage behaviour and provides a recommendation regarding individuals’ readiness to do a specific behaviour. (Defranc et al., 2008; Clinton and

Obama, 2018) claims that as an over-all decree, “the robust the intent to take part in behaviour, the further to be predictable at work efficiently”. In TAM, both PU and PEOU impact an individual’s intent to practice the technology, which in likelihoods impact the usage behaviour David (1989).

There is a considerable provision in works for the association amongst BI and usage behaviour in overall (Davis 1989; Taylor and Todd, 1995; Kent et al., 2010; Azzahro et al., 2018; Venkatesh et al., 2019).

In the framework of information system investigation, system usage was considered as an endogenous variable and is often calculated by only BI (Davis et al., 2014; Morris et al., 2009; Gefen and Straub, 2018), or by lone AU (Szajna, 2016; David, 1989), or even both BI and AUI (Venkatesh et al., 2014; Taylor and Todd, 1995). The framework of investigation & alike to former researches, current study measured AUI as endogenous constructs in hypothetical background. It is expectable that AUI will have an effect in forecasting the practice Intention of engineers to implement construction technology in forthcoming.

Therefore, the researcher proposes the following hypotheses:

H4 a, b - BI will have a positive influence on his or her Intention of construction technology structure in India contrasted to Turkey.

H4 c – Engineers mean BI to use Construction-technology systems will be statistically different in India compared to Turkey.

With respect to this investigation & alike to former works, this study measured AU construct as dependent on the framework of this theory. It is predictable that AU may have straight effect in forecasting the behaviour of users of engineers to agree to take in & implement the usage of C-tech is forthcoming.

3.4 Hofstede’s Cultural Dimensions

This segment debates the initial class of elements associated to elements of Hofstede (PD, MF, UA, IC) that possibly will affect the associations amongst principal variables and intention of behaviour to implement in the structure. The motivation behind the additions of moderations in our model of the theory is to rise the analytical power of the model.

3.4.1 Power distance (PD)

PD finds out the degree to which individuals imagine and agree to take variances in power among diverse people (G. Hofstede, 1993). The overall prediction is that users with PD

values would be further possible to be reliant on referent control in decision making, i.e. they would be extra inclined by the opinions of others, principally managers, in determining whether to accept technologies. Although this disagreement seems rational, indication in the provision of it has remained unclear. (Dinev, Goo, Hu, & Nam, 2009) compared models as of South Korea and the United States in the background of acceptance of defending (e.g. anti-virus) software. They created that the relationship between SN and BI remained important for the South Korean model (a high PD values) but not for the US model (low PD).

According to (Fairweather, 2009) was not capable to validate the forecasted influence in their study, with PU->BI associations with both Uruguay & US models exhibited in support. While liberty at workplace may upsurge intentions of behaviour to approve and implement novel techs in structure (Gefen and Straub, 2006) and individuals can implement their personal abilities (i.e. SE) & agree to take techs due to their significance to accomplish obligatory job (i.e. PU) even if too much workload from the senior. A number of researches have revealed globally PD has declined especially in Asian nation-states, still as formerly stated India, as an Asian country, does not differ much on a social basis and traditionally from Turkey on the basis of Hofstede's dimension of PD. Turkey factually has not much significant difference higher level of PD (value index = 66 than India (value index = 77).

Therefore, according to former studies of power distance is predicted to have an association with PEOU, PU and will be more connected to engineers with low PD, while power distance of engineers is predicted to be impacted by FC. Therefore, the subsequent hypothesis was suggested:

H5 a1, a2, a3, a4- The association amongst (PEOU, PU, FC, BI) and actual usage Intention of the Construction technology system is moderated by the Power Distance value in the Indian background.

H5 b1, b2, b3, b4- The association amongst (PEOU, PU, FC, BI) and actual usage Intention of the Construction technology system is moderated by the Power Distance value in the Turkish background.

H5 C- Power Distance means will be statistically different in India contrasted to Turkish background.

3.4.2 Masculinity/Femininity (MF)

Corresponding to Hofstede (1993) explanation of this element of culture, a high

masculinity culture (low femininity) will highlight performance objectives, like as money earned through as paid employment and endorsements. Over-all, individuals with masculinity high frequently value competitiveness, confidence, determination & concentration on presentation and assets of material. Instead, individuals on low masculinity (high on femininity) are fortified to track more old-style, fond and shy characters.

Individuals controlling high femininity standards of culture are described as existing further people-oriented than high masculinity values (Wei et al., 2015). A moderating connotation amongst PU and BI may consequently be forecast, the connection being predictable to robust with more masculine principles. (Srite & Karahanna, 2015) hypothesized this influence but unsuccessful to obtain an important outcome. (Srite and Karahanna, 2015) established an effect in the opposite direction to that predictable, with an important outcome of PU on BI for a US model (more feminine) but no important consequence for a Chinese model (more masculine). The association not being clearly discovered in connection to emerging intelligent techs taking; we forecasted the background of connection of high masculinity will be stronger for individuals.

It is valuable to observe that India varies socially with a higher score of masculinity (value index= 56) than Turkey (value index= 45). At the national level, turkey is measured as moderate in masculine guide related to 56 in India which shows a masculine culture with respectively.

Consequently, founded on former debates it is probable that engineers with high masculine standards will be more anxious about the usefulness of the emerging intelligent c-tech system, while engineers with feminine standards perceive a higher reputation of PEOU and FC Thus, we hypothesize the followings:

H6 a1, a2, a3, a4- The relationship among (PEOU, PU, FC, BI) and actual usage Intention of the C-tech system is moderated by masculinity/femininity value in the Indian background.

H6 b1, b2, b3, b4- The relationship among (PEOU, PU, FC, BI) and actual usage Intention of the C-tech system is moderated by masculinity/femininity value in the Turkish background.

H6 C- masculinity means will be statically different in India contrasted to Turkish background.

3.4.3 Individualism/Collectivism (IC)

As stated by Hofstede (1993), the element is mentioned to the degree to which individuals are unified into sets. In cultures of individualistic, individuals concentration is on their own accomplishments and private goal line relatively than on the cluster they fit into, such

persons appear to innovative, and value private time, tasks and liberty, whereas in collectivistic cultures folks favour faithfulness and collective triumph on their individual advantage (Hazel and Shinobu, 1991). The level individualism/collectivism of an individual powerfully affects the connection among a being and the cluster of which one is a participant (Hofstede, 1993).

Individualism/collectivism was found to have a moderating effect on the connection between PU, PEOU, FC and behavioural intention (BI) to the usage of precise technology, such that PU and BI will be vastly measured with individualistic users, and PEOU, FC and BI will be vastly measured with collectivistic operators.

Some writers also recommended that Individualism/Collectivism might show a role in other TAM relations. (Hong et al., 2007) forecast and originated that Individualism has a direct optimistic outcome on both PU and PEOU.

Moreover, TAM validates, PEOU affects the attitudes of individuals via two methods: instrumentality and self-efficacy too can be better-quality with conditions of facilitation (David, 1989; Csikszentmihalyi, 2014). The rationale might be that users with high collectivistic cultural standards will require training, physical conditions and use of skills which is connected collectivism.

It is significant observing that Turkey's cultural score is significantly lower on individualism (value index= 37) compared to India (value index = 48) which is significantly slight high on individualism respectively. Consequently, founded on preceding ponderings, it is expected engineer's with high individualistic standards will be more anxious about the usefulness of the emerging intelligent c-tech system while engineer's with feminine values perceive a higher position of PEOU. Hence, we postulate the following hypotheses:

H7 a1, a2, a3, a4- The relationship among (PEOU, PU, FC, BI) and actual usage Intention of the construction-technology system is moderated by the **individualism/collectivism** value in the Indian background.

H7 b1, b2, b3, b4- The relationship among (PEOU, PU, FC, BI) and actual usage Intention of the Construction-technology system is moderated by the **individualism/collectivism** value in the Turkish background.

H7 C- Individualism means will be statistically different in India compared to Turkey.

3.4.4 Uncertainty Avoidance (UA)

As stated by Hofstede (1980), UA mentions to the degree to which doubts and fears are endured. In point of fact, the level of pressure and nervousness for individuals with high UA

risks more after uncertain circumstances happen related to individuals with low UA (Marcus and Gould, 2000). In other difference of opinion, individuals with high UA social standards will create formal guidelines and might reject divergent thoughts and behaviours meanwhile it has remained linked with nervousness and the necessity for safety Hofstede, (1984). On the contrary, individuals with low UA cultural standards might have a greater inclination to take risks Hofstede (1984) and will feel less nervousness with unaware circumstances and complications (Dorfman et al., 1988).

UA has remained hypothesised to play a moderating role in a numerous of TAM relationships and these have been explored with mixed consequences as defined under. (Franco et al., 2009) forecasted that UA might have a moderating consequence on the relations amongst both PU and PEOU on behavioural Intention, disagreeing that these features would benefit to resolve uncertain conditions and that this material would have a comparatively larger effect on the behaviour of high UA models. They showed a contrast of models from Nordic (high individualism, low UA) and Mediterranean (low individualism, high UA) cultural backgrounds. The consequences reinforced a moderating outcome of PEOU on BI, with PEOU more likely to inspire agreement among the Mediterranean organization users (wherever UA was higher). Alternatively, the relationship between PU and BI will be stronger for individuals with low UA cultural standards (Cullen et al., 2005).

Implementation and acceptance of technology include taking jeopardies and undertaking roughly innovative (Ganesan and Sorescu, 2013; Bandura, 2011) argued that the relationship between FC and PEOU are reciprocal respectively. This means that higher concerns will decline the FC and, in the end, declining complete presentation. In such conditions to decrease uncertainty and nervousness and progress presentation, individuals will depend more on FC from the societal setting Morris (2013). Correspondingly, individuals with low UA social standards are linked with a robust enthusiasm to accomplish and more aspiration and consequently will perceive the significance of the technology on their life expectancy.

It is important observing that Turkey has a higher degree of UA (index value = 85) than India (index value = 40). Founded on the overhead dialogue, we postulated the subsequent hypotheses in line with this dialogue.

H8 a1, a2, a3, a4: The relationship between (PEOU, PU, FC, BI) and actual usage Intention of the construction-technology system is moderated by the **uncertainty avoidance** value in the Turkish background.

H8 b1, b2, b3, b4: The relationship between (PEOU, PU, FC, BI) and actual usage Intention

of the construction-technology system is moderated by the **uncertainty avoidance** value in the Turkish background.

H8 C: Uncertainty avoidance mean will be statistically different in India contrasted to Turkey.

3.5 Individual Characteristics

In comparison with the primary class which included Hofstede's cultural dimensions, there is furthermore additional type of factors which is individual characteristics is (gender, age, educational level and experience) that might have moderating effects on the relationships amongst the principal concepts and BI and AU. These variables will be debated in the subsequent unit in sequence.

3.5.1 Gender

It is stated as an arranged split amongst males and females embedded proportionately (Roux et al., 2001). According to Schema theory gender was represented with the context of behaviour (Bem, 1981) and several outlines of TAM (e.g. TPB, TAM 2). Recently revised researches have made to know man and woman are poles apart in policymaking (Morris, 2013).

Above mentioned investigation has suggested gender plays a critical role in predicting behaviour within IS arena put forward how explanatory power 52 per cent of TAM was improved when gender was used as a moderating factor in the model. explained women are beyond men to accept and practice a system than men. Outcomes are reliable with gender researches (Khorsandi and Mottaleb, 2013). It may be that gender will impact FC and association will be stronger associated with males. This difference is founded on the cultural way of life (Santanna et al., 2015) advised accurately connected to masculinity/femininity social proportions which describe that women connected with men appreciate enhanced position in the way of FS relating to service structures and the work background.

Therefore, with afore discussion it may be predicted that association amongst PU and BI indicate to be robust for men engineers, however, the association amongst PEOU, FC and BI will be more robust for female engineers. Therefore, we suggest the subsequent hypotheses:

H9 a1, a2, a3, a4- The association amongst (PEOU, PU, FC, BI) and Actual usage Intention of Construction-technology system will be moderated by the **gender** in the Indian background.

H9 b1, b2, b3, b4: The association amongst (PEOU, PU, FC, BI) and Actual usage Intention of the Construction-technology system will be moderated by the **gender** in the Turkish background.

3.5.2 Age

Researchers had put forward age is a significant demographic variable which has a direct and moderating impact on behavioural intention, put to use and acceptance of technology (Ackerman et al., 2005). It has been stated in the UTAUT context that age is an important moderator (Abubakar and Ahmed, 2013). It has been recognized in the organizational background that connections between functioning confidence (alike to PU), FC and BI were stronger for new employees, they choose that “widened age discovered to be connected with misfortune in running problematic provocation and conveying importance to the material on the line of work”. In the same way, they arranged that age moderate the relation between FS and AI.

Within this variation, Bonner (1983) was not able to find any moderating outcome of age on the relationship between PEOU, PU and BI in cultures. It is clear that new adults face little anxiety instead of senior similar version Su (2016) and that slighter parts of computer anxiety are connected little unwillingness to take in risk to research modern technology skills (Marangunic and Granic, 2015).

Even with contradictions in former studies that straight or moderating impact of age on the effect of several elements on Actual behavioural intention. Accordingly, it is predicted age will impact on the association amongst PEOU, and BI will be robust for elder entities, although the effect of PU, FC on BI will be robust for fresher Individuals. Thus, we suggest the subsequent hypotheses:

H10 a1, a2, a3, a4- The association amongst (PEOU, PU, FC, BI) and actual usage Intention of the construction- technology will be moderated by the **age** in the Indian background.

H10 a1, a2, a3, a4- The association amongst (PEOU, PU, FC, BI) and actual usage Intention of the construction-technology will be moderated by the **age** in the Turkish background.

3.5.3 Educational level (EL)

In the previous studies, the educational stage was linked to skills and realities that impact the Intention values (PU and PEOU) in the way of accepting and implementing of latest technologies (Edmondson and Nembhard, 2009). Educational stage, similar to person parts, has been measured as an ancestor of PU or PEOU Attewell (2014) and as a moderator that impacts the association between main factors and Intention (Shah and Marchionini, 2013). Indefinite, the educational stage was put forward to impact the connection between PEOU, PU and BI (Shah and Marchionini, 2013).

In the meantime, it can decline technological nervousness and enhance the whole sight. It appeared to know with the difference that between PU and training stage there was no relationship, instead, connection was found amongst PEOU. Similarly, (Elahi and Ilyas, 2019) appear to know that training stage lone moderates the influence of PEOU on BI, instead no moderating connection was found amongst PU and BI in the way of implementing on the voluntary origin. Furthermore, the training stage was created to pessimistically influence the social effect on behavioural usage when aggregating emerging technology in society as experience and education will inspire the operators (Bec et al., 2019).

Therefore, in the context of the study, it is predicted that association amongst PU and BI will be robust for handlers with advanced education stage, even though the association among PEOU will be robust for operators with lesser education stage. So, we suggested the subsequent hypotheses:

H11 a1, a2, a3, a4: The association between (PEOU, PU, FC, BI) and Actual usage Intention of the construction-technology system will be moderated by **educational level** in the Indian background.

H11 b1, b2, b3, b4: The association between (PEOU, PU, FC, BI) and actual usage Intention of the construction-technology system will be moderated by **educational level** in the Turkish background.

3.5.4 Experience

As per the philosophy of experience an entity should participate to a certain degree within a segment of time. As stated by (Cregard and Corin, 2019) an entity involvement is measured with the stage of experience and what numbers of involvement in practising a specific technology and will result in a firm intention connection. Moreover, TAM2 clearly integrated experience as a moderator that impacts the connections between main elements and actual behavioural intention.

Previous studies derived that handler's spot of related involved moderators a quantity of relationship between TAM Farmer (2013). The relation between actual intention and practice was entirely recognized important for specialized practice distinguished to fresher users and thus involvement might be an optimistic impact on the connection between BI and AU.

In that means PU, (Stella et al., 1386) detailed that involvement severely moderates the relation of PU and BI i.e., the relationship was stronger for inexpert handlers, their outcome

was not predictable. This suggested that PU has a stronger impact on BI for inexperienced users.

In this context, it is predicted that expert will show more importance in the connection amongst key factors and actual intentions to practice the c-tech system. It is predicted that engineer's expertise rises, they will be extra alert of the profits of the engineer's system on their c-tech system (Day et al., 2019) Thus, we suggest the subsequent hypotheses:

H12 a1, a2, a3, a4- The association between (PEOU, PU, FC, BI) and actual usage Intention of the construction technology system will be moderated by **experience** in the Indian background.

H12 a1, a2, a3, a4- The association between (PEOU, PU, FC, BI) and actual usage intention of the construction technology system will be moderated by **experience** in the Turkish background.

3.6 Summary

In this unit, we prearranged a hypothetical background taking into consideration those frequent elements that are profitable to influence and take in of latest intelligent c-tech systems in Turkey and India in the context of construction firms. This theory of concept is based on various renowned TAM and other models discussed in unit 2 like TAM, TAM2, TRA, DTPB and UTAUT which are suitable to the context of this research.

These elements take in FC, PEOU, PU, BI and AU and practice. In adding together, culture and demographic elements were united as two sets of moderators.

Thus, this investigation proposes and tests three categories of hypotheses, initial type, investigation suggest 4 direct hypotheses from H1 to H4. In the subsequent type, 4 cultural variables and 4 individual features were hypothesised to have a moderating influence on the association amongst the key determining factors and AU. Even though in subsequent type, 4 hypotheses were suggested to test the variations amongst the Turkish and Indian illustration. It is predicted that outspreading TAM to consist of FC with two groups of moderators, might support in description further difference of Intention and actual practice to discover details because of the model might embrace improved little backgrounds.

The intangible outline will be verified empirically in two nation-states. Turkey and India, to accomplish the goal of the study, as debated in the aforementioned units. So, the subsequent unit explains the elected methodology, and take in a thorough description of the technique of data gathering, questionnaire process and several tools and techniques implemented for data analysis.

4. RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

Unit2 assessed the models and values in culture and techs. The model was set up in Unit3, to examine the influence of demographic features and cultural values on technology on emerging intelligent construction technology situation in Turkey and India. This unit describes and authenticates the logical way, measures and procedures applied in this research to achieve the major examination goals and to reply to the inquiry form.

To understand and authenticate the model, this research applied a quantitative methodology. For the survey, this study followed the method founded on positivism. Data collection way was used for feedback. Further (SEM) Structural Equation Modelling by means of (AMOS) Analysis Moment of Structure type 23.0 was used as an analysis method.

Furthermore, it is intended part 4.2 selecting the positivism pattern for the study and 4.3 approach of investigation for quantitative and qualitative. part 4.4 survey investigation method part 4.5 examination design part 4.6 population and sampling part 4.7 data gathering progress part 4.8 Instrument scale measurement and part 4.9 data analysis part 4.10 ethical reflection. part 4.11 conclusion.

4.2 Selecting The Positivism Pattern for The Study

According to Teherani et al. (2015) positivist technique was selected computing the differences associating three underlying techniques and explanation of the study being stated. Specifically choosing this technique was founded on the following opinions: The positivist way was the key method associating other 3 techniques with a further 75% research method.

Within the range of this investigation, the goal was to explore the moderating influence demographic and cultural variables on construction technology actual intentions in the two different circumstances (Turkey and India). To discover the straight influence of engineers, take in and determination on agreeing as part of this investigation. Therefore, this exploration is associated with the social arena where the engineer's actual behavioural intention is computed and similarly researcher is separated Bharath et al. (2011). So, within the ontological standpoint positivist technique was authenticate.

This investigation assumes various hypothesised associations to be authenticated and quantitatively estimated in the circumstances of technology taking. The quantitative technique is usually associated with the positivist technique. Which applies pragmatic progress Bryman

(2008). Therefore, this investigation is defensible from the methodological suggestion of investigation.

The goal of this research requires a specific metaphysical model where associations amongst the paradigms are evidently explained with specific computations. In the current study, numerous examples regarding the embracing of technology from numerous enhanced and authenticated philosophies and context were implemented and illustrated in unit 2. Consequently, this investigation is defensible from the theory of facts.

To run through the hypotheses and moderators this investigation will implement SEM and attain various tests like as Multi-group by contrasts (unit 5 and 6). The statistical files implemented describes the positivist techniques Gefen (2005).

Finally, the outcomes of this research may be done again in a dissimilar investigation or in the diverse background which is the main merits of implementing the positivist technique.

While explained details in selecting the positivist examples for this research, subsequent explains the research tactics.

4.3 Approach of Investigation: Quantitative and Qualitative

Accordingly, to Bryman (2008), quantitative investigation approaches attempt to collect arithmetical statistics and confirm the associations amongst the computable variables in a general cause-impact technique. Furthermore, measurable methods use an experimental way that is connected with hypothesis testing in order to convert or strengthen the main viewpoint (Force et al., 2004). They are generally with positivist philosophy of facts (epistemology) which give in to methodical ways and means and grips statistical measures and frequently give in to evidence arithmetically (Creswell and Garrett, 2008).

According to Yin et al, (2009) the profit of quantitative study method that is deepened in the positivist research of being is supported by various investigators in the arena of IS. This research suggests perceiving and inspect associated assumptions in the circumstances of technology take in in a rational mode. Furthermore, the concepts with their associations within the theoretical model were advanced and authenticated via philosophies and frameworks about the implementation and technology take in (see unit 2). Furthermore, data survey technique was implemented to gather statistics from numerous participants in line to inspect the data by means of SEM way and this data was typically given in to in numerals and thus fit the quantitative method rationally than qualitative Bryman (2008).

After the justification for the quantitative approach, the next part makes indistinct that data gathering way used in this investigation.

4.4 Survey Investigation Method

Numerous studies jointly have illustrated in previous works that study of ethnic groups, area studies, workplace test, real way of life have been applied Creswell and Garrett (2008). Survey technique was applied to gather information from the answerers both in Turkey as well as in India for the following reasons:

- With 55% of the total journals applied survey technique which is vastly actual and efficient way implemented in IS bodies osman et al., (2014).
- Within the arena of technology take in discoveries survey technique has widely been implemented and put out further 76% in the previously recommend journals which are associated to technology take in implementing survey technique, while if sample research was applied by the left behind 25% lone Mathieson (2019).
- The goal of this investigation is to examine individual engineer's construction technology usage in Turkey and India which concludes gathering information with a large number of participants noticeably applying (SEM) technique in data investigation, applying one extra technique could be far overpriced and time-inefficient (Hair et al., 2014).
- Numerous investigations must be rationally inspected in the supposed prototype see (unit 3) which is basically appropriate applying survey research technique.
- For the meantime a huge volume of data is being gathered when commissioning the survey technique, this permits the outcomes to be widespread to the whole populace.
- Within the survey study method, data is typically gathered within several processes i.e., like LinkedIn, Facebook, telephonic talk, email, and self-administrated questionnaire (SAQ) (Hoffman et al., 2009). This study used the self-administrated questionnaire as a data-gathering technique for subsequent purposes :
- Data can be gathered from a greater number of contestants at the same time in a rapid, effortless, cost-effective and economical approach (Hoffman et al., 2009)
- Superior confidentiality of participants since problems that is anonymity and privacy were organized within the explanatory letter.
- Gathering the questionnaires instantaneously afterwards being finished will guarantee an advanced reply speed Murgan (2015).
- Respondents can follow transparency and so might comprehend the theory on some

query they are responding which in turn curtails the outliers in the findings by Kramer (2007).

- Based on the prior debate of the investigation technique, the next ensuing part makes simpler the study model and shorten the overall study circumstance.

4.5 Examination Design

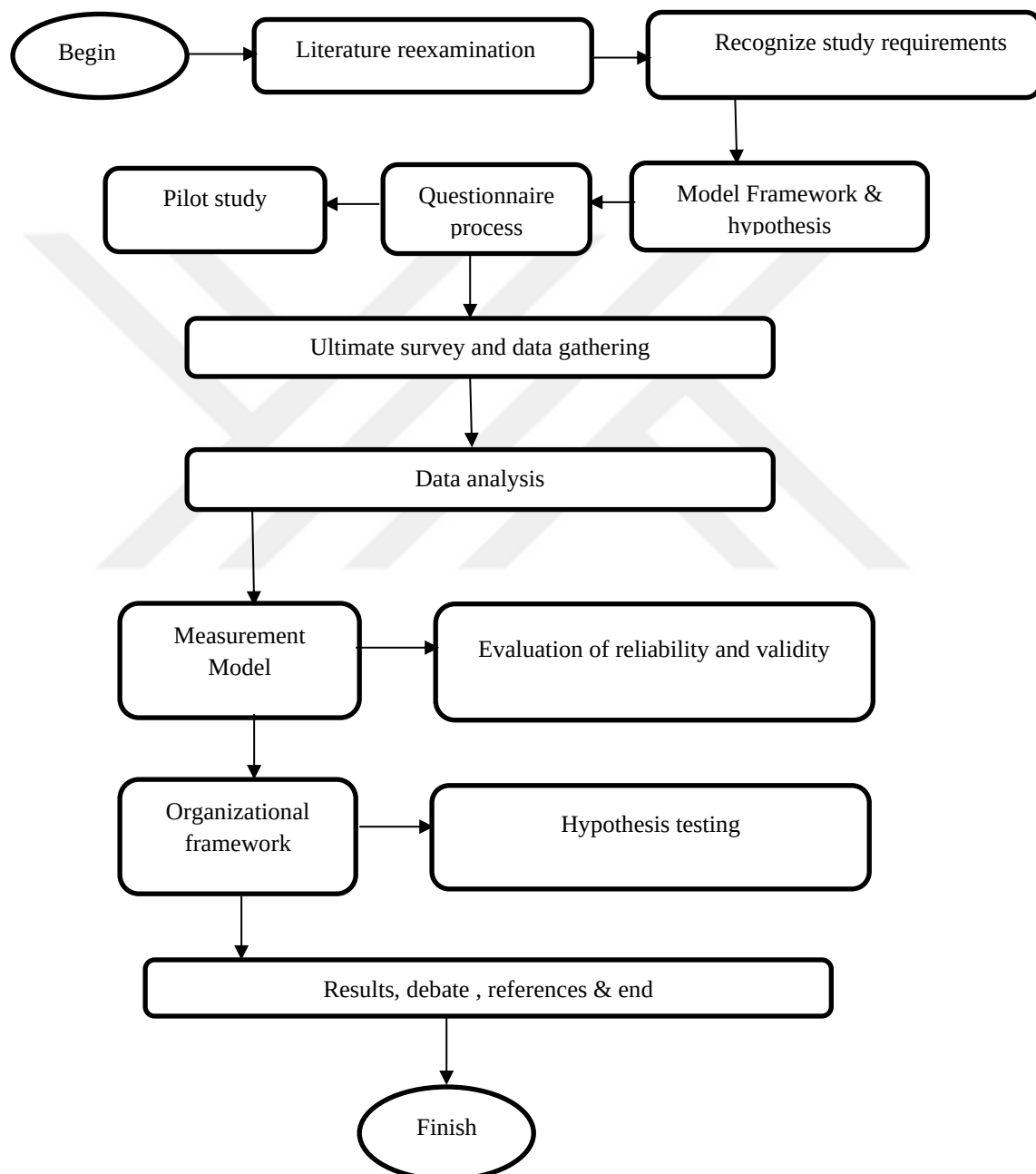


Figure 4.1. *Research Design*

4.6 Population and Sampling

The four major complications are to be computed when making the sample as under; (1) selection of probability or non-probability way; (2) sample frame; (3) extent of sample; (4) reply rate.

4.7 Data gathering Progress

The various phases of evolving the questionnaire, apparatus testing and pilot analyze.

4.7.1 Questionnaire Design and Progress

Afterwards assessing the previous works about technology approving background, culture and emerging c-tech the questionnaire explanation suggested in unit 2 and specifically on the investigation hypotheses and theoretical outline in unit 3. This investigation evaluated to make up a questionnaire

Assuring with a purpose that neither uncertain nor unclear questions and looking after the principal goal of the object, the questionnaire plan went through diverse phases and took over months before it was finalized (from May 2018 till July 2018). The questionnaire is made of 4 sheets, an agreement procedure and an envelope letter. The objective of the research was in brief put in plain words answers the envelope memo with of data, which denote contribution firmly secret (see Appendix A). The key inquiry form is made up of 6 subdivisions. Subdivision one contains the demographic moderation of constructs like as age, gender, educational stage and emerging intelligent c-technology skill. Section B, C, D and E enclosed the straight elements in the suggested model, whereas section F enclosed 4 moderation of constructs. The theoretically and functionality of variables & constructs implied in the feedback form is calculated as next:

Division A: This division contains the demographic contextual of the participants.

- The first 4 questions (Q1-Q4) all computed on the nominal scale were calculated as moderators in the suggested model these demographic features mention to age, gender, educational level and c-tech experience. They were set in the beginning part due to the significance of these queries.

Division B: This division contains the main factors of the TAM.

- Perceived usefulness (PU): states that the amount to which an entity has faith in that by means of the emerging intelligent c-tech structure would improve functioning (Davis, 1989). This construct is set up of 4 queries (Q5- Q8) computed via five-point

Likert scale varying between from 1 (strongly disagree) to 5 (strongly agree).

- Perceived ease of use (PEOU): states that the amount to which an entity has faith in that by means of the emerging intelligent c-tech structure would improve functioning (Davis, 1989). This construct is set up of 4 queries (Q9- Q12) computed via five-point Likert scale varying between from 1 (strongly disagree) to 5 (strongly agree).

Division C: This division consists of the extended TAM determinant.

- Facilitating conditions (FC): states that the amount to which an entity has faith that a structural and methodological set-up supports the implementation of the structure (Venkatesh et al., 2003). The setup of the construct is of 4 questions (Q13-16) and is computed via a five-point Likert scale varying from 1 (strongly disagree) to 5 (strongly agree).

Division D: This division determines the behavioural intention to practice the emerging intelligent c-tech structure.

- Behavioural intention (BI): states that the amount to which an entity has framed sentient tactics to involve in a behaviour Davis (1989). The setup of the construct is of 3 queries (Q17-Q20) computed via five-point scale varying between from 1 (strongly disagree) to 5 (strongly agree).

Division E: This section examines the actual usage of c-tech and assists the outline explanation about what engineers implement the structure for.

- Actual usage: states that entities actual use of c-tech structure Davis (1989) and set up on 2 questions (Q21-Q22). The primary question (Q21) computes how often the engineers use the system and is calculated using 5-point Likert scale where 1= less than a month, 2= once a month, 3= a few times a week, 4= about once a day, 5= several times a day. The next question (Q22) computes the engineers' average daily user of the structure and is calculated using 5-point Likert scale where 1= almost never, 2= less than 30 minutes, 3= from 30 minutes to one hour, 4= from one hour to two hours, 5= from two hours.

This segment also consists of a subdivision about questions associated to what the engineers use the classification for. This question (Q23) collects data about the degree to which they use the classification to accomplish the subsequent responsibilities: 1) Virtual Reality Design 2) Augmented Reality 3) Cloud Computing 4) Wearable Technology 5) Machine Learning 6) Connected Job Sites 7) Thermal Imaging 8) Autonomous Equipment 9)

Internet of Things. These queries are examined by means of 5- scaling varying from 1 (not at entirely) to 5 (to a great degree).

Division F: The division calculates the 4 moderation of cultural elements proposed by (Hofstede 1980). The motives of constructs of culture were computed at the stage of individuality & not at the level of individuality were explained and drawn in Unit 3.

- Power distance (PD): states the amount to which entity hope for & admits variances in power amongst unlike folks Hofstede (1980). This construct is set up on 4 questions (Q24-Q27) selected from the effort of (Dorfman and Howell 1988) and are computed by means of five-point scaling varying as of 1 (strongly disagree) to 5 (strongly agree).
- Masculinity/Femininity (MF): states that the amount to the level to which individuals old-style gender parts are distinguished Hofstede (1980). This construct is set on 4 questions (Q28-Q31) selected from the effort of (Dorfman and Howell 1988) and are computed by means of five-point Likert scale varying as of 1 (strongly disagree) to 7 (strongly agree).
- Individualism/ collectivism (IC): states the amount to which the entity is unified into sets (Hofstede, 1980). This construct is set on 4 questions (Q32-Q35) selected from the effort of (Dorfman and Howell, 1988) and are computed by means of five-point Likert scale varying as of 1 (strongly disagree) to 5 (strongly agree).
- Uncertainty Avoidance (UA): states that the degree to which uncertainties and doubts are endured (Hofstede, 1980). This construct is set on 5 questions (Q36-Q39) selected from the effort of previous researches and are computed by means of five-point Likert scale varying as of 1 (strongly disagree) to 5 (strongly agree).

4.7.2 Approaches to Accomplish High Rates of Comeback

As stated by Manfreda et al. (2002, a lot of ins and outs that might influence the comeback percentage and may reason rejection as of possible applicants to reinforce the feedback form, for instance, the extent of the questionnaire, inquiring boring queries and hard or complex queries.

In this study, subsequent stages were pursued to advance the replier percentage and remove prejudice percentage.

- To make respondents concentration on the queries the things in the feedback form were computed as nominal or 5-point Likert rule.

- The researcher applied trouble-free and effortless writing and prevents the usage of open-ended queries.
- A motivating cover letter and describing the aim and influence of the study were granted to every member erstwhile to their involvement to inspire contribution. It was also informed private data will keep on severely private.
- While knowing the complication of the suggested model (39 items), the investigator formed a brief and short questionnaire and also keep away the use of interesting or boring queries.

A total of 600 questionnaires were circulated to 300 engineers from the Indian and 300 from Turkish side individually 462 were returned indicating 77% comeback wide-ranging rate. After doing preliminary analysis for missing data and repeated comebacks, we took 462 questionnaires' for analytical purposes. These counted in 214 Indian members and 248 Turkish members (see Table 5.3).

4.7.3 Pre-testing The Questionnaire

In this investigation, the main factor of c-techs acceptance was primarily carefully chosen from the aforesaid TAM and Hofstede and other numerous researches. Formerly, a questionnaire was established to gather views from experienced users regarding c-techs acceptance. The content validity of the 41 elements on the questionnaire was verified through head-on meetings with three specialists who have more than 6 years of experience each and recognize that c-tech can be used for their everyday jobs. The specialists were also requested to examine the questionnaire for redundancy and accuracy. Next, the discussion, the number of factors was reduced to 39.

For the second stage, the pilot study was conducted from several multi-national construction companies, the feedback form was circulated to a sample of 30 (N= 60) to engineers with the c-tech companies in a period of one and a half week. As stated by (Nargundkar, 2003), the pilot study must have moderately small (up to 105) but then exemplify sample being inspected. Of the 60 questionnaires were circulated, 44 were taken back which shows response rate high (73.3%). The figure of functioning questionnaires was 39, which were inspected. The act of taking it to the conclusion the agreed period of the feedback form was 8 minutes comparatively balanced.

Over-all, the outcomes showed that the inquiry form items were undoubtedly phrased and simple to comprehend. Consequently, preliminary provision for validity & reliability of the

feedback form was attained formerly taking place to the data gathering step. Yet again, subsequently the modifications to the device, duplicates of the inquiry form were distrusted for the pilot test. The effect of the pilot study is shown in unit 5.

4.8 Instrument Measurement Scale

This research established a questionnaire method integrating nominal and ordinal scale (see Appendix A). Nominal scales were chiefly implemented to examine the contributors' demographic features such as nationality, experience, gender, age, educational level. Scales implied to compute the contributors' principles and views in the direction of technology taking in c-tech setting. This scale was initially established by Rensis Likert in 1932, Likert (1932) and delivers a progressive fact scale that differs from 1 to 10 parted by equal breaks. In order to permit members to show their contract or difference of opinion with particular reports or queries associated to their attitudes and beliefs, the 5-point Likert scales were applied to permit diversities in the responses as contestants in this research distribute a lot of resemblances in their features. Furthermore, this scale is broadly used by numerous researchers in the IS and social science works (Davis, 1989; Venkatesh and Davis, 2000; Dorfman and Howell, 1988).

4.9 Data Analysis

Intended for this investigation, gathered statistics examined into 2, unlike steps. In the initial step, SPSS 23.0 type was implemented meant for the objective of illustrative data for the answers and the introductory statistics investigation (see Unit 5) for instance missing value, outliers and extreme values, mean, multicollinearity standard deviation and Skewness. Whereas subsequent step (SEM) was applied to test and observe associations amongst variables in the suggested theoretical model (see Unit 6 and 7). This sector explains and defends the usage of SEM as the key informational examination method used in the investigation sector briefly defines and defends the use of SEM as the chief data analysis method used in the investigation.

4.9.1 Structural Equation Modelling

With its extensive and overall agreement amongst investigators in IS, behavioural and social science (Janssens et al., 2008) the SEM likewise identified as path examination, covariance assembly investigation, real-time calculation mockups, is implied to investigate

hypothesised associations amongst variables in the projected theoretical model. As said by Fidel et al., (2007), SEM is typically implied to produce concepts and perceptions.

The utmost significant phases in SEM is measuring a definite model ‘fits’ the gathered statistics or not Yuan (2005). SEM has the capacity model hypothetical constructs firm or unbearable to compute straight.

Within this background of our research, the choosing of SEM by means of the chief analysis method was founded on the subsequent explanations:

As stated by Hair et al. (2010), 6 phases are in the SEM result method“1). Explaining concepts of individuality 2). Advancing the complete measurement model, 3) Designing research to yield pragmatic outcomes, 4) Evaluating dimension model validity, 5) Lay down the model, and 6) Measuring validity” (Hair et al. 2010).

The initial 4 phases are typically covered in the measurement model whereas the preceding 2 phases typically enclosed in the model. The usage of the 6-phases in SEM methods is deeply debated in Unit 5, 6 and 7.

4.10 Ethical Reflection

The factors are vastly crucial in the investigation and precisely in goals to research the manners of members (Leavy et al., 2010). In the current research, founded on Eskisehir technical university strategies about concerns of principles of ethics while information gathering, members requested to sign up in print agreement procedure which specifies their privileges to pull out from research at any period if wished as, and contribution is volunteer, and privacy and secrecy is definite in all phases of the investigation. This method is vital for the research as the validity of members may response feedback form with comprehensive trustworthiness. This investigation takes extra ethical problems like part of the study subsequently data gathering process especially at the information examination phase (Sekaran and Bougie, 2011). A duplicate of letter of cover is contained within Appendix-B.

Moreover, a letter of cover given to the contributors. The contained letter within designation, aim and influence for research, in adding to time & length for a feedback form, and contact information of the investigator and their supervisor if arise any queries.

4.11 Summary

The aim of this unit was to give and defend the theoretical viewpoints, tactics, procedures and statistical methods used in this research.

This investigation implied a quantitative way to comprehend and authenticate the theoretical outline (see Unit 3). A survey investigation method, which is founded on positivism to lead the study, was set up to be most suitable for the investigation.

A questionnaire was implemented for information gathering method & in-depth explanation of the numerous phases together with the progress, pre-test, pilot study and scale inquiry form was presented. The investigation was of 2 phases of pre-test was done prior to last form of feedback form, 1 include academics (Professional facts) & rest were possible members. The unit went a thorough description of sampling proportions and diverse methods on conditions of defence for the choice of non-probability test group method.

The key information investigation method implemented in the study is to build SEM by means of AMOS form 23.0. An explanation for choosing this method having the difficulty of the theoretical prototype as approved. CFA & model of the structure has a 2-step method in SEM examination as implemented in research to study and exam associations amongst variables. Lastly, this unit ponders the ethical problem associated with the investigation.

The subsequent Unit 5 shows the initial data examination with pilot study outcomes and model screening.

5. PRELIMINARY DATA EXAMINATION

5.1 Introduction

Unit 3 explained the suggested theoretical method put to use for investigating the influence of features of demographic and culture on the implementation and opting of emerging intelligent c-techs in Turkey and India. In unit 4, the process of the investigation showed the exploration was debated, defensible in the selection of exploration of survey method to hypothetical examination and thus the response of queries of research.

This unit puts forward the data for introductory analysis for the information achieved from giving a response. The Statistical Package for (SPSS) type 23.0 was put to use for analysis as well as the screening of data, percentages and frequencies reliability examination, exploratory factor examination and t-tests. The put forward of findings from analysis in this unit emphasis on the variances of cross-cultural amongst Turkey and India and also examines the diverse assignments that engineer's carry out while making use of emerging intelligent c-technology.

This unit consists of eight distinct parts. The next subdivision explains the consequences of the pilot findings to confirm the reliability and validity of the computing tools will be implemented for the hypothetical examination. Subdivision 5.3 puts forward the outcomes of investigation of the preliminary analysis of the main research in Subdivision 5.4. and Subdivision 5.5 illustrates reliability and profile of respondents in Subdivision 5.6 and 5.7 Descriptive statistics of variable elements and cultural constructs in Subdivision 5.8. Cross-cultural variances amongst the two models are put forward in Subdivision 5.9. The everyday jobs that engineers achieve implementing the C-tech structure To finish, Subdivision 5.10 put forward the conclusions and summary of this unit.

5.2 Outcomes of the pilot study

To examine the elements of questionnaire a pilot study was conducted to make certain precision and readability and examine information gathered from analysis responds the questionnaire and presents face validity (Presser et al., 2004; Sekaran and Bougie, 2011; Zikmund, 2009). All the elements of the questionnaire are drawn from the literature. To achieve content validity from both of the countries academic professional were consulted. (mention to Unit 4, Section 4.8.3). The response and guidelines from capable contestant (Engineers), very slight variations were proposed on the query phrasing and the survey outline by the answers, and thus confront validity was recognized. The investigator then analyzed the data to determine

any problems or possible warnings within the inquiry form and thus choices can be put together regarding the things to be removed, kept back or still added. Further down are certain illustrations of the slight deviations:

- 1). Even though a few of the dimension scales for various constructs were rational, they were not connected in the present research. i.e., we eliminated the Voluntariness variable as the maximum of the contestants rely on that it is obligatory to make use of the structure throughout their method.
- 2). “A definite person was able to give support” as a replacement of “somebody was offered to help.”

The feedback form was circulated to a sample of 30 (N= 60) engineer’s in the time of 2 weeks in both countries. As said by Nargundkar (2003), the size of the model for the pilot study must be moderately slight (up to 95) but then stand for the sample being examined. Out of 60 questionnaires circulated, 44 taken back which shows elevated rejoinder rate of (73.3%). The numeral of usable questionnaires was 38, which were examined. The act of bringing it to end the given period for the inquiry form was 8 minutes which is rational.

The reliability mentions to the consistency used to determine within the research (Sekaran and Bougie, 2011). In the exploration, the reliability of the variables Cronbach’s Alpha was confirmed Cronbach, (1951). It calculated how a group of elements calculate a latent variable. Dissimilar reliability standards were computed adequate by unlike

Table 5.1. *Inter-Item Correlation and Cronbach’s Alpha for Turkish and Indian model*

Factor	Number of Items	Cronbach Alfa	Inter-Item Correlation	Item-to-total Correlation
PU	4	.952	.698 - .855	.758 - .943
PEU	4	.918	.776 - .988	.766 - .843
FC	4	.889	.888 - .922	.833 - .903
BI	4	.882	.799 - .904	.910 - .925
AU	4	.910	.880 - .899	.625 - .885
PD	4	.975	.778 - .852	.755 - .883
MF	4	.886	.710 - .810	.668 - .772
IC	4	.913	.668 - .911	.778 - .888
UA	4	.867	.821 - .933	.625 - .755

investigation.

With an outcome vary amongst 0.867 for UA to 0.975 for PD, Table 5.1 shows that variables have satisfactory reliability. It signifies elements were positively correlated.

5.3 Preliminary Analysis of the Main Research

The purpose of the analysis for the information is to become aware of outliers, normality, missing data and homogeneity of the information in the statistics documents via SPSS and AMOS 23.0. This method is significant in formulating the gathered information for analysis. The subsequent segment put forward the results and remedy for the recognized tests for two samples.

5.3.1 Data screening

Entire questionnaires put to use in this study were inspected for any misplaced response ahead of data submission. Even though this procedure was easy, nevertheless it was too critical to simplify data entry. On this subject, a patterned at the illustrative statistics for separate entry was taken to confirm the exactness of the information. In this subject, we contrasted the responses of queries that formed out of scope principles with a novel inquiry form for exactness.

5.3.2 Missing Data

As stated by Hair et al. (2010), missing values is well thought out as one of the utmost unending difficulties in the analysis that can influence the outcomes of the study purposes. The effect of lost data is more serious when applying SEM in AMOS.

Moreover, it is vital to find out the category of lost values to recognize just in case the lost data were taking place randomly or non-randomly.. By the way, if the misplaced values are non-arbitrarily circulated in the elements of the inquiry form, then data might be unnoticed. Nevertheless, if the lost values are non-arbitrarily circulated, then widespread of the outcomes will be changed.

According to Schumacker and Lomax (2004) proposes that misplaced data up to 5% is regarded as tolerable. Taking into account preliminary testing in the SPSS 23.0, it was bringing into being that all misplaced data for equally samples were circulated in a random method and were

less than 5 % limit. The percentage of missing data was 1.4 and 1.6 for the Indian and Turkish samples correspondingly. This proportion of misplaced value is very little and might be well-thought-out tolerable. Thus, the investigator used the ‘mean substitution’ technique to substitute misplaced values for the categorical constructs whereas misplaced data for nominal constructs were kept out far ahead throughout the examination of multi-group, as proposed by various researchers Appendix-C in Table 1 & 2 shows the misplaced values of frequency and percentages.

5.3.3 Outliers

As stated by Hair et al, (2006), an outlier is described as “understandings with an exceptional association of features recognizable as clearly dissimilar from else surveillance”. Thus, identifying and dealing with outliers is serious meanwhile it can impact the normality of the information and can critically misrepresent arithmetical trials (Tabachnick and Fidell 2007). This way, Tabachnick and Fidell (2007) recommend that the exceeding outliers must be removed while keeping the mild outliers. Hair et al, (2006) notice two methods identify outliers: Univariate & multivariate outliers.

SPPS was implemented in the current study to find the outliers for the data documents by finding out z-score, as recommended by Kline (2010). Despite the fact, there are no definite guidelines to recognize utmost values, for a big model (greater than 85) value up to ± 3.28 may be acknowledged. The result was not removing any values from the data set as the statistics of the data did not find any outliers, Appendix D puts forward in Table 3 and 4 the findings of the outliers for samples.

5.3.4 Testing the Normality Supposition

As stated by Hair et al. (2010), in multivariate examination assessing the existence of normality vital. As said by Tabachnick and Fidell (2007), kurtosis-skewness vary between ± 2.60 , with respect to both data’s they were shared normally (i.e., $< \pm 2.60$). In Appendix E Table 7& 8 displays the standard deviation, skewness and kurtosis, means values for each construct. This information approves no chief problem in the nonnormality.

5.3.5 Multicollinearity

As stated by Pallant (2010), multicollinearity happens after two or more constructs are extremely correlated with one another or things reciprocally. Unlike values recommended

being acceptable by unlike researchers. For example, correlations up to 0.78 or 0.91 are well-thought-out extremely difficult as stated by Tabachnick and Fidell, (2007) despite the fact a value 0.7 or greater is well-thought-out cause for worry as stated by Pallant (2010). While investigating multicollinearity acceptable value more than 0.10 and smaller than 3.0 for the VIF, (see Appendix F) shows no occurrence multicollinearity for both samples.

5.4 Reliability

Table 5.2. *Cronbach's Alpha, Inter-item Correlation for the Indian And Turkish Sample*

Factor	Items		TURKEY			INDIA	
		Cronbach Alfa	Inter-Item Correlation	Item-to-total correlation	Cronbach Alfa	Inter-Item Correlation	Item-to-Total Correlation
PU	4	.897	.568 - 1	.665- .846	.952	.698- 1	.758- .943
PEU	4	.929	.662 - 1	.772- .915	.957	.730- 1	.841- .937
FC	4	.929`	.703 - 1	.761- .892	.953	.719- 1	.801- .943
BI	4	.953	.774 - 1	.815- .924	.923	.690- 1	.811- .836
AU	4	.936	.881 - 1	.881- .881	.935	.878- 1	.878- .879
PD	4	.976	.871 - 1	.891- .970	.923	.522- 1	.544- .944
MF	4	.953	.788 - 1	.845- .914	.916	.451- 1	.560- .972
IC	4	.947	.723 - 1	.791- .919	.943	.606- 1	.619- .962
UA	4	.980	.908 - 1	.931- .960	.752	.399- 1	.550- .652

This was examined by Alpha Cronbach (1951). Table 5.2 exhibits the outcome of the constructs and shows tolerable reliability, varying between .897 for PU to .980 for UA for the Indian sample, however, the lowermost was .752 for the UA and the maximum was .957 for PEOU for Turkish sample. The correlation was positively related to elements (Hair et al. 2010).

Table 5.2 also put forward the outcomes of another two internal inconsistency reliability pointers, that is an inter-item correlation and item-to-total correlation. Hair et al. (2010) recommends that the values must surpass 0.5 for the item-to-total correlation and 0.3 for inter-item correlation. The outcomes of the key study surpassed the cut off value for all the constructs used in the feedback form in Indian and Turkish sample correspondingly.

5.5 Profile of Respondents

Indian and Turkish engineers remained the key focus for the survey, those implement construction technology system in their day-to-day work. These engineers were complete-time engineers working on various positions i.e., directors of project, managers of project, managers for construction, project engineers, civil, electrical, mechanical, surveyors, information technology engineers from various companies in Mumbai, Delhi, Jammu Kashmir, Dehradun located in India, and various companies in Istanbul, Ankara, Eskisehir, Izmir situated in Turkey.

An over-all 600 questionnaires were circulated to 300 engineers in India and 300 in Turkey correspondingly, out of 462 were given back signifying a 77% comeback total rate. Subsequently screening for misplaced data and repeated answers, we get back 455 feedback for analytical purpose. These add-in 245 Turkey members and 210 India members, the missing data were very less so by calculating the mean of the total variable missing entries were inputted. (see Table 5.3).

Table 5.3: *Participants For Percentage And Frequency*

	Frequency	Percent
India	210	70
Turkey	245	81.6
Total	462	100.0

In the following Table 5.4, demographic data will be explained

Table 5.4: *Answerers for Gender-based Percentage and Frequency*

	Turkey		India	
	Frequency	Percent	Frequency	Percent
Male	145	58.4	140	65.42
Female	103	41.5	74	34.5

In the Indian model, 145 (58.4%) male answerer and 103 (41.5%) female answerer. Even though in the Turkish sample there were 140 (65.42%) male and 74 (34.5%) female answerer. The ratio of male and female answerer was just about sufficiently circulated. The Chart (5.4) put forward the percentage and frequencies of each group respectively. Subsequent, the answerers' age was analyzed in Table 5.5.

Table 5.5. *Participants for Age-based Percentage and Frequency*

	Turkey		India	
	Frequency	Percent	Frequency	Percent
24-30 years	162	65.32	125	58.41
>30 years	86	34.6	89	41.58

For both samples, most of the answerer with respect to age was 24-30 years, with 162 (65.4%) and 125 (58.41%) in Turkey and India correspondingly. Whereas answerers fit into the older group were 86 (34.6) and 87 (41.58%) within the Turkey and India correspondingly. Next, the answerers' stages of education were analyzed in Table 5.6.

Table 5.6. *Participants for the level of education-based Percentage and Frequency*

	Turkey		India	
	Frequency	Percent	Frequency	Percent
Graduate	150	69.4	149	69.6
Postgraduate	98	45.7	65	30.3

From the educational level viewpoint, similar to age, most answerers for both samples were 149 (69.6) graduate engineers within the Indian sample and 149 (69.6) within the Turkish sample, whereas the rest were post-graduate holders 98 (45.7) graduate engineers within the Indian sample and 149 (30.3) within the Turkish sample. Following, the answerers' construction-technology experience was analyzed in Table 5.7 beneath.

Table 5.7. *Answerers for the level of experience-based percentage and frequency*

	Turkey		India	
	Frequency	Percent	Frequency	Percent
Some Experience	108	43.5	78	36.4
Experienced	140	56.4	136	63.5

The class of construction-technology experience discovered that most of the engineers within the samples were some-experience in practicing the c-tech, with 108 (43.5%) and 78 (36.4%) in Indian and Turkish sample correspondingly. The other set take in the engineers having experience in applying c-tech with 140 (56.4) Turkish answerers and 136 (63.5) Indian answerers.

5.6 Descriptive Statistics of Variable Elements

For the Indian model, the respondents were 214 and all means were above 3.89 and meanwhile, respondents for Turkish model were 248 and all means were above 3.82 which signify that contestants show positive answers for the variables that were examined in this thesis. Mean has been distributed narrowly as exhibited by the standard deviation (SD). Next analysis for statistical description has been explained.

5.6.1 Perceived Usefulness (PU)

This variable is theorized to take out the data from engineers' trust by means of the C-tech tools that will advance his/her carry out and efficiency. Four elements were implemented in effort associated to TAM (Davis, 1989; Ngai et al., 2007; Pituch and Lee, 2006) and was computed by implementing a 5-point Likert scale, scaling from 1 - strongly disagree to 5-strongly agree. From Table 5.8, each element means associated to PU variable vary amongst 3.33 (± 1.64) and 4.00 (± 1.38) for the Turkish sample, and amongst 3.89 (± 1.26) and 4.00 (± 1.21) which show that most contributors come to an agreement that c-tech is functional.

Table 5.8. *Illustrative statistics of Variable PU*

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
PU1	3.54	1.46	3.89	1.26
PU2	4.00	1.38	3.92	1.27
PU3	3.88	1.35	3.94	1.21
PU4	3.33	1.64	4.00	1.21

5.6.2 Perceived Ease Of Use (PEOU)

Table 5.9. *Illustrative statistics of Variable PEOU*

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
PEOU1	3.71	1.40	3.85	1.28
PEOU2	3.70	1.41	3.87	1.27
PEOU3	3.60	1.59	3.92	1.22
PEOU4	3.74	1.38	3.96	1.19

The variable PEOU is theorized, to take out the data of engineers' trust by means of the c-tech tools is simple to practice and comprehend. The 5 elements of the constructs are opted from the functions linked to TAM (Davis, 1989; Ngai et al., 2007; Pituch and Lee, 2006) and were examined by 5-item Likert scale, varying from 1- strongly disagree to 5- strongly agree. The outcomes in Table 5.9 illustrates elements associated to PEOU vary amongst 3.74(± 1.38) and 3.60(± 1.59) for the Turkish mean linked to sample, and 3.96(± 1.19) and

3.85(± 1.28) for the Indian side. The outcomes showed engineers set up the structure trouble-free to use and comprehend and expectedly it was more on the Indian side.

5.6.3 Facilitating Condition (FC)

The FC variable is abstracted, to take data associated to engineers' view of engineers if they are capable to get into the essential capitals and the essential provision to implement c-tech facilities that administrative and methodical set-up occurs to provide his or her usage of the c-tech structure. The variables were computed by four elements accepted by the operating (Teo, 2009a; Maldonado et al., 2009; Venkatesh et al., 2003) by implementing 5-items Likert scale, varying from 1 - strongly disagree to 5- strongly agree. As exhibited in Table 5.10, the outcomes display mean vary amongst 3.79 (± 1.38) and 3.83(± 1.50) in the Turkish sample, and 3.79 (± 1.38) and 3.91(± 1.23) in the Indian sample demonstrating accord on the significance of the readiness of tech-based assets.

Table 5.10. Illustrative statistics of Variable FC

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
FC1	3.79	1.38	3.91	1.23
FC2	3.83	1.50	3.90	1.25
FC3	3.79	1.38	3.91	1.23
FC4	3.80	1.42	3.79	1.38

5.6.4 Behavioral Intention (BI)

The BI is theorized, as a dependent construct in this theory, to take out data associated with engineers' behavioural intention to apply the c-tech structure in the forthcoming. Four items accepted by the efforts of Moon and Kim (2001); Davis (1989); Park (2009); Chang and Tung (2008), computed by means of 5-elements of Likert scale vary between 1-strongly disagree to 5-strongly agree. The outcomes of the illustration in Table 5.11 exhibits mean vary amongst 3.75(± 1.42) and 3.81(± 1.40) for the Turkish sample, whereas it varies among

3.72(± 1.29) and 3.80(± 1.26) for the Indian sample. The outcomes exhibited Turkish and Indian engineers disclosed pact on constructs.

Table 5.11: *Illustrative statistics of Variable BI*

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
BI1	3.81	1.40	3.80	1.37
BI2	3.77	1.56	3.97	1.20
BI3	3.79	1.43	3.72	1.42
BI4	3.75	1.42	3.96	1.27

5.6.5 Actual Usage (AU)

The AU is theorized, as a dependent construct in the theory, to get the data of engineers about actual usage about the structure. It is observing that usage was computed by personal-detailed procedures. This was computed by two elements implemented by the efforts of Davis, (1989); Venkatesh et al., (2000); Venkatesh et al., (2003). Usage Behaviour implements measuring methods from 1 to 5 (1= less than once a month and 5 = several times a day) to measure the frequency of implementing c-tech structure and (1= Almost never and 5 = more than 2 hours) to calculate the maximum implementation per hour. In Table 5.11, mean varies amongst 3.81(± 1.47) and 3.83(± 1.47) for the Turkish sample, however, vary amongst 3.89 (± 1.21) and 3.89(± 1.22) for the Indian sample. Consequently, the outcomes propose were high stages of implementation in over-all.

Table 5.11: *Illustrative statistics of Variable AU*

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
AU1	3.81	1.47	4.06	1.21
AU2	3.83	1.47	3.89	1.22

5.7 Culture Constructs

This division put forward the outcome of the four stages of individual cultural principles Indian and Turkish engineers found outcomes of the factor examination. Completely the elements were computed by 4 elements. Items were computed by means of a 5-steps Likert scale vary between 1-strongly disagrees to 5-strongly agree. The approved variables put the effort of Srite and Karahanna, (2006) in coming back technologically advanced their degree grounded on the effort of Dorfman and Howell (1988); Hofstede 1980) improved to fit in background of the investigation. The subsequent subsets make available a thorough explanation of the constructs of cultural variables used in the research.

5.7.1 Power Distance (PD)

This theorized variable was put in use to compute the engineers' view of the belief of a trainer's power. The outcome in Table 5.12 exposed Turkish and Indian engineers comparatively slight varying on power distance, with a variation of mean amongst $3.51(\pm 1.43)$ and $3.60(\pm 1.41)$ for the Turkish engineers, whereas vary amongst $3.81(\pm 1.28)$ and $4.17(\pm .91)$ for the Indian engineers.

Table 5.12: Illustrative statistics of Variable PD

	Turkey		India	
Item	Mean	Standard deviation	Mean	Standard deviation
PD1	3.60	1.41	4.17	.91
PD2	3.54	1.41	3.81	1.28
PD3	3.51	1.43	3.83	1.27
PD4	3.53	1.43	3.90	1.23

5.7.2 Masculinity/Femininity (MF)

This theorized variable, in this theory, to perceive the features of feminine and masculine of engineers. An engineer has low femininity or high masculinity standards stress the effort goal line and substantial attainments, for instance, wages and upgrades, however low individual of masculinity or high on femininity, put more worth on associations of mankind and excellence of expectancy of life and typically stimulated to pursue more old-style, fond and shy characters. In Table 5.13, the outcomes exhibit that engineers were high on masculinity

valued with the mean varied $3.19(\pm 1.47)$ and $3.26(\pm 1.48)$ for Turkish engineers, and meanwhile varied among $3.85(\pm 1.14)$ and $4.19(\pm 1.00)$ for Indian engineers.

However this research computed the extents of cultural outline at the stage of individuality and former works to reinforce results on technological background, Still, relating national stage, outcomes of Turkish model unpredicted national stage of Turkey is thought-out moderate in the index of masculinity related to India that shows identical culture of masculinity Hofstede (1980).

Table 5.13: *Illustrative statistics of Variable MF*

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
MF1	3.20	1.48	4.19	1.00
MF2	3.22	1.47	3.85	1.14
MF3	3.19	1.47	3.86	1.15
MF4	3.26	1.48	3.89	1.10

5.7.3 Individualism/Collectivism (IC)

This theorized variable in the theory indicates the degree that individuals are united in clusters. In the social order, an individual's concentration is on their accomplishments and private goal line relatively in the cluster they fit in Table 5.14 gives illustrative figures of the IC standards of culture. Turkish engineers average mean varies amongst $2.96(\pm 1.54)$ and $3.25(\pm 1.50)$, however, the mean varies amongst $3.81(\pm 1.26)$ and $4.19(\pm 0.86)$ for the Indian engineers. The outcomes show that Indian engineers had individualistic standards while Turkish engineers had collectivist morals. Our outcomes are steady with Hofstede (1980) results at the national stage.

Table 5.14: *Illustrative statistics of Variable IC*

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
IC1	3.25	1.50	4.19	.86
IC2	3.23	1.55	3.78	1.30
IC3	3.16	1.54	3.81	1.26
IC4	2.96	1.54	3.81	1.28

5.7.4 Uncertainty Avoidance (UA)

This theorized variable, in this theory, to compute the degree of doubts, and worries as endured. The difference of opinion, with high UA of individuals standards of cultural values, creates official instructions which may refuse different philosophies and behaviours in the meantime it has been recognized with nervousness and the requirement for safety. On the contrary, low UA of individuals standards of culture may take superior readiness to jeopardies. In Table 5.15, Turkish sample with average variance amongst 2.88(± 1.53) and 2.95(± 1.56), while the mean varies amongst 4.19(± 1.25) and 4.66(± 0.62) for the Indian engineers. The outcomes show that Indian engineers exhibit avoidance of uncertainty to be neutral related to Turkish engineers that set up uncertainty to be highly valued. The outcome is close to Hofstede (1980) result at the national stage.

Table 5.15: *Illustrative statistics of Variable UA*

Turkey			India	
Item	Mean	Standard deviation	Mean	Standard deviation
UA1	2.95	1.56	4.66	.62
UA2	2.88	1.53	4.34	1.11
UA3	2.91	1.57	4.19	1.25
UA4	2.95	1.52	4.67	.62

5.8 Cross-Cultural Variances Amongst The Two Models

To observe comparisons & variances T-test amongst the Turkish and Indian engineers at the national stage. Outcomes for segment supported to accomplish one more purpose of this study is “to advance a comprehensive classification of comparisons & variances among Turkish and Indian engineers on the take in and practice of c-tech structures at the national stage”. It will support detecting & comprehending variances amongst the cultures of these states. Table 5.16 displays the set of variances and means of t-test to every variable amongst Turkish & Indian engineers at the culture of the national stage.

Table 5.16: *Conducting T-test For all Variables*

T-test for Equivalence of Means					
	Mean		T-test	Sig.(2-tailed)	Mean Variance
	Turkey	India			
PU	3.697	3.889	-1.639	.102	-.1914
PEOU	3.694	3.040	5.91	.000***	.6536
FC	3.810	3.827	-.137	.891	-.0166
BI	3.788	3.304	4.127	.000***	.4834
AU	3.824	3.988	-1.251	.212	-.1637
PD	3.544	3.313	1.816	.05*	.2312
MF	3.222	2.940	2.251	.02*	.2823
IC	3.155	2.862	2.269	.02*	.2930
UA	2.983	2.605	2.550	.01**	.3787

Note: *p<.05, **p<.01, ***p<.001

Cluster variances at the national stage, the outcomes disclose that no significant differences with respect to pu (t= -1.693, mean difference =-.1914) & BI (t= 4.127, variance of mean = -.4834) amongst Turkish & Indian engineers. Accordingly, Turkish and Indian engineers set up the structure advantageous in their job & show positive intentions to implement the structure in the upcoming.

With respect to PEOU, the score of mean is 3.694 for Turkey and 3.040 for India; unpredictably the outcomes exhibit PEOU is significantly advanced in Turkey interrelated with India ($t=5.91$, $p<.001$). facilitating conditions showed doubts, the score of mean 3.81 for Turkey and 3.827 for India, that is expectedly advanced for India ($t=-.137$, the variance of mean $=-.0166$). Similarly, with respect to AU, the score of mean is 3.824 for Turkey & 3.988 for India, thus exhibiting India engineers are implementing the c-tech structure more than the Turkish engineers ($t=-.20269$, $p<.01$).

Concerning the variances amongst Turkey and India on the stage of individuality principles of culture, the outcomes revealed a significant variance on four constructs.

In PD, the score of mean is 3.544 for Turkey & 3.313 for India, signifying Turkish & Indian engineers were low on PD with significantly mean higher in Turkey ($t=1.816$, $p<.05^*$). Outcomes support the findings of (Hofstede 1980) with respect sample which indicate that Turkey is low on PD.

About masculinity and femininity (MF), mean is 3.22 for Turkey and 2.94 for India, signifying a masculine value for culture samples is suggestively higher in mean ($t= 2.251$, $p<.02^*$). This outcome is unpredictable with (Hofstede 1980) outcome who specify that Turks are high on femininity.

In what concerns individualism and collectivism (IC), the score of is **3.155** for Turkey and **2.862** for India with the significance of mean higher in India ($t=2.269$, $p<.02^*$). The outcome unveils that Indian engineers have individualistic cultural principles, while Turkish engineers had collectivistic cultural principles. The outcome is consistent with (Hofstede 1980) results for Turkey & India.

At the end relating to uncertainty avoidance (UA), the score of mean is **2.983** for Turkey, though for Indian engineers the mean is **2.605**, revealing the significance of mean higher in Turkey ($t=2.550$, $p<.01$). It means that Turkish engineers discover the ambiguity more worrying and sidestep uncertain settings than Indian engineers. Our outcomes are steady with Hofstede (1980) results for Turkey and India.

The following section will make accessible a more detailed description of each element implemented in every questionnaire of the survey.

5.9 The Everyday Jobs That Engineers Achieve In Implementing The Construction-Technology Structure

This part will profit in determining the informed implementation of c-tech structures in Turkish and Indian businesses which profit achieve the fourth objective of this study. A

descriptive investigation applying SPSS to describe the existing practice of c-tech in both nation-states, however, T-test were employed to observe the likenesses & variances between the Turkish and Indian engineers on implementing the c-tech structure.

The responsibilities of engineers finish by implementing the c-tech structures, the givers were demanded to loop to every queries initiated the following measurement rulers, where 1= *Do not use it at all*; 2=*to a small degree*; 3= *to some degree*; 4= *to a moderate degree*; and 5= *to a great degree*. The commonly held engineers in both models implement the c-tech structure to finish day-to-day work. Table 5.17 and 5.18 explain percentage and frequencies to every nation-state, still, variances amongst the two sets are submitted in Table 5.18.

Table 5.17. *Indian specimen actual usage for the structure*

India					
	Not at	Small	Some	Moderate	To a great
	All	degree	degree	degree	degree
1. Virtual Reality Design	8.87% (19)	14.9% (32)	24.2% (52)	34.1% (73)	17.75% (38)
2. Augmented Reality	11.9% (26)	13.5% (29)	20.09% (43)	35.01% (75)	19.15% (41)
3. Cloud Computing	7.9% (17)	13% (27)	21% (44)	39.25% (84)	20% (42)
4. Wearable Technology	10.7% (23)	16% (34)	24% (51)	29.9% (64)	20% (42)
5. Machine Learning	6% (13)	17% (36)	23.5% (51)	23.5% (50)	29.9% (64)
6. Connected Job Sites	12% (27)	18% (38)	22.5% (48)	24.7% (53)	22.5% (48)
7. Thermal Imaging	4% (10)	19% (40)	23% (49)	23% (49)	30.8% (66)
8. Autonomous Equipment	7% (17)	11% (23)	29.9% (64)	27% (57)	25% (53)
9. Internet of Things	8% (19)	13% (27)	29.9% (64)	26% (55)	23% (49)

With respect to Indian sample, the outcomes in Table 5.17 offered broadly held givers answered, “to a Moderate degree” and “to some degree” and “to a great degree” on all other majority responded, “to a small extent”.

Table 5.18. Turkish sample actual usage of the structure

Turkey					
	Not at All	Small degree	Some degree	Moderate degree	To a great degree
1. Virtual Reality Design	21.9% (49)	11.5% (24)	20% (42)	30% (64)	16.6% (35)
2. Augmented Reality	21.0% (45)	16.8% (36)	11.6% (25)	30.8% (66)	19.6% (42)
3. Cloud Computing	21.9% (47)	19.6% (42)	9.8% (21)	29.9% (64)	18.6% (40)
4. Wearable Technology	11.5% (27)	21.9% (46)	29.9% (64)	16.6% (35)	19.6% (42)
5. Machine Learning	20.5% (42)	19.5% (41)	30.8% (66)	15.4% (33)	14.9% (32)
6. Connected Job Sites	15.4% (35)	13.4% (28)	34.5% (74)	14.5% (31)	21.7% (46)
7. Thermal Imaging	14.0% (30)	9.8% (21)	24.7% (53)	36.4% (78)	14.9% (32)
8. Autonomous Equipment	21.5% (46)	19.5% (41)	12.6% (27)	29.4% (63)	15.8% (34)
9. Internet of Things	25.7% (55)	19.6% (42)	23.3% (50)	18.7% (40)	12.6% (27)

Turkish sample, Table 5.18 exhibited gives answer was either ‘to a moderate degree’ or ‘to some degree’, and only IOT “not at all” The means, standard deviation and t-test investigation are presented in the following table.

Table 5.19: Tasks Implemented for T-test

	India		Turkey		T-test		
	Mean	Std Dev	Mean	Std Dev	t	Sig Tailed	(2- Mean Diff
1. Virtual Reality Design	3.369	1.194	3.056	1.409	2.479	.01**	.313
2. Augmented Reality	3.355	1.272	3.112	1.449	1.843	.05*	.242
3. Cloud Computing	3.500	1.173	3.037	1.459	3.613	.00***	.462
4. Wearable Technology	3.317	1.256	3.088	1.291	1.859	.05*	.228
5. Machine Learning	3.542	1.246	1.962	.809	15.54	.00***	1.57
6. Connected Job Sites	3.215	1.278	3.116	1.335	.776	.43	.098
7. Thermal Imaging	3.560	1.230	3.285	1.243	2.305	.02*	.27
8. Autonomous Equipment	3.490	1.205	3.018	1.430	3.691	.00***	.47
9. Internet of Things	3.411	1.221	2.729	1.360	5.45	.00***	.68
Note: *p<.05, **p<.01,***p<.001							

The variances on day-today jobs attained implementing c-tech structure, the outcomes in Table 5.19 discovered no significant variances in “Connected Job sites”, “Augmented Reality” and “Thermal Imaging Turkey and India, where significant variance was higher in India with respect to “Machine learning” and “Internet of things” “Autonomous Equipment”

This means that Indian engineers implement the c-tech applications more with respect to Turkish engineers.

5.10 Summary

This unit described the outcome of the initial investigation of data putting on SPSS 23.0. The various procedures of statistics implemented in this unit benefit out the investigator study the preliminary dataset outcomes.

The succeeding unit 6 will make an accessible investigation of by means of SEM with AMOS 23.0 to exam the direct connection between predictors, behavioural intention and actual usage.

Table 5.20: Abstract of Outcomes linked to the direct hypotheses

Abstract Outcomes of Direct Hypothesis		S Results	
Research Direct Hypothesis	India	Turkey	
H1 c- Engineers mean PEOU will be statistically different in India Contrasted to Turkey.	S	S	
H2 c – Engineers mean PU will be statistically different in India Contrasted to Turkey.	S	S	
H3 c – Engineers mean FC will be statistically different in India Contrasted to Turkey.	S	S	
H4 c – Engineers mean BI will be statistically different in India Contrasted to Turkey.	S	S	
H5 c – PD means will be statistically different in India Contrasted to Turkey.	S	S	
H6 c – MF means will be statistically different in India Contrasted to Turkey.	S	S	
H7 c – I/C mean will be statistically different in India Contrasted to Turkey.	S	S	
H8 c – UA means will be statistically different in India Contrasted to Turkey.	S	S	

NS= NOTSUPPORTED

S=SUPPORTED

6. MODEL ANALYSIS

6.1 Introduction

Unit 5 put forward the information for preliminary investigation. The current unit puts forward a detailed examination of the associations between the variables in the projected model. In this course of all the way, two levels were executed. CFA was implemented in stage one which worked to evaluate variables' exam and validity for appropriate model. In the subsequent SEM technique was implemented to examine the hypothesized associations amongst exogenous and endogenous constructs. It is stated by Hair et al., (2014) in the two-phased procedure constructs attained from survey exhibits good reliability and validity measurements to be implemented in the model.

Consequently, the unit is prepared as: In Segment first, the evaluation of the computation, debated together with reliability and validity of the variables. After this, it was pursued by examining the associations amongst the variables of the studied computed model in India and Turkey correspondingly. Part 6.4 discourses the norms & approaches implemented to calculate the influence of moderators.

This unit then will examine the influence of moderation for four dimensions of culture (PD, M/F, I/C, UA) and after that features of demography that is experience, gender and age on associations amongst the dependent and independent variables in the produced model in Part 6.5 and 6.6. In the end, Part 6.7 exhibits a brief of key outcomes. This study has engaged the AMOS 23.0 to test associations between constructs. AMOS is well-thought-out simple-to-apply, and manageability related to other software, for instance, LISREL, EQS, Green (2016).

6.2 Investigation of Measurement Model

To observe the associations between the dissimilar variables in the model of theory, AMOS 23.0 was applied in this investigation for confirmatory factor analysis CFA Routledge, (2010). To evaluate CFA, the investigator well-thought-out the measurement fit and after that estimated measurement validity for the model.

There is no requirement in CFA to differentiate among exogenous & endogenous constructs whereas it is a compulsory thorough testing period. In Figure 6.1, variables are linked with each other shapes of rectangles. Two-headed signs are signified for covariance, however association amongst variables to the indicator is mentioned by the one-headed sign. In total, 18 elements resulted out from EFA and were implemented in CFA (see Unit 5).

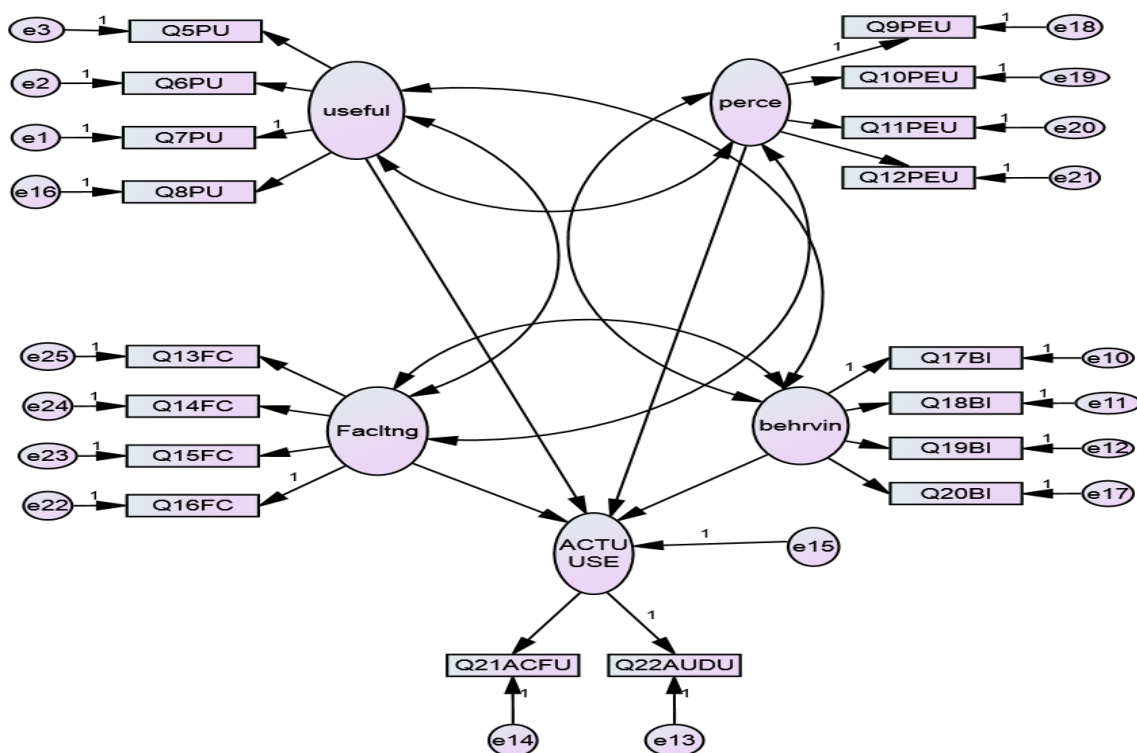


Figure 6.1. Hypothesized CFA model resultant of EFA

6.2.1 Goodness of fit indices

To compute parameters of models this study implemented a maximum likelihood method in which all investigations were exhibited on matrices of co-variance & variance. To examine goodness-of-fit we must take into account some fit indicators. In the primary stage, it was measured by implementing least function χ^2 . In this case, χ^2 was found sensitive proportions of model, with respect to this case higher possibility is that model may reject to some extent true, and slight differences (Hair et al., 2014).

To overcome other measures of fit were applied. At first sum of χ^2 determination with degree of freedom (χ^2/df) was applied, less than 3 worth showing sufficient fit mentioned following signs to point out satisfactory fit (GFI); (NFI); (PNFI); (RMSR); (CFI); (AGFI); (RMSEA)" (Crutzen & Peters, 2017;(F. Hair Jr et al., 2014).

Table 6.1 illustrates the point of fit of acceptance attained with data of the study.

Indian side outcomes exhibited [$\chi^2 = 289.223$; $\text{df} = 122$; $\chi^2/\text{df} = 2.34$; GFI = .881; AGFI=.833; CFI=.948; STD RMSR=.0423; RMSEA=.079, NFI=.913; PNFI=.728] and [$\chi^2 = 286.053$; $\text{df} = 112$; $\chi^2/\text{df} = 2.554$; GFI = .896; AGFI=.840; CFI=.969; STD RMSR=.0403;

RMSEA=.079, NFI=.951; PNFI=.696] for Turkish side. The outcomes exhibited further possibility for progress to exhibit a fit of good data for the model. The entire outcomes are exhibited in Appendix F.

Table 6.1: Model fit brief for analytics model

Fit Index	Suggested Value (Hair, 2006)	Indian Analytical Model	Turkish Analytical Model
χ^2	Non-significant at $P < 0.05$	286.223	286.053
Degree of freedom	n/a	122	112
χ^2/df	<5 preferable <3	2.34	2.55
Goodness-of-fit index (GFI)	>0.90	.881	.896
Adjusted Goodness-of-fit index (AGFI)	>0.80	.833	.840
Comparative fit Index (CFI)	>0.90	.948	.969
Root mean square residuals (RMSR)	<0.10	.0403	.0403
Root mean square error of Approximation (RMSEA)	<0.08	.079	.079
Normed fit index (NFI)	>0.90	.913	.951
Parsimony normed fit index (PNFI)	>0.60	.728	.696

6.3 Examination of the Structural Model and Investigation of Hypothesis

To exam the associations amongst the dependent and independent constructs which can be done during the structural model stage (Hair et al., 2014).

SEM supposes covariance amongst the independent constructs, as represented by 2-directed symbols, however, an association from exogenous construct to endogenous construct is denoted by 1-sign. Consequently, the connection amongst variables indicted subsequently the changeover from the measurement model to the structural model.

Succeeding hypotheses applied to exam straight associations amongst 3 dependent and 2 independent constructs. Associations were recognized in unit 3 through the model progress phase. The dependent variables were PEOU, PU and FC, while dependent constructs were BI and AU.

H1 a, b- Perceived Usefulness will have a straight positive impact on intention to implement C-tech structure in Indian and Turkish Context.

H2 a, b – Perceived Ease of Use will have a straight positive impact on intention to implement

C-tech structure in Indian and Turkish Content.

H3 a, b – Perceived Ease of Use will have a straight positive impact on perceived usefulness of C-tech structure in Indian and Turkish Content.

H4 a, b – FC will have a straight positive impact on Actual Intention Usage of C-tech structure in Indian and Turkish Content.

H5 a, b – BI will have a straight positive impact on Actual Usage Intention of C-tech structure in India compared to Turkey.

The outcomes of the investigation of a model of structure will be discoursed in different subsets.

6.3.1 Examining the Structural Model for the Indian Data Set

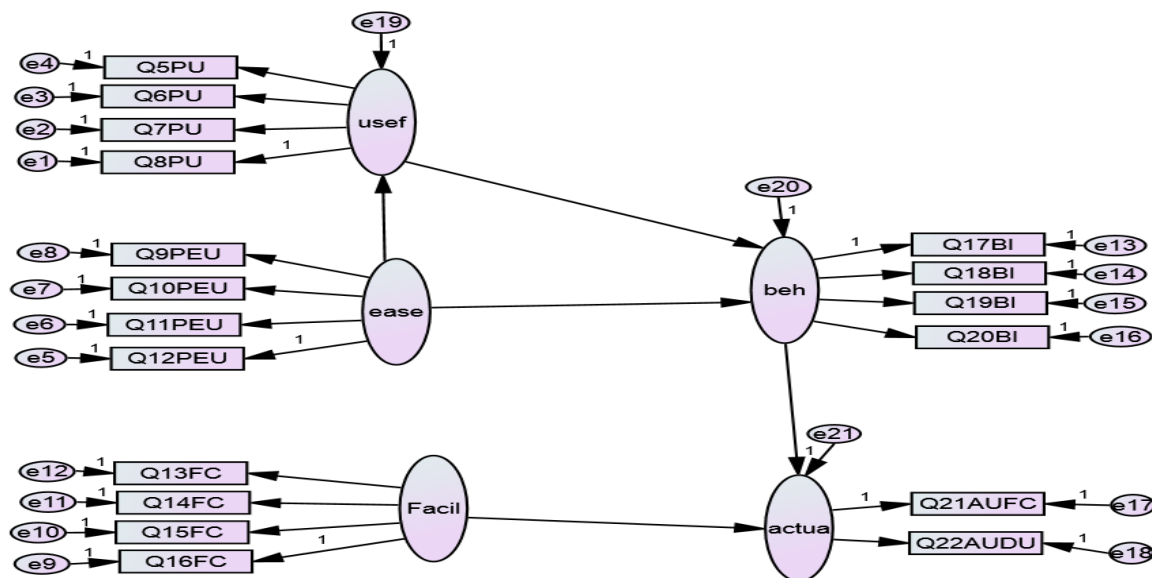


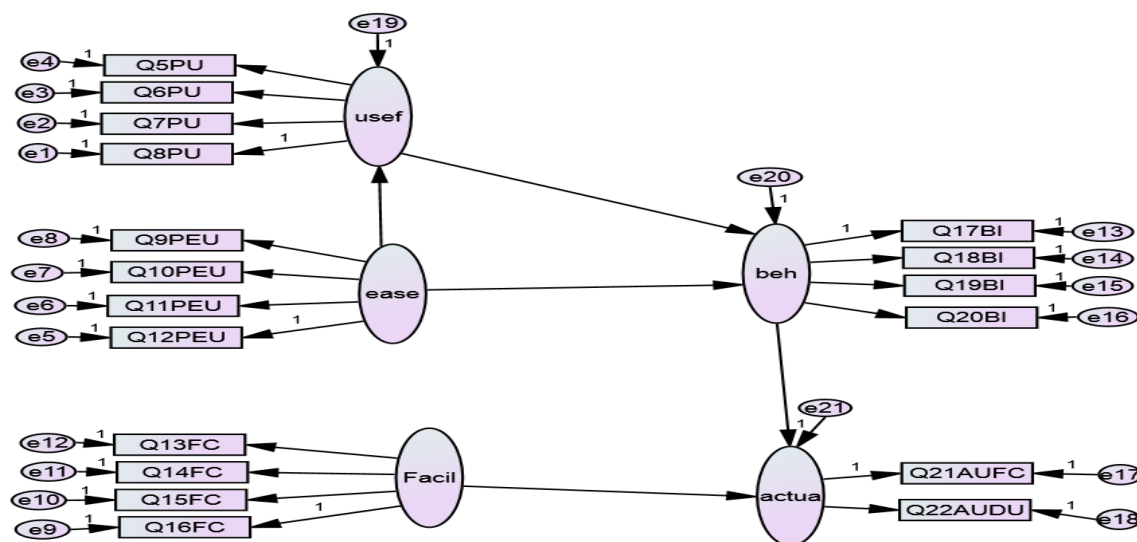
Figure 6.2. Model of structure for India Data Set

As the way measurement model was used to examine goodness-of-fit for the recommended model, outcomes of indices of fit for the initial run were as under: [CMIN=364.319; df= 129; AGFI=.792; CFI=.929; CMIN/DF= 2.824; Standardized RMSR=.056, GFI=.903; RMSEA=.083, PNFI=.755; NFI=.895] signifying a very good fit. Therefore, we carry on observing the association of hypothesis to model. Table 6.2 illustrates the coefficient of the path for relationships of hypothesis in the suggested model of research.

Table 6.2. The brief of Straight Hypothesized outcomes for Indian Experiment

H#	Proposed Relationship	Effects Type	Path Coefficient	Study Results
H1a	PU (+) → BI	Direct effect	-.371***	Not supported
H2a	PEU (+) → BI	Direct effect	.880***	Supported
H3a	PEU (+) → PU	Direct effect	.506***	Supported
H4a	FC (+) → AU	Direct effect	.144**	Supported
H5a	BI (+) → AU	Direct effect	.688***	Supported
Notes: * p<0.1; ** p<0.05; *** p<0.01; NS p>0.1				

6.3.2 Examining Model of Structure for the Turkish Data Set

**Figure 6.3.** Model of Structural for the Turkish Data Set

Turkish experiment, the outcomes of indices of fit for initial proceed of test propose a good fit for model (df= 112; CMIN=332.273; CMIN/DF = 2.724; GFI=.875; AGFI=.824; PNFI=.708; CFI=.925; Standardized RMSR=.51, RMSEA=.084, NFI=.888). Consequently, another phase is to inspect the hypothesized associations is suggested examination of the test. Outcomes of the coefficient of the path for hypothesized associations in the suggested study as

shown in Table 6.3.

Table 6.3. Direct Hypothesized outcomes for Turkish set

H#	Proposed Relationship	Effects Type	Path Coefficient	Study Results
H1b	PU (+) → BI	Direct effect	.148*	Supported
H2b	PEU (+) → BI	Direct effect	.653***	Supported
H3b	PEU (+) → PU	Direct effect	.520***	Supported
H4b	FC (+) → AU	Direct effect	.083	Not Supported
H5b	BI (+) → AU	Direct effect	.761***	Supported
Notes: * p<0.1; ** p<0.05; *** p<0.01; NS p>0.1				

6.4 Effects of Moderation

This portion discuss effects of moderation of four Hofstede's dimensions of culture (MF, ID, PD, UA) at the level of individuality and as well its 4 variables of demography (experience, age, educational and gender) association between the independent variables (PEOU, PU and FC) and dependent (BI and AU) constructs.

The effects of moderators as explored by implementing multi-group investigation. This method, sample of data is separated in subcategories and similar model of structure proceeds at a similar time for together experiments. After that it is pursued by the binary distinction of coefficients of the path along with two sets (high vs low), bearing in mind the critical ratio for variances amongst clusters to create validity and reliability. Though, pursuing (F. Hair Jr et al., 2014) suggestions, primarily studied the valuation of the measurement model formerly going on to study the effects of moderators on the relationship amongst the variables. The hypotheses linked to moderation of effect of culture and other constructs of individuality were recognized in Unit 3 all through the expansion of model phase are as under:

Constructs of culture:

H6 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of C-tech structure are moderated by the **power distance** value in the Indian context.

H6 b1, b2, b3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure are moderated by the **power distance** value in the Turkish context.

H7 a1, a2, a3, a4: The relationship amongst (PEOU, PU, FC, BI) and Actual usage Intention of the C-tech structure is moderated by the **masculinity/femininity** value in the Indian context.

H7 b1, b2, b3, b4: The relationship amongst (PEOU, PU, FC, BI) and Actual usage Intention of the C-tech structure are moderated by the **masculinity/femininity** value in the Turkish context.

H8 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure is moderated by the **individualism/collectivism** value in the Indian context.

H8 b1, b2, b3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure are moderated by the **individualism/collectivism** value in the Turkish context.

H9 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure is moderated by the **Uncertainty avoidance** value in the Turkish context.

H9 b1, b2, b3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure are moderated by the **uncertainty avoidance** value in the Turkish context.

Demographic Constructs :

H10 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of C-tech structure will be moderated by the **gender** in the Indian context.

H10 b1, b2, b3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure will be moderated by the **gender** in the Turkish context.

H11 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C- tech will be moderated by the **age** in the Indian context.

H11 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech will be moderated by the **age** in the Turkish context.

H12 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure will be moderated by **educational level** in the Indian context.

H12 b1, b2, b3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure will be moderated by **educational level** in the Turkish context.

H13 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure will be moderated by **experience** in the Indian context.

H13 a1, a2, a3: The relationship amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure will be moderated by **experience** in the Turkish context.

6.5 Effects of Moderation in Indian Model

This part will discourse Hofstede's 4 cultural dimensions of moderation influence at level of individuality, along with, four demographic constructs that is experience, age, gender, level of education on associations amongst dependent constructs (PEOU, PU and FC) and the independent constructs (BI and AU) latent variables in the Indian model.

6.5.1 Hofstede's Dimensions of Culture

This section states outcomes of effects of moderation of Hofstede's 4 dimensions of culture; that is power distance, individualism\collectivism, masculinity\femininity, and uncertainty avoidance; on the associations in the model of India.

6.5.1.1 Power distance

The variable PD was computed in the investigation feedback form applying 4 items using 5-point scales varying as of 1-strongly disagree to 5-strongly agree. The mean for total was 3.31/5 signifying a low culture for PD. While in the meantime the variable for moderation PD is metric, we applied the split-median technique to shift the scale of metric in nonmetric (categorical) scale (Hair et al., 2014). Among 214 answerers, 102 engineers were low PD group (median $\leq$.75) and 112 within the high PD group (median $>$.75).

After implementing model of measurement for respective group individually disclosed the succeeding: for group of low-PD [df= 16; χ^2 =70.547; χ^2 /df= 4.409; NFI=.991; GFI=.984; AGFI=.763; RMR=.052; CFI=.993; RMSEA=.045, PNFI=.099] and df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI=.984; AGFI=.763; CFI=.993; PNFI=.099 RMR=.052; RMSEA=.045, NFI=.991;] for the group of high-PD, signifying an tolerable data for fit.

6.5.1.3 Individualism/collectivism

The moderation of IC variable was computed by 6 elements implementing 5-point scale varying from 1-strongly disagree to 5-strongly agree. The total mean 2.86/5 signifying a moderate IC culture. While moderation IC is in nature is metric, we implemented a split-median technique to shift the scale of the metric into (categorical) scale. In the present investigation total 214 answerers, the group of low-IC (median $\leq$.6) were 102 engineers and group with high-IC (median $>$.6) were 112.

After implementing model of measurement for respective group individually disclosed the succeeding: group with low-IC [df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; AGFI=.763; CFI=.993; RMR=.052; PNFI=.099; RMSEA=.045,NFI=.991;] and df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; CFI=.993; RMR=.052; AGFI=.763; RMSEA=.045, PNFI=.099; NFI=.991] for the group high-IC, signifying tolerable fit of data.

Table 6.6: *The Abstract of Moderating Influence of IC*

Hypothesis	Individualism		Z-score	Results	Collectivism		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU $\rightarrow$ BI	38.9%	-.109	-1.500	Not supported	66.3%	- .030	.403	Not Supported
PEU $\rightarrow$ BI		.678	7.444***	Supported		.794	10.67	Supported
FC $\rightarrow$ AU	19.2%	.439	4.906***	Supported	39.3%	.627	8.482	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.5.1.4 Uncertainty Avoidance

In UA six elements were examined for moderation. This variable was computed implementing 5-point scale varying from 1-strongly disagree to 5-strongly agree. The total mean 2.60/5 signifying UA as a moderate culture. While moderating UA variable in nature was metric, we implied split-median technique to shift the scale of the metric into a non-metric scale. Among 214 answerers, the outcomes of explanatory statistics displayed 83 engineers with UA low group (median $\leq$.4) and 131 UA with the high group with (median $>$.4).

After implementing model of measurement for respective group individually disclosed the succeeding: for group with low-UA [df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; AGFI=.763; CFI=.993; RMR=.052; PNFI=.099, RMSEA=.045,NFI=.991;] and df= 16; χ^2 =70.547; χ^2 /df= 4.409; CFI=.993; GFI =.984; AGFI=.763; ; RMR=.052; RMSEA=.045, NFI=.991; PNFI=.099] for group with high-UA, signifying an tolerable data for fit.

6.5.2.2 Age

Comparable to gender, in nature age was ordinal and consequently no requirement to process the split of set within the experiment (Hair et al., 2010). In this investigation, two groups were divided from age; that is younger (age $\leq$ 30) and groups with older age (age $>$ 30). Among 214 answerers, 89 engineers with age set younger and 125 engineers set older age set.

After implementing model of measurement for respective group individually disclosed the succeeding: with low-PD set [df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; AGFI=.763; CFI=.993; RMR=.052; PNFI=.099; RMSEA=.045, NFI=.991;] and df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; CFI=.993; RMR=.052; AGFI=.763; PNFI=.099; RMSEA=.045, NFI=.991;] for set with high-PD, signifying tolerable data of fit.

Table 6.9. *The Abstract of Moderation Influence on Age*

Hypothesis	Age 24-30years		Z-score	Results	Age>30years		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU $\rightarrow$ BI	51.2%	-0.44	-0.44	Not Supported	60.1%	.018	-1.157	Not Supported
PEU $\rightarrow$ BI		.739	8.610***	Supported		.765	11.16***	Supported
FC $\rightarrow$ AU	27.7%	.526	5.813***	Supported	38%	.617	8.71***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.5.2.3 Level of Education

Like other characteristics of demography, level of education in nature was categorical and consequently, refinement was not a necessity. Amongst 214 answerers, the explanatory frequencies for the level of education disclosed 150 graduate and 64 postgraduate engineers.

After implementing model of measurement for respective group individually disclosed the succeeding: for PD-low set [df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; AGFI=.763; RMR=.052; CFI=.993; RMSEA=.045, PNFI=.099; NFI=.991] and df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; CFI=.993; RMR=.052; AGFI=.763; RMSEA=.045, ; PNFI=.099; NFI=.991] for PD-high set, signifying tolerable data fit.

Table 6.10: *The Abstract of Influence of Moderation on Level of Education*

Hypothesis	Graduate		Z-score	Results	Post Graduate		Z-score	Results
	R ²	Estimate			R ²	Estimate		
PU → BI	54.5%	-.071	-1.202	Not Supported	56.4%	.035	324	Not supported
PEU → BI		.780	11.55***	Supported		.728	6.809***	Supported
FC → AU	29.8%	.546	7.94***	Supported	40.5%	.637	6.572***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.5.2.4 Experience

The technological experience for explanatory frequencies in categories shows the majority of engineers (N=136) experienced implementing C-tech structure, while as remaining (N=78) had experience low.

After implementing model of measurement for respective group individually disclosed the succeeding: for low-PD set [df= 16; χ^2 =70.547; χ^2 /df= 4.409; GFI =.984; AGFI=.763; CFI=.993; RMR=.052; PNFI=.099; RMSEA=.045, NFI=.991;] and df= 16; χ^2 =70.547; χ^2 /df= 4.409; AGFI=.763; GFI =.984; CFI=.993; RMR=.052; RMSEA=.045, NFI=.991; PNFI=.099] for set with high-PD, signifying an tolerable data of fit.

Table 6.11: *The Abstract of Influence on Moderation of Experience*

Hypothesis	Some Exp		Z-score	Results	Experienced		Z-score	Results
	R ²	Estimate			R ²	Estimate		
PU → BI	56.7%	.009	.098	Not Supported	54.3%	-.070	-1.124	Not Supported
PEU → BI		.747	7.964***	Supported		.778	10.877***	Supported
FC → AU	41%	.641	7.332***	Supported	28.7%	.535	7.357***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6 Turkish Data Set With Impact of Moderation

This division states influence of moderation influence of Hofstede's four dimensions of culture (MF, PD, UA,IC) at the level of individuality of four constructs of demography namely gender, experience, level of education and age on the associations amongst the dependent (PEOU,FC and PU) and independent (AU and BI) variables in data set of turkey.

6.6.1 Turkish Set of Data for Hofstede's Dimension of Cultural

The part brings forth the outcomes of Hofstede's four dimensions of culture by moderating the associations with the model of Turkey.

6.6.1.1 Power distance

From 248 answerers, illustrative data disclosed the total mean for PD as 3.54/5 signifying a culture of PD as low. Implementing split-median technique (median $\leq$ 2.0), a set of 102 engineers disclosed a PD-low set and 146 PD-high set (median $>$ 2).

After implementing model of measurement for respective group individually disclosed the succeeding: set with PD-low [df= 16; χ^2 =105.449; χ^2 /df= 6.594; GFI=.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994;] other set [df= 16; χ^2 =105.449; χ^2 /df= 6.594; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; NFI=.994; RMSEA=.053, PNFI=.099] for PD-set, signifying tolerable data of fit.

Table 6.12: The Abstract of moderating influence on Power distance

Hypothesis	Low PD		Z-score	Results	High PD		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU $\rightarrow$ BI	88.5%	.879	12.882***	Supported	89.7%	.818	18.963***	Supported
PEU $\rightarrow$ BI		.070	1.026	Not supported		.158	3.665***	Supported
FC $\rightarrow$ AU	69.4%	.833	15.141***	Supported	44.1%	.664	10.682***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6.1.2 Masculinity\Femininity

The total mean 3.22/7 signifying a moderate culture of masculinity. Implementing split-median technique; statistics of illustration revealed 87 MF-low set (median $\leq$ 2) and 161 MF-high set (median $>$ 2).

After implementing model of measurement for respective group individually disclosed the succeeding: for MF-low set [χ^2 =105.449; df= 16; χ^2 /df= 6.594; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; RMSEA=.053, NFI=.994; PNFI=.099] group [χ^2 =105.449; df= 16; χ^2 /df= 6.594; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; RMSEA=.053, NFI=.994; PNFI=.099] for MF-high set, signifying tolerable data of fit.

Table 6.13: *The Abstract of Moderation Influence on Masculinity\Femininity*

Hypothesis	Low MF		Z-score	Results	High MF		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU→BI	88.3%	.934	15.137	Supported	90%	-.767	16.65***	Not Supported
PEU→BI		.007	.108***	Not Supported		.208	4.526***	Supported
FC→AU	52.1%	.721	9.784***	Supported	57.2%	.756	14.603***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6.1.3 Individualism\collectivism

The outcomes of illustrative statistics disclosed the total mean of moderating variable IC was 2.86/5 signifying a value of cultural collectivism. Using split-median technique data was divided into two sets, out of 124 IC-low sets (median≤1.5) and 124 high-MF sets 124 (median>1.5).

After implementing model of measurement for respective group individually disclosed the succeeding; the IC-low set [df= 16; χ^2 =105.449; df= 16; χ^2 /df= 6.594; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994;] set [df= 16; χ^2 =105.449; χ^2 /df= 6.594; GFI=.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994;] for the set with IC-high, signifying an tolerable data of fit.

Table 6.14: *The Abstract of Influence of Moderation on Individualism\Collectivism*

Hypothesis	Individualism		Z-score	Results	Collectivism		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU→BI	89.8%	.736	10.630***	Supported	88.6%	.882	19.831	Supported
PEU→BI		.227	7.511***	Supported		.079	1.776***	Not Supported
FC→AU	74.2%	.862	7.013***	Supported	37.7%	.614	8.640***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6.1.4 Uncertainty Avoidance

The outcomes of the mean for the moderation of UA variable was 2.98/5, indicated a high UA value for culture. As per split-median technique, the data was divided into two sets, were 120 in UA-low set (median≤2) and another set of 128 UA-high sets (median>2).

After implementing model of measurement for respective group individually disclosed the succeeding; for UA-low set [df= 16; χ^2 =105.449; df= 16; χ^2 /df= 6.594; GFI =.980;

AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994] another set [df= 16; χ^2 =105.449; df= 16; χ^2 /df= 6.594; GFI =.980; CFI=.995; PNFI=.099; AGFI=.698; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994;] for UA-high set, signifying tolerable data of fit.

Table 6.15: *The Abstract of Influence for Moderating on Uncertainty Avoidance*

Hypothesis	Low UA		Z-score	Results	High UA		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU → BI	90%	.710	9.885	Not Supported	88.5%	.877	20.16***	Not Supported
PEU → BI		.255	3.555***	Supported		.086	1.97	Supported
FC → AU	65.6%	.810	15.065***	Supported	46.5%	.682	10.50***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6.2 Turkish Data Set Characteristics for Demographic

This part will state the outcomes of the effect of moderation on four variables of demography (gender, experience, level of education and age) on the association amongst the key predictors BI and AU of C-tech structure in Turkish model.

6.6.2.1 Gender

Among 248 answerers, the illustrative frequencies disclosed 106 males and 142 females.

After implementing model of measurement for respective group individually disclosed the succeeding; for set of females [df= 16; χ^2 =105.449; df= 16; χ^2 /df= 6.594; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099 RMSEA=.053, NFI=.994;] another set [df= 16; χ^2 =105.449; χ^2 /df= 6.594; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099 RMSEA=.053, GFI =.980; NFI=.994;] for set of males, signifying an tolerable data of fit.

Table 6.16: *The Abstract of Moderating Influence on Gender*

Hypothesis	Female		Z-score	Results	Male		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU → B I	92.5%	.900	16.653***	Supported	85.9%	.775	15.64***	Supported
PEU → BI		.070	1.303	Not Supported		.188	3.789***	Supported
FC → AU	64.4%	.802	13.876***	Supported	46.3%	.680	11.016***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6.2.2 Age

Among 248 participants, 86 engineers with a younger set of age and 162 with older set of age.

After implementing model of measurement for respective group individually disclosed the succeeding; for younger set [$df= 16$; $\chi^2 = 105.449$; $\chi^2/df= 6.594$; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994] another set [$df= 16$; $\chi^2 = 105.449$; $\chi^2/df= 6.594$; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994] for set of older age, signifying tolerable data of fit.

Table 6.17: *The Abstract of Moderating Influence on Age*

Hypothesis	Low Age		Z-score	Results	High Age		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU → BI	86.5%	.662	9.852***	Supported	92.0%	.929	.746***	Supported
PEU → BI		.309	4.596***	Supported		.035	.886	Not Supported
FC → AU	40.2%	.734	10.051***	Supported	55.7%	.746	.270***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6.2.3 Level of Education

Among 248 total participants, the illustrative frequencies of the level of education disclosed 150 graduate and 98 engineers of postgraduation.

After implementing model of measurement for respective group individually disclosed the succeeding; for the set of graduate [$df= 16$; $\chi^2 = 105.449$; $\chi^2/df= 6.594$; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994;] another set [$df=16$; $\chi^2=105.449$; $\chi^2/df= 6.594$; GFI=.980; AGFI=.698; CFI=.995; RMR=.046; NFI=.994; RMSEA=.053, PNFI=.099;] for set of post graduate, signifying tolerable data of fit.

Table 6.18: *The Abstract Influence of Moderation on Level of Education*

Hypothesis	Graduate		Z-score	Results	Post Graduate		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU → BI	91.5%	.931	21.87***	Supported	87.7%	.661	10.436***	Supported
PEU → BI		.031	.729	Not Supported		.313	4.94***	Supported
FC → AU	53.1%	.729	.040***	Supported	58%	.762	11.65***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.6.2.4 Experience

The illustrative frequencies of the c-tech set for experience disclosed widely held engineers (N=141) were experienced in implementing the c-tech structure while remaining (N= 107) showed little experienced.

After implementing model of measurement for respective group individually disclosed the succeeding ; for some-experience set [df= 16; χ^2 =105.449; χ^2 /df= 6.594; GFI =.980; AGFI=.698; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053, NFI=.994;] for another set [df= 16; χ^2 =105.449; χ^2 /df= 6.594; GFI =.980; AGFI=.698; NFI=.994; CFI=.995; RMR=.046; PNFI=.099; RMSEA=.053] for set of experienced, signifying tolerable data for fit.

Table 6.19: *The Abstract Influence of Moderation on Experience*

Hypothesis	Some Exp		Z-score	Results	Experienced		Z-score	Results
	R^2	Estimate			R^2	Estimate		
PU → BI	94.1%	.898	19.02***	Supported	84.8%	.773	14.93***	Supported
PEU → BI		.082	1.74	Not Supported		.182	3.52***	Supported
FC → AU	66.2%	.814	14.52***	Supported	45%	.671	10.72***	Supported
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10								

6.7 Summary

After computing the outcomes of reliability and validity of constructs, the succeeding part was to calculate model to examine associations of hypothesis amongst the constructs, in the proposed model. Outcomes of (R^2), which brings forth data up to degree were model explains variation in the set of data, suggested that the model presents a robust explanatory power for both models. More preciously, the determinants PU, PEOU and FC reported 69% and 62% of the difference of BI and AU for Indian and Turkish correspondingly. It was

revealed out from model of path ten out of nine straight hypotheses were accepted for both models. Table 6.43 briefed the outcomes with respected to supported/ not supported the hypothesis that are linked to direct determinants.

The last stage of examination includes finding moderating influence of culture on four constructs that is, PD, IC, MF and UA and four constructs of demography that is, level of education, experience, gender and age on the associations amongst the independent (PEOU, PU, and FC) and dependent (BI and AU) variables. An abstract of outcomes linked with respect to supported/ not supported hypotheses that are linked to dimensions of culture and characteristics of demography are itemized in Table 6.44 and 6.45 correspondingly. The outcomes disclosed that associations of hypothesis for moderation were partially supported in both samples respectively.

This unit put forward the outcomes of the key study; the next unit will make clear the outcomes and presents a conclusion that relates to literature.

Table 6.20: Abstract of Outcomes Connected To The Direct Hypotheses

Abstract Outcomes of Direct Hypothesis		Study Results	
Research Direct Hypothesis		India	Turkey
H1 a, b- Perceived Usefulness will have straight positive Impact on the intention to use C-tech structure in the Indian and Turkish Context.		NS	S
H2 a, b – Perceived Ease of Use will have straight positive influence on the intention to use C-tech structure in the Indian and Turkish background.		S	S
H3 a, b – Perceived Ease of Use will have a straight positive influence on perceived usefulness of C-tech structure in the Indian and Turkish background.		S	S
H4 a, b – FC will have a straight positive influence on Actual Intention Usage of C-tech structure in the Indian and Turkish Content.		S	NS
H5 a, b – BI will have a straight positive influence on his or her on Actual Usage Intention of C-tech structure in India compared to Turkey.		S	S

NS = NOTSUPPORTED

S = SUPPORTED

Table 6.21: Abstract of Outcomes linked To The Moderating Cultural Dimensions Hypotheses

Abstract of Outcomes of Cultural Aspects for Moderating effects		Study Outcomes	
Study Hypothesis Moderators	Proposed Relationship	India	Turkey
H6 a1, a2, a3: The association amongst (PEOU, PU, FC) Behavioural Intention and Actual usage Intention of the C-tech the structure is moderated by the PD value in the Indian context.	PU $\longrightarrow$ BI	NS	S
	PEU $\longrightarrow$ BI	S	NS
	FC $\longrightarrow$ AU	S	S
H6 b1, b2, b3: The association amongst (PEOU, PU, FC) Behavioural Intention and Actual usage Intention of the C-tech the structure is moderated by the PD value in the Turkish background.	PU $\longrightarrow$ BI	NS	S
	PEU $\longrightarrow$ BI	S	S
	FC $\longrightarrow$ AU	S	S
H7 a1, a2, a3, a4: The association amongst (PEOU, PU, FC, BI) and Actual usage The intention of the C-tech structure is moderate by the MF value in the Indian background.	PU $\longrightarrow$ BI	S	S
	PEU $\longrightarrow$ BI	S	NS
	FC $\longrightarrow$ AU	S	S
H7 b1, b2, b3, b4: The association amongst (PEOU, PU, FC, BI) and Actual usage Intention of the C-tech structure is moderated by the MF value in the Turkish background.	PU $\longrightarrow$ BI	NS	NS
	PEU $\longrightarrow$ BI	S	S
	FC $\longrightarrow$ AU	S	S
H8 a1, a2, a3: The association amongst (PEOU, PU, FC) Behavioural Intention and Actual usage Intention of the The C-tech structure is moderated by the IC value in the Indian background.	PU $\longrightarrow$ BI	NS	S
	FC $\longrightarrow$ BI	S	S
	PEU $\longrightarrow$ AU	S	S
H8 b1, b2, b3: The association amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the The C-tech structure is moderated by the IC value in the Turkish background.	PU $\longrightarrow$ BI	NS	S
	PEU $\longrightarrow$ BI	S	NS
	FC $\longrightarrow$ AU	S	S
H9 a1, a2, a3: The association amongst Behavioral (PEOU,PU,FC) Behavioural Inten and Actual usage Intention of the C-tech	PU $\longrightarrow$ BI	NS	NS
	PEU $\longrightarrow$ BI	S	S

structure is moderated by the UA value in the Turkish background.	FC → AU	S	S
H9 b1, b2, b3 : The association amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech structure is moderated by the UA value in the Turkish background.	PU → BI	NS	NS
	PEU → BI	S	S
	FC → AU	S	S

NS = NOTSUPPORTED

S = SUPPORTED



Table 6.22. Abstract of Outcomes Linked To The four-Demographic Construct

Abstract Of Outcomes Of Demographic Aspects For Moderating Effect		Study Outcomes	
Study Hypothesis Moderators	Proposed Relationship	India	Turkey
H10 a1, a2, a3: The association amongst (PEOU, PU, FC) Behavioural Intention and Actual usage Intention of the C-tech the structure is moderated by the gender value in the Indian background.	PU → BI	NS	S
	PEU → BI	S	NS
	FC → AU	S	S
H10 b1, b2, b3: The association amongst (PEOU, PU, FC) Behavioural Intention and Actual usage Intention of the C-tech the structure is moderated by the gender value in the Turkish background.	PU → BI	NS	S
	PEU → BI	S	S
	FC → AU	S	S
H11 a1, a2, a3, a4: The association amongst (PEOU, PU, FC, BI) and Actual usage The intention of the C-tech structure is moderate by the age value in the Indian background.	PU → BI	NS	S
	PEU → BI	S	S
	FC → AU	S	S
H11 b1, b2, b3, b4: The association amongst (PEOU, PU, FC, BI) and Actual usage Intention of the C-tech structure is moderated by the age value in the Turkish background.	PU → BI	NS	S
	PEU → BI	S	NS
	FC → AU	S	S
H12 a1, a2, a3: The association amongst (PEOU, PU, FC) Behavioural Intention and Actual usage Intention of the The C-tech structure is moderated by the educational value in the Indian background.	PU → BI	NS	S
	FC → BI	S	NS
	PEU → AU	S	S
H12 b1, b2, b3: The association amongst (PEOU, PU, FC) Behavioral Intention and Actual usage Intention of the C-tech system is moderated by the educational value in the Turkish background.	PU → BI	NS	S
	PEU → BI	S	S
	FC → AU	S	S
H13 a1, a2, a3: The association amongst (PEOU, PU, FC) Behavioural Intention	PU → BI	NS	S

and Actual usage Intention of the C-tech the system is moderated by the experience value in the Turkish background.	PEU → BI	S	NS
	FC → AU	S	S
H13 b1, b2, b3: The association amongst (PEOU, PU, FC) Behavioural Intention and Actual usage Intention of the C-tech the system is moderated by the experience value in the Turkish background.	PU → BI	NS	S
	PEU → BI	S	S
	FC → AU	S	S

NS = NOTSUPPORTED

S = SUPPORTED



7. CONCLUSION AND FURTHER RESEARCH

Unit 1 introduces the person who reads the study drawback, It is recognized in the literature that construction technology applications are not just a technological way out, instead, it is a method of numerous diverse aspects, for instance, social, behavioural, individual and cultural backgrounds. Nevertheless, it has disagreed that there is a less of exploration dealing the vital part. In developing nation-state for instance turkey and India where establishments reinforce old styles. Furthermore, it was acknowledged in the literature that even though c-tech is well thought-out as a worldwide technology, competence of these tools must also be computed in the vicinity in the meantime handlers typically labour in local/national circumstances. Consequently, this unit draws attention to the significance of investigating the impacts on the approval and taking of c-tech tools by engineers in India and turkey.

Unit 2 presents a complete literature evaluation of the 3 key investigation parts that make the foundation about this investigation: technology adoption, c-tech, and individual-level culture. This unit begins the evaluation of the 9 utmost significant philosophies and models linked to technology embracing together with DTPB, TRA, IDT, SCT, TPB, TAM, TAM2, ATAM, and UTAUT, along with the debate for dissimilar c-tech tools in use by construction industries.

Unit 3 describes and defends the details after selecting the TAM as a basis in our abstract model to explore c-tech taking. This unit also presents a more explanation for containing the circumstantial feature as the main determining factor in accumulation to the amalgamation of features of individuals and Hofstede's dimensions of culture as moderators in the model to explore c-tech approval and taking. Furthermore, investigation hypotheses are drawn, and effective explanations are described. The outcomes of the unit with thorough literature assessment in unit 2 assisted attain the primary goal of this investigation, which is "to create a conceptual outline".

Unit 4 illustrates and defends the logical tactic, procedures and skills applied in this investigation to attain the key investigation purposes and to response the exploration queries. Unit 5 explains the outcomes of the pilot study to guarantee the validity and reliability of the determining apparatuses to be applied in analyzing hypotheses and put forward the introductory investigation of the data attained from the answers. The outcomes of the data examination in the unit emphasis on the cross-cultural variances amongst Turkey and India (study goal number 2) and correspondingly inspect the diverse responsibilities that engineers accomplish applying

the c-tech structures (study goal number 3). These unit benefits attain the next and third points of the investigation, which are “to inspect the resemblances and variances amongst Indian and Turkish engineers on the taking and practice of c-tech”.

Unit 6 presents the outcomes of the model analytical stage where a detailed examination of the relationships amongst the variables in the suggested study model is obtainable. The outcomes of the structural model reinforce the toughness of the model in Turkey and India correspondingly. Precisely, this Unit supports attain the chief study inquiry, which is “to empirically recognize the aspects that affect the engineers’ intention to approve and implement the c-tech structure and observe the moderating effect of individual-level culture and other demographic variances on the association amongst factors”.

The results of this study have real-world suggestions to put into action in India and Turkey. However, the administration of these two-nation state is financing in construction technology, it must be observed that engineers will not agree to take and employ technology only for the reason that it is beneficial. As formerly stated, engineers’ insights in the direction of using the c-tech structure are shaped by using individual, social and organizational principles, furthermore to cultural standards and other demographic variances. In this setting, all the major and unlike individual aspects must be measured at the similar time; then we can see a crystal-clear image of the vibrant features of individual technology of only than a more complete picture of the dynamic nature of individual technology may commence to appearing. To be precise, it is pointless to facilitate a skill which is executed in a Western nation-state or for exact set of users and then implement it in a non-western nation-state that has large cultural alterations not taking into account the cultural principles. Consequently, decision-makers must not take into account the policies associated to information, design and structure in one nation-state and just implement it to one more as it will be ruined to fail in other backgrounds.

This study is to focus on the investigation of the capable aspects that influence the approval and implementation of c-tech in Turkey and India correspondingly, particularly the aspects linked to the individual-level cultural extents. Consequently, a lot of recommendations for the forthcoming study rising from this effort, specifically that the Turkish explanatory power of the Turkish model is lesser than the Indian one. Other aspects that must present more power in describing c-tech behaviour in the non-western nation-state. Consequently, this research is only a commencement and recommends numerous investigation guidelines.

At the micro-level with dissimilar cultural backgrounds, this investigation is among limited studies that bring technology and acceptance philosophies and cultural philosophies together. To our information, not much investigation has been done while measuring cultural

features at the individual stage in Turkey and India with construction industries background. Consequently, this investigation is well thought out a valuable direction for other investigators to comprehend if the recognition of technology is chiefly influenced by individual's cultural context (moderation impact) or maybe recognized is because of main elements of technology without an unintended influence of moderation. Moreover, much of the theories regarding cultural investigation is founded on an organizational or national stage. In most of the national state, individuals are frequently affected and inspired by organizational, experts, social alliance they fit in. since national culture is a macro-stage occurrence. Individual behaviour will not be computed or forecasted by using the national dimension grade while there are no ways to specify cultural features regarding individuals in the same nation-state, particularly for computing real behaviour in the embracing and taking of technology (Walumbwa et al., 2007). There is proof for a confusing utilizing country score in describing individual behaviour, for instance Diversity et al., (2013) stated that his country-level investigation was not capable to forecast the individual behaviour. Consequently, this investigation varies from widely studies which use the score of national culture to examine individual behaviour.

The outcomes of the investigation put forward the significance of individual aspects and cultural dimensions, where one individual delegate may overrule others in c-tech settings. Therefore, the forthcoming investigation greeted to explore the dealings amongst amalgamations of unlike to compute their comparative significance in c-tech settings.

Conclusion of the results of this investigation put forward an outline that permits the engineer, strategy makers to designers to comprehend the elements that influence engineers behavioural intention to approve and apply the c-tech structure in Turkey and India.

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Appendix A

Section A. About Yourself

Gender	Male	Female
Age	24-30 years	30>years
Education Level	Undergraduate	Postgraduate
Construction technology Experience	Some Experience	Experienced

Section B. Perceived Usefulness, Perceived Ease of Use, Behavioral Intention Facilitating Conditions about Construction Technology Usage

Please rate the extent to which you agree with the statement below

1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree					
B1. Perceived Usefulness about using C-technology system					
Using the C-tech system will					
1. Permit me to achieve tasks faster	1	2	3	4	5
2. improve my performance in the job	1	2	3	4	5
3. make it Easier for work content	1	2	3	4	5
4. increase my productivity in the job	1	2	3	4	5

B2. Perceived Ease of Use about Construction technology system					
1. I find it easy to get a tech-based system to do what I want to do	1	2	3	4	5
2. My Interaction with tech-based system is clear and understandable	1	2	3	4	5
3. It is easy for me to become a skill full at using tech-based System	1	2	3	4	5
4. I find c-tech structure trouble-free to use	1	2	3	4	5

B3. Facilitating Conditions about using the Construction technology System					
1. I have the resources necessary to use the tech-based System	1	2	3	4	5
2. I have the knowledge necessary to use technological System	1	2	3	4	5
3. A Specific Person was available to provide assistance	1	2	3	4	5
4. When I need help to use the c-tech system, guidance was available	1	2	3	4	5

B4. Behavioural Intention to Use construction System						
1.	Given the chance, I intend to use the cloud computing system to do different things like to make it easier for workers, contractor, clients, regulators and any	1	2	3	4	5
2.	other parties to access design, permits and other documents	1	2	3	4	5
3.	I predict to use the technology system in the future to discuss results of C-technology	1	2	3	4	5
4.	In general, I plan to use the Virtual reality design (BIM 360 DEGREE DOCS) frequently to discuss a workflow from beginning to end of the design and build process	1	2	3	4	5

Section C: Actual Usage of the C-tech System

1. On average, how frequently do you use the tech-based system? (Frequency usage)

1. Less than once a month

2. Once a month

3. A few times a week

4. About once a day

5. Several times a day

2. On the average working day, how much time do you spend on the tech-based system?
(Daily Usage)

1. Almost never

2. Less than 30 minutes

3. From 30 minutes to 1 hour

4. From 1 to 2 hours

5. More than 2 hours

3. Please indicate the extent to which you use the Tech-based system to perform the following tasks?

	Not at All	To a Small Extent	To Some Extent	To a Moderator Extent	To a Great Extent
Virtual Reality Design	1	2	3	4	5
Augmented Reality	1	2	3	4	5
Cloud Computing	1	2	3	4	5
Wearable Technology	1	2	3	4	5
Machine Learning	1	2	3	4	5
Connected Job Sites	1	2	3	4	5
Thermal Imaging	1	2	3	4	5
Autonomous Equipment	1	2	3	4	5
Internet of Things	1	2	3	4	5

**Section D: POWER DISTANCE, MASCULINITY/FEMININITY,
INDIVIDUALISM/COLLECTIVISM AND UNCERTAINTY AVOIDANCE**

D1. POWER DISTANCE (PD)	
24.	Managers should make most decisions without consulting the Engineers
25.	Managers should avoid social interaction with Engineers
26.	Managers should not delegate vital tasks to engineers
27.	Engineers should not disagree with decisions made by their management
D2. Masculinity/ Femininity (MF)	
28.	Male Engineers solve problems with logical analysis, while female engineers Usually, solve the problem with Intuition
29.	It is preferable to have a Male in a high-level position rather than a female
30.	There are some main practices in which male engineers can always do better than female
31.	Male engineers are more determined and competitive focusing on achievement success while female engineers are modest and humble focusing on the

	relationship
D3. Individualism/ Collectivism (IC)	
32.	Group Success is more important than Individual success
33.	Being accepted as a member of a group is more important than having autonomy And Independence
34.	Group welfare is more important than individual rewards
35.	Individuals ransom or give up self-interest for the group they belong to
D4. Uncertainty Avoidance (UA)	
36.	Standardized work procedures are helpful for my work
37.	It is important to have specific requirements and instructions spelt out In detail so that one always knows what I am expected to do
38.	It is very important to closely follow instructions and procedure related to the technology
39.	Rules and regulations are vital because they inform the staff or engineers what organization is expected of them

Appendix B.

Missing Data

Table 1. *Indian sample univariate data (Individual level)*

	N	Mean	Std. Deviation	Missing (India)	
				Frequency	Percent
Q5PU	212	3.8972	1.27404	2	.9
Q6PU	214	3.9206	1.27019	0	.0
Q7PU	211	3.9346	1.23540	3	1.4
Q8PU	212	4.0093	1.21798	2	.9
Q9PEU	213	3.8551	1.28646	1	.5
Q10PEU	211	3.8925	1.28284	3	1.4
Q11PEU	211	3.9019	1.24271	3	1.4
Q12PEU	213	3.9626	1.19408	1	.5
Q13FC	213	3.9065	1.24118	1	.5
Q14FC	212	3.8879	1.27325	2	.9
Q15FC	214	3.9159	1.23045	0	.0
Q16FC	214	3.7944	1.38901	0	.0
Q17BI	214	3.804	1.3768	0	.0
Q18BI	214	3.9766	1.20032	0	.0
Q19BI	214	3.7243	1.42864	0	.0
Q20BI	212	3.9626	1.28132	2	.9
Q21ACFU	212	4.0654	1.21625	2	.9
Q22AUDU	213	3.8972	1.22903	1	.5
Q23PD	213	4.1784	.91945	1	.5
Q24PD	214	3.8131	1.28648	0	.0
Q25PD	214	3.8318	1.27810	0	.0
Q26PD	214	3.9019	1.23892	0	.0
Q27MF	213	4.1963	1.00178	1	.5
Q28MF	212	3.8692	1.14723	2	.9
Q29MF	214	3.8645	1.15687	0	.0
Q30MF	214	3.8972	1.10428	0	.0
Q31IC	214	4.1916	.86980	0	.0
Q32IC	214	3.7897	1.30643	0	.0
Q33IC	213	3.8271	1.26455	1	.5
Q34IC	214	3.8178	1.28167	0	.0
Q35UA	212	4.6729	.62462	2	.9
Q36UA	212	4.3458	1.11417	2	.9
Q37UA	214	4.1963	1.25177	0	.0

Q38UA	213	4.6729	.62462	1	.5
Gender	214			0	.0
Age	212			2	.9
Educatelevel	214			0	.0
CtechExp	212			2	.9

Table 2. Turkish sample univariate data (Individual level)

	N	Mean	Std. Deviation	Missing (Turkey)	
				Frequency	Percent
Q5PU	248	3.5484	1.46403	0	.0
Q6PU	248	4.0081	1.38234	0	.0
Q7PU	248	3.8871	1.35700	0	.0
Q8PU	244	3.3468	1.64720	4	1.6
Q9PEU	247	3.7218	1.40819	1	.4
Q10PEU	247	3.7056	1.42493	1	.4
Q11PEU	248	3.6048	1.59106	0	.0
Q12PEU	248	3.7460	1.38089	0	.0
Q13FC	245	3.8024	1.38722	3	1.2
Q14FC	248	3.8306	1.50960	0	.0
Q15FC	246	3.8024	1.38722	2	.8
Q16FC	247	3.8065	1.42946	1	.4
Q17BI	247	3.8185	1.40103	1	.4
Q18BI	246	3.7782	1.56738	2	.8
Q19BI	246	3.7984	1.43963	2	.8
Q20BI	247	3.7581	1.42204	1	.4
Q21AUFC	246	3.8185	1.47973	2	.8
Q22AUDU	246	3.8306	1.47707	2	.8
Q23PD	248	3.6008	1.41347	0	.0
Q24PD	248	3.5444	1.41352	0	.0
Q25PD	246	3.5161	1.44247	2	.8
Q26PD	246	3.5161	1.44247	2	.8
Q27MF	248	3.2097	1.48555	0	.0
Q28MF	246	3.2258	1.48045	2	.8
Q29MF	246	3.1935	1.48503	2	.8
Q30MF	248	3.2621	1.48946	0	.0
Q31IC	248	3.2500	1.50640	0	.0
Q32IC	246	3.2419	1.55270	2	.8
Q33IC	248	3.1613	1.54494	0	.0
Q34IC	247	2.9677	1.56860	1	.4
Q35UA	247	2.9556	1.56701	1	.4

Q36UA	246	2.8952	1.54720	2	.8
Q37UA	246	2.9234	1.57607	2	.8
Q38UA	246	2.9597	1.52655	2	.8
Gender	248			0	.0
Age	248			0	.0
Educatlevel	247			1	.4
CtechExp	246			2	.8

Appendix C

Table 3. *Outliers and Univariate Outliers*

Variable	Minimum	Maximum
PU1	-2.27402	.86559
PU2	-2.29931	.84983
PU3	-2.37541	.86241
PU4	-2.47076	.81336
PEU5	-2.21938	.88993
PEU6	-2.25479	.86330
PEU7	-2.33512	.88366
PEU8	-2.48109	.86877
FC9	-2.34176	.88098
FC10	-2.26809	.87347
FC11	-2.36976	.88107
FC12	-2.01178	.86796
BI13	-2.03642	.86887
BI14	-2.47987	.85258
BI15	-1.90692	.89295
BI16	-2.31215	.80962
ACFU17	-2.52038	.76841
AUDU18	-2.35731	.89730
PD19	-3.45687	.89358
PD20	-2.18665	.92260
PD21	-2.21561	.91403
PD22	-2.34225	.88636
MF23	-3.19060	.80231
MF24	-2.50095	.98572
MF25	-2.47606	.98154
MF26	-2.62361	.99867
MF27	-2.51965	.92942
IC28	-2.13538	.92641
IC29	-2.23567	.92753
IC30	-2.19850	.92242
UA31	-2.67825	.52368
UA32	-3.00296	.58717
UA33	-2.55339	.64208
UA34	-2.67825	.52368

Table. 4. *Indian sample Univariate outliers*

	Minimum	Maximum
PU1	-1.74066	.99152
PU2	-2.17607	.71758
PU3	-2.12756	.82012
PU4	-1.42470	1.00366
PEU5	-1.93281	.90771
PEU6	-1.89880	.90837
PEU7	-1.63717	.87687
PEU8	-1.98854	.90813
FC9	-2.02018	.86330
FC10	-1.87509	.77461
FC11	-2.02018	.86330
FC12	-1.96329	.83496
BI13	-2.01176	.84327
BI14	-1.77252	.77950
BI15	-1.94382	.83467
BI16	-1.93951	.87335
AUFC17	-1.90477	.79842
AUDU18	-1.91639	.79167
PD19	-1.84002	.98990
PD20	-1.80002	1.02981
PD21	-1.74432	1.02870
PD22	-1.74432	1.02870
MF23	-1.48744	1.20516
MF24	-1.50347	1.19842
MF25	-1.47711	1.21644
MF26	-1.51874	1.16680
IC27	-1.49363	1.16171
IC28	-1.44390	1.13227
IC29	-1.39895	1.19015
IC30	-1.25446	1.29559
UA31	-1.24801	1.30462
UA32	-1.22490	1.36042
UA33	-1.22037	1.31759
UA34	-1.28373	1.33656

Table. 5 . Turkish Sample Univariate Outliers

	Minimum	Maximum
PU5	-1.74066	.99152
PU6	-2.17607	.71758
PU7	-2.12756	.82012
PU8	-1.42470	1.00366
PEU9	-1.93281	.90771
PEU10	-1.89880	.90837
PEU11	-1.63717	.87687
PEU12	-1.98854	.90813
FC13	-2.02018	.86330
FC14	-1.87509	.77461
FC15	-2.02018	.86330
FC16	-1.96329	.83496
BI17	-2.01176	.84327
BI18	-1.77252	.77950
BI19	-1.94382	.83467
BI20	-1.93951	.87335
AUFC21	-1.90477	.79842
AUDU22	-1.91639	.79167
PD23	-1.84002	.98990
PD24	-1.80002	1.02981
PD25	-1.74432	1.02870
PD26	-1.74432	1.02870
MF27	-1.48744	1.20516
MF28	-1.50347	1.19842
MF29	-1.47711	1.21644
MF30	-1.51874	1.16680
IC31	-1.49363	1.16171
IC32	-1.44390	1.13227
IC33	-1.39895	1.19015
IC34	-1.25446	1.29559
UA35	-1.24801	1.30462
UA36	-1.22490	1.36042
UA37	-1.22037	1.31759
UA38	-1.28373	1.33656
Valid N (listwise)		

Appendix D

Table -6. Indian Sample Normality (Skewness and Kurtosis value)

	Mean	Std. Deviation	Skewness	Kurtosis
	Statistic	Statistic		
Q5PU	3.8972	1.27404	-1.002	-.157
Q6PU	3.9206	1.27019	-1.071	.016
Q7PU	3.9346	1.23540	-1.096	.240
Q8PU	4.0093	1.21798	-1.183	.373
Q9PEU	3.8551	1.28646	-.942	-.237
Q10PEU	3.8925	1.28284	-1.036	-.072
Q11PEU	3.9019	1.24271	-.968	-.147
Q12PEU	3.9626	1.19408	-1.013	-.033
Q13FC	3.9065	1.24118	-.951	-.256
Q14FC	3.8879	1.27325	-.959	-.260
Q15FC	3.9159	1.23045	-.953	-.202
Q16FC	3.7944	1.38901	-.910	-.521
Q17BI	3.804	1.3768	-.916	-.486
Q18BI	3.9766	1.20032	-1.073	.152
Q19BI	3.7243	1.42864	-.840	-.699
Q20BI	3.9626	1.28132	-1.146	.152
Q21ACFU	4.0654	1.21625	-1.201	.283
Q22AUDU	3.8972	1.22903	-1.043	.013
Q23PD	4.1784	.91945	-1.208	1.467
Q24PD	3.8131	1.28648	-.915	-.182
Q25PD	3.8318	1.27810	-.947	-.086
Q26PD	3.9019	1.23892	-1.023	.140
Q27MF	4.1963	1.00178	-1.167	.844
Q28MF	3.8692	1.14723	-.796	-.092
Q29MF	3.8645	1.15687	-.816	-.053

Q30MF	3.8972	1.10428	-.745	-.151
Q31IC	4.1916	.86980	-.685	-.595
Q32IC	3.7897	1.30643	-.803	-.486
Q33IC	3.8271	1.26455	-.823	-.378
Q34IC	3.8178	1.28167	-.816	-.425
Q35UA	4.6729	.62462	-1.730	1.710
Q36UA	4.3458	1.11417	-1.745	2.101
Q37UA	4.1963	1.25177	-1.450	.859
Q38UA	4.6729	.62462	-1.730	1.710
Valid N (listwise)				

Table .7. *Turkish Sample Normality (Skewness and Kurtosis value)*

	Mean	Std. Deviation	Skewness	Kurtosis
	Statistic	Statistic		
Q5PU	3.5484	1.46403	-.557	-1.118
Q6PU	4.0081	1.38234	-1.201	.036
Q7PU	3.8871	1.35700	-1.077	-.138
Q8PU	3.3468	1.64720	-.398	-1.501
Q9PEU	3.7218	1.40819	-.758	-.793
Q10PEU	3.7056	1.42493	-.730	-.865
Q11PEU	3.6048	1.59106	-.689	-1.161
Q12PEU	3.7460	1.38089	-.763	-.742
Q13FC	3.8024	1.38722	-.898	-.544
Q14FC	3.8306	1.50960	-.933	-.708
Q15FC	3.8024	1.38722	-.880	-.587
Q16FC	3.8065	1.42946	-.879	-.667
Q17BI	3.8185	1.40103	-.902	-.552
Q18BI	3.7782	1.56738	-.849	-.930
Q19BI	3.7984	1.43963	-.865	-.678
Q20BI	3.7581	1.42204	-.817	-.716
Q21AUFC	3.8185	1.47973	-.924	-.644
Q22AUDU	3.8306	1.47707	-.936	-.631
Q23PD	3.6008	1.41347	-.680	-.879
Q24PD	3.5444	1.41352	-.611	-.979
Q25PD	3.5161	1.44247	-.571	-1.063
Q26PD	3.5161	1.44247	-.571	-1.063
Q27MF	3.2097	1.48555	-.245	-1.380
Q28MF	3.2258	1.48045	-.228	-1.379
Q29MF	3.1935	1.48503	-.224	-1.373
Q30MF	3.2621	1.48946	-.317	-1.342
Q31IC	3.2500	1.50640	-.225	-1.441
Q32IC	3.2419	1.55270	-.220	-1.524
Q33IC	3.1613	1.54494	-.153	-1.522
Q34IC	2.9677	1.56860	.022	-1.577
Q35UA	2.9556	1.56701	-.047	-1.614
Q36UA	2.8952	1.54720	.071	-1.591
Q37UA	2.9234	1.57607	.008	-1.628
Q38UA	2.9597	1.52655	.013	-1.573
Valid N (listwise)				

Appendix E

Table.8. Multicollinearity India

Model	Variables Entered	Variables		Method
		Removed		
1	PEU, PU, FC	.		Enter

a. Dependent Variable: BI

b. All requested variables entered.

Coefficients

Model		Collinearity Statistics	
		Tolerance	VIF
1	peu	.454	2.204
	pu	.407	2.456
	fc	.412	2.430

a. Dependent Variable: BI

Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	peu	pu	fc
1	1	3.888	1.000	.00	.00	.00	.00
	2	.058	8.187	.87	.20	.01	.03
	3	.031	11.168	.10	.79	.13	.37
	4	.023	12.979	.02	.01	.85	.60

a. Dependent Variable: BI

Turkey

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	FC, Pu, BI ^b	.	Enter

- a. Dependent Variable: peu
b. All requested variables entered.

Coefficients

Model		Collinearity Statistics	
		Tolerance	VIF
1	bi	.390	2.562
	pu	.410	2.438
	fc	.626	1.598

- a. Dependent Variable: peu

Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	bi	pu	fc
1	1	3.807	1.000	.01	.00	.00	.00
	2	.103	6.085	.50	.20	.08	.03
	3	.051	8.606	.39	.00	.14	.92
	4	.038	9.973	.10	.79	.77	.05

- a. Dependent Variable: peu

Appendix F

Table.9. *Measurement Model (Model Fit Summary)*

Measurement model (Indian sample first run)

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	49	286.223	122.000		2.346
Saturated model	171	.000	0		
Independence model	18	3301.342	153.000		21.577

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.130	.881	.833	.628
Saturated model	.000	1.000		
Independence model	.900	.215	.122	.192

Baseline Comparisons

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.913	.891	.948	.935	.948
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.797	.728	.756
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	164.223	118.662	217.497
Saturated model	.000	.000	.000
Independence model	3148.342	2965.118	3338.882

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	1.344	.771	.557	1.021
Saturated model	.000	.000	.000	.000
Independence model	15.499	14.781	13.921	15.676

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.079	.068	.091	.000
Independence model	.311	.302	.320	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	384.223	393.821	549.156	598.156
Saturated model	342.000	375.495	917.582	1088.582
Independence model	3337.342	3340.868	3397.929	3415.929

Measurement model (Turkish sample)

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	59	286.053	112.000		2.554
Saturated model	171	.000	0		
Independence model	18	5806.370	153.000		37.950

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.095	.896	.840	.587
Saturated model	.000	1.000		
Independence model	1.364	.110	.006	.099

Baseline Comparisons

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.951	.933	.969	.958	.969
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.732	.696	.709
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	174.053	127.948	227.839
Saturated model	.000	.000	.000
Independence model	5653.37054075315905.543		

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	1.158	.705	.518	.922
Saturated model	.000	.000	.000	.000
Independence model	23.50822.88821.89323.909			

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.079	.068	.091	.000
Independence model	.387	.378	.395	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	404.053	413.887	611.346	670.346
Saturated model	342.000	370.500	942.796	1113.796
Independence model	5842.3705845.3705905.6115923.611			