

Dear Sir/Madam,

I am writing to express my interest in a teaching position at your university. I have enclosed my resume to facilitate your consideration. I believe I have excellent credentials for a teaching position and welcome your interest in my candidacy.

I have completed a PhD in Enterprise Management recently. I hold a master of philosophy in Management and obtained an MBA in Human Resource Management after my bachelors in Commerce. I have developed a reasonable research aptitude during my PhD with **01 SSCI** indexed journal paper; **02 EI indexed** papers and another **02 SSCI papers** are in 2nd round of review. In addition, I have **06** other publications.

I have been to 05 countries and traveled to 35 cities in China during my 3 years stay here. It has helped me improve my understanding of life, people and technology. I have total 14+ years cumulative experience. My CV shall reveal a comprehensive career that spans over 10 years in management roles in Training, Operations management, administration, and finance functions. I am able to design and implement process improvements designed to streamline work as well as enhance performance, efficiency and quality through participative leadership.

I have also provided consultancy services to British multinational firms in Pakistan, striving towards streamlining the corporate outlook through improvement in operational efficiency and B2B process flow management with UK, Srilanka and India offices with the help of a 40 member team. Planning and implementing processes, Training Development, change management, performance measurement and corporate communication have been core activities throughout my career. I potently advocate the concept of learning, developing, training and growing; and believe it to be a life-long process through which I strive to prove and improve myself.

I now seek the opportunity to transition my qualifications into a high growth corporation in need of my teaching abilities with strong field experiences.

Hoping for your apposite consideration and to hear from you soon!

Sincerely,

Fawad Ahmed
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Fawad Ahmed

Mobile: 0092 333 5515 815; E-mail: fawadahmed1@live.com



Research Interests

Green Harmony at workplace, Inclusive Diversity, Integrated Sharing, Disruptive Innovation Adoption, Human interaction with Artificial Intelligence, 5G, Leadership role in CSR, Employee Green Behavior, CSR related to Digital Transformations, Education and Awareness of masses about Digitization.

Language Skills

Chinese (Mandarin) : HSK Level 2 (194/200) **Urdu** : Native
English : IELTS (9.0 Score) **Punjabi** : Native

Professional Qualification

PhD (Enterprise Management)	2016-2019	85.6 %	Wuhan University of Technology
Master of Philosophy (Management)	2014-2016	3.70/4.0	Preston University
MBA (Human Resource Management)	2007-2009	3.36/4.0	International Islamic University
Chartered Accountant (Foundation)	2003-2005	B Grade	Institute of Chartered Accountants
Bachelor of Commerce	2001-2003	1 st Div.	University of the Punjab

Experience

Lecturer	Wuhan University of Technology	Oct.2016 – Mar. 2019
Dy.Project Manager (Voluntary)	Little Angels Foundation Orphanage	Jan.2013 – Dec.2015
Accounts Officer (Grade 17)	Ministry of Education, Pakistan	Aug.2011 – Aug.2016
Consultant Operations & Strategy	TravelHouseUK	Aug. 2011 – Jun. 2015
Manager Operations	Expedia International	Jan. 2009 - Aug. 2011
Assistant Manager Operations	Expedia International	Jan. 2007 – Apr. 2009

Publications

1. ***AHMED, F.**, QIN, Y.J., Martinez, L., (2019) Sustainable Change Management through Employee Readiness: Decision Support System Adoption in Technology-Intensive British E-Businesses, *Sustainability (11)(11)*, doi.10.3390/su11112998 **[SSCI, 2.592 impact factor]**
2. **AHMED, F.**, Qin, Y.J., Faraz, N.A., Raza, A., Iqbal, M.K., (2019) Information Systems Adoption and Role of Institutional Support in Chinese Universities Mediated by Innovativeness and Self-Efficacy, *International Journal of Technology Management* **[SSCI, 1.16 impact factor, in 2nd Round of Review]**
3. ***AHMED F.**, QIN Y.J., ADUAMOH M. Employee Readiness for Acceptance of Decision Support Systems as a New Technology in E-Business Environments; A Proposed Research Agenda [C]. 2018 *7th International Conference on Industrial Technology and Management*. Oxford, U.K; Institute of Electrical and Electronics Engineers Inc. **[EI indexed]**
4. *QIN Y.J., **AHMED F.**, A conceptual model for impact of employee readiness for E-business on technology acceptance; *proceedings of the 2017 7th International Workshop on Computer Science and Engineering, WCSE 2017*, 2017 [C]. **[EI indexed]**

5. IQBAL, M.K., RAZA, A., **AHMED, F.**, FARAZ, N.A., Bhutta, U.S., (2019) The Influencing Mechanism of Personality Traits on Customers Online Purchase Intention: a Mediating role of Trust, *International Journal of Electronic Business* [EI] **[under review]**
6. Raza, A., Wang A., Iqbal, M.K., **AHMED, F.**, Faraz, N.A, Understanding Corporate Social Responsibility and Customer Loyalty in the Pakistani Banking Industry, *Total quality management and business excellence*, [SSCI] **[under review]**
7. **AHMED, F.**, Mughal, M. F., Razzaq, A., Warraich, S.H., Faraz, N.A., (2018) An Empirical Study on Role of Innovative Work Behavior as a Predictor of Technology Adoption in British Tourism Industry: The Management Perspective. [J] *The International Journal of Business Management*, 6 (6), p. 1-5
8. Faraz, N.A., Mughal, M.F., **AHMED F.**, Raza Ali, Iqbal, M.K., (2019), The Impact of Servant Leadership on Employees' Innovative Work Behaviour-Mediating Role of Psychological Empowerment, *International Journal of Management Science and Business Administration*, 5 (3), pp. 10-21. DOI: 10.18775/ijmsba.1849-5664-5419.2014.53.1002
9. FARAZ, N.A. , YANXIA, C., **AHMED, F.**, ESTIFO, Z.G., RAZA, A., (2018), The influence of transactional leadership on innovative work behavior-a mediation model, *European Journal of Business and Social Sciences*, 7 (1), PP. 51-62
10. Raza, A., Saeed, A., Iqbal, M.K., **AHMED, F.**, Faraz, N.A., (2018) Customer Expectations of Corporate Social Responsibility Initiatives and Customer Loyalty: A Mediating Role of Service Quality, *IOSR Journal of Business & Management*, 20 (6), P.01-08
11. Aduamoah, M., Yinghua, S., Anomah, S. & **AHMED, F.**, (2017). Riding the Waves of Technology: A Proposed Model for the Selection of Appropriate Computerized Accounting Software for Implementation in SMEs in Developing Countries, *Archives of Business Research*, 5(12), 156-179.

Conferences/Workshops

- **2019** Attended a Seminar on **Contemporary Quantitative Research** Mar 30th, 2019, **Singapore**
- **2018** Attended Workshop on **Academic Research Writing**, March 18th, 2018, **Istanbul, Turkey**
- **2018** *7th International Conference on Industrial Technology and Management*. Institute of Electrical and Electronics Engineers Inc. 7th – 9th March, 2018, **Oxford, United Kingdom**
- **2018** Workshop on **SEM with Smart-PLS-3.2.7**, January 2018, **Langkawi, Malaysia**
- **2018** *4th Innovation and Global Industrial Development Forum & International Symposium on Chinese Economy under the New Development Approach*, **Wuhan, Hubei, China**
- **2017** *5th Academic International Conference on Business, Marketing and Management*, 13th-15th November 2017, **Oxford, United Kingdom**
- **2017** *7th International Workshop on Computer Science and Engineering*, WCSE, 25th – 27th June, 2017, **Beijing, China**
- **2016** Two-Days Workshop on Research Methods & Quantitative Analysis using SPSS & AMOS

Seminars & Trainings Conducted as a Speaker

- | | |
|----------------------|--|
| April 2019 | One-Day Training on PLS-SEM with SmartPLS data analysis for PhD students in Wuhan University of Technology |
| October 2018 | Workshop on Business Communication & English Language for Chinese Students |
| May 2018 | Conducted a workshop on Research Methods for PhD students |
| December 2017 | Delivered a talk in seminar on “ What, Why, How of Communication ” for international students of Wuhan University of Technology |

Analytical Tools/Software Expertise

Smart-PLS 3.2.8	PLS-SEM (Partial Least Square–Variance based Structural Equation Modeling)
SPSS AMOS 22	CB-SEM (Covariance based structural equation modeling)
Endnote	Referencing/Citation Software

Professional Projects

Jul. 2012-Jun.2015	Poverty alleviation & Education – “Little Angels Foundation”	
	Orphanage fund management (Travelhouseuk’s CSR drive for 10 years)	
January 2012	Re-Branding, Vision, Mission, Goals	Travelhouseuk
Jul. 2011-Dec. 2011	Client Referral Rewards (CRR)	Travelhouseuk
Jan. 2010-Jul. 2010	Client Portfolio Development	Expedia International

Honors and Awards

- **PhD Scholarship** nomination through high-level examination by Government **2016**
- **Annual Awards**, TravelHouseUK **Dec. 2011**
Operational Efficiency - 10 million GBP turnover; Reduced 67% Complaints & Disputes
- **Certificate of Excellence**, Expedia International **Jan. 2010**
Designed 2 new programs encompassing operational efficiency and client retention!
- **100 % Scholarship**, International Islamic University Islamabad (IIUI) **Jan. 2007**
- **100 % Scholarship**, Punjab College of Commerce **Sep. 2003**
- **Gold Medal**, Federal Board of Intermediate & Secondary Education (FBISE) **Aug.2001**
Topped the Federal Board examination in Commerce Group (**A-LEVELS**)

Extracurricular Activities

- **President** of Pakistani Community at Wuhan University of Technology (**2017 – 2018**)
- Public Speaker/Debater with **Native** Level command over **English** Language
- Badminton ▪ Chess ▪ Travel around the World

References

Professor Qin Yuan Jian, Wuhan University of Technology, Wuhan, Hubei, China
Email : qyjhb@163.com **Mobile:** 18971066088

Professor Luis Martinez, University of Jaen, Jaen, Spain
Email : martin@ujaen.es **Wechat:** lumalo1970

Dr. Bilal, Associate Professor, School of Accounting, Hubei University of Economics, Wuhan
Email : bilal@hbue.edu.cn **Wechat:** Sharifbilal

Personal Information

Nationality: Pakistan Date of Birth: 1983-06-23 Marital Status : Married



武漢理工大學
WUHAN UNIVERSITY OF TECHNOLOGY



This is to certify that

FAWAD AHMED

a native of Pakistan, born on June 23rd, 1983

having completed the requisite courses

and fulfilled all other requirements by the full-time program of

DOCTOR Degree

from September 2016 to July 2019,

has been awarded this certificate in

Enterprise Management

given at Wuhan, China

on the Twentieth of June, in the year of 2019.

President

Wuhan University of Technology

The People's Republic of China

No. 104979201901000062

WUHAN UNIVERSITY OF TECHNOLOGY



武汉理工大学

SCHOOL OF MANAGEMENT



TRANSCRIPT OF ACADEMIC RECORD FOR DOCTOR OF PHILOSOPHY (Ph.D)

STUDENT NAME	DATE OF BIRTH	GENDER	NATIONALITY
Fawad Ahmed	1983-06-23	MALE	Pakistan

DOCTOR OF PHILOSOPHY IN ENTERPRISE MANAGEMENT				
COURSE DESCRIPTION AND GRADES				
Course Code	Course Description	Credit	Grade	Score
200701	Chinese Language	6	A	84.50
200702	International Marketing Management	3	A	96.00
200703	Technological Philosophy	3	A	90.00
200705	Introduction to China	3	B	83.00
200708	Multinational Company Financial Risk Management and Performance Evaluation	3	A	92.00
200711	Management Science	2	A	92.00
200712	Strategic Management of Technology and Innovation	2	B	80.00
200713	Optimization Theory and Methods	2	A	86.00
200714	Management Frontier	3	A	92.00
200715	Management Research Methodology	3	A	84.20
200717	Advanced Organizational Development	2	A	85.00
200718	Academic Thesis Writing	2	C	72.00
Total		34	Average Score	86.40

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Luis Martínez López
Full Professor Computer Sciences
University of Jaén
School of Computing Campus, Las Lagunillas s/n, 23071
Tfno: 0034:953-011902 // 0034636176928



June 4th, 2019

To Whom It May Concern:

Even though, I have been collaborating in research issues since May 2018, I met first time Dr. Fawad Ahmed in March 2017 during my research stay in Wuhan University of Technology as Chutian Scholar in my teaching module “Management Frontier” of the PhD program Enterprise Management. We discussed during my period there and later on by email about his research PhD proposal and his ongoing progress. He was enthusiastic to collaborate to develop high quality joint research in common research interests such as, p high quality joint research in common research interests such as, sustainability, decision support, etc.

Dr. Ahmed has developed his Bachelor of Commerce and Master of Philosophy in Management additionally to his MBA in Human Resource Management.

Dr. Ahmed has been developing his Ph.D. on the *Impact of Employee Readiness for E-Business on Intention to use Decision Support Systems* from the School of Management in Wuhan University of Technology.

His research results have been successfully published or been submitted to different indexed international journals.

From our interactions Dr. Ahmed is highly motivated and has showed his skills for research with a high curiosity and analytical thinking from the very beginning. He also showed very good communication skills facilitating the work between us. He always works precisely and efficiently with a great amount of creativity and a brilliant mind necessary to fulfill the tasks of teaching and researching.

Dr. Ahmed would be a great asset as a faculty member in your department, because his communication skills and his research in decision making suggests a great potential benefit from the opportunities for academic development provided by this teaching position.

Consequently, I would highly recommend Dr. Ahmed for the teaching position because of his skills, experience and background in research I would say that he is a perfect candidate.

The bottom left of the document features a handwritten signature in blue ink and a circular official stamp. The stamp is blue and contains the text 'UNIVERSIDAD DE JAÉN' around the top and 'DEPARTAMENTO DE INFORMÁTICA' around the bottom. In the center of the stamp is a coat of arms.

Prof. Luis Martínez López



武汉理工大学
WUHAN UNIVERSITY OF TECHNOLOGY

June 03, 2019

LETTER OF RECOMMENDATION

I am very pleased to recommend **Fawad Ahmed**. Being his **PhD Supervisor** in Wuhan University of Technology, I believe he has gained good acumen for research. From day one, Fawad impressed me with his ability to be articulate about difficult concepts and explaining difficult ideas in simple words.

Fawad collaborated with me for research work; we have **02 SSCI papers** and **02 EI papers** together. He has strong research abilities and is capable to carry independent research work with minimum supervision. He can work on any topic and area and can produce good research work and results with practical implications. He has proven that his excellent academic record and achievements are not just pieces of paper but a documentation of his capability as a keen learner.

Fawad taught undergraduate classes as my teaching assistant. He has strong teaching and presentation skills and he has conducted workshops to teach Chinese as well as international PhD students how to carry latest data analysis techniques using 'smartPLS SEM'. I strongly recommend him as I believe he can complete any demanding professional project whether it is professional field work, research, teaching or an academic program. Fawad's credentials as a student are exceptional. He also has a vast field experience with multinational firms as well as education sector. So, I have no doubt that he is an able person to meet any demanding task.

Given his portfolio as he further grows academically as well as professionally, I have no doubt that he will one day become an undisputed opinion former. I sincerely wish him unprecedented success in his future endeavors.

A handwritten signature in black ink, which appears to read 'Qin Yuan Jian'.

Qin Yuan Jian
Professor of Marketing Management
Wuhan University of Technology
Phone: 189 7106 6088
qyjhb@163.com



Reference No.SOM/L-230

May 06, 2019

TO WHOM IT MAY CONCERN

This is to certify that Mr. FAWAD AHMED has been my student in Master of Philosophy (Management) program at Preston University, during the academic session 2014-2016. As a course instructor of **Advanced Organizational Behavior**, I always found FAWAD to be strongly committed to his work. His academic record is commendable. He was proactive and intelligent student. He has strong ability to grasp, link and integrate old and new concepts and always promptly comes up with effective solutions of complex problems.

FAWAD has been in contact with me for his PhD studies and has been consulting me about his topic. He was a voracious student and keen researcher. I found him to be well read and very much informed about most of the topics that we discussed. Overall he is self-motivated, disciplined and pleasant personality.

For all the reasons stated above, along with his career aspirations, I believe that he has tremendous potential as a teacher and researcher. I strongly recommend FAWAD for a teaching position at university level.

Professor Dr. Victor Disouza-Hunt
Member of Doctoral Faculty
Preston University
Islamabad (Pakistan)
Email: victorhunt01@outlook.com

RESEARCH STATEMENT

Area of Interest : Disruptive Innovation in Information Technology, Employee Behavior and Organizational Behavior, E-Business Organizations

Research Direction : Change Management, Employee Readiness for Change, Adoption of Information Technology and Innovativeness

Future Interest : Disruptive Technologies, Human interaction with Artificial Intelligence, 5G, Leadership Roles in Technology and Innovation, CSR related to Digital Transformation in developing economies, Education and Awareness of masses about Digitization.

I have recently completed my PhD. I have a strong research aptitude with 01 SSCI indexed paper, second SSCI paper is in 2nd round of review after revisions, and 02 EI indexed papers. In addition, I have 06 other publications including CPCI indexed papers.

I have experienced and observed that Employees, as individuals, behave differently in different situations depending upon their motivations, fears and benefits. During my professional career, planning and implementing processes, Training Development, change management, performance measurement and corporate communication have been core activities throughout my career.

I have had to implement technological changes through new softwares and information systems. During the new technology's adoption process, I had observed various phenomena from Employees' Perspective. My past experiences were the motivation behind my PhD dissertation topic and research on factors that make-up employee readiness for E-Business and how they influence their technology adoption behavior.

Employee is the unit of change in an organization. Although adoption of new technologies and training employees at workplace for their usage is a challenging task for pursuit of improved systems. A much more overwhelming job is to introduce such new systems to users for acceptance. The reason being that it could result in changes in job design and could restructure the workers duties and work environment in a multitude of ways

I studied the Decision support systems (DSS) as the technology under focus in e-businesses in particular and Information systems in general. These, unlike the personal use technologies, are primarily utilized in work-settings for performance of job tasks. Assessing the DSS adoption and

its use, this study makes a contribution to technology acceptance model literature by empirically showing that adoption and continued usage of group-based technologies in E-Business work-settings is subject to prior employee readiness. This is determined by individual employee's perceptions about the four dimensions i.e. Benefits, Collaboration, Certainty and Security stemming from existing organizational culture regarding preparedness of employees.

Although technology has been discussed in literature with ample evidence through proven studies, the evaluated phenomenon on most occasions tends to be the overall ability of the organizational adaptive capability, the customer's readiness for a particular technology or the supplier's integration with the system between buyer and supplier from a supply chain point of view. However, there is no substantive research available on employee readiness for E-business in conjunction with technology acceptance for a decision support system.

More specifically, technology acceptance research is comparatively much less focused on employee as the unit of analysis. This study uses the construct of "employee readiness for e-business" (EREB) proposed by Lai & Ong (2010) developed as a multiple-item measurement scale in order to assess level of employee readiness for e-business tasks while purely focusing on the employee's perspective as the user of technology. Thus, this study adds to the knowledge-base on the subject of e-business and technology acceptance model from the employees' perspective in addition to the organizational change perspective. It will be useful to researchers and practitioners interested in designing, implementing, and managing e-business technologies.

For Example, Alibaba purchased Daraz, Pakistan fastest booming ecommerce website, in May 2018. This will bring boom to e-business and employees in such firms will need to be trained and ready for adoption of new technology. New software applications and technologies like MIS, ERP and DSS are now becoming commonly introduced at workplace. So it is important to understand factors that affect the employee's behaviour regarding technology adoption. This is how my doctoral research added value to existing research:

I. First important aspect of this research was exploring the relationship between 4 dimensions of **EREB** i.e. Benefits, Collaboration and Certainty and Security, and **TAM** model's Perceived Usefulness and Perceived Ease of Use leading onto Intention to Use; which was an untouched area in the literature. It is exigent, because employees could be induced to adopt new technologies by promoting the effectiveness and benefits of new technologies through enhanced EREB. The results showed that three constituent factors of Employee Readiness for

E-Business have positive effects on the perceived usefulness and perceived ease of use for Decision Support Systems use.

II.a) New Theoretical perspective of Employee Behavior in Technology adoption instead of

Consumer Behavior: It is a theoretical contribution of this research because it uses TAM model to study user behavior from employee's perspective to adopt a new technology. Past literature shows studies from consumer behavior and student behavior and some studies show teacher's behavior. But no study shows behavior of employees of organizations such as E-business firms. This study focuses on employee as a unit of analysis for technology adoption, instead of past literature which focuses on consumer as a unit of analysis for technology adoption for E-business firms. The respondents of this study are individual employees working in firms engaged in e-business, instead of the consumers and in the organization level adoption of technology.

b) Mandatory Use of Technology VS. Choice of Use: It is mandatory for individual users who do not have a choice to NOT adopt the technology; instead they have to comply with company-wide regulations. So, this aspect makes it a certain factor that it will affect the job security of employees.

c) Methodological contribution of this study is that known that the characteristic of **sample** (respondents) is **experienced and expert in technology use** and works in a **technology-intensive** organization. This is different from past studies where mixed respondents have been used.; either past studies do not bifurcate between experienced or non-experienced users or it is not known in majority of studies whether the sample is made of respondents who are adept in use of technology and work in a technology-intensive environment.

III. Mediating Role of Self Efficacy: There is no study in past that uses Self-Efficacy as a mediator between Institutional Support and Perceived Ease of Use. From theoretical point of view, this is an innovative point of this research that it explores mediating role of Self Efficacy between Institutional Support and Perceived Ease of Use. Although Self Efficacy has been studied in past literature only as an independent variable affecting PEU and as a moderator between some variables and PEU, however, this is the first study to examine mediating role of SE.

Looking ahead, technology inadvertently continues to become a part and parcel of modern day lives. From routine daily tasks to complex manufacturing processes, human lives have become dependant on assistive technologies. However, as technology grows, it brings about the fear amongst the masses that it will replace humans, replace jobs and some even fear human extinction by robots in future, as seen in sci-fi movies.

Scholars argue, and rightly so in my opinion, that future jobs will not be taken over, rather be transformed by technology. The masses will need to be educated in technology and not just theory. A technology-literate person would never be unemployed. Digital transformation occurs every day more for every aspect of human interaction, however, masses are not yet literate in technology and most underdeveloped countries are not ready for this leap because the masses are unaware of the benefits it brings about.

So this brings us to the task of finding solutions and planning implementation of those solutions for the better understanding, awareness and education of the masses. It is human nature to fear the unknown. Going forward, I wish to study the phenomena related to sustainable practices for general public's welfare perspective in this technological and innovative world of digital transformation. The human interaction with disruptive technologies (breakthrough innovation) is a very relevant area of research in modern times.

I would like to take up challenges in research from technology, Innovation, education and CSR perspectives focusing on the public welfare aspects. I wish to take part in research that helps identify factors that inhibit or facilitate sustainable technological and digital changes in underdeveloped or developing countries. How can institutions in a society play their CSR roles as enablers. Find solutions and pathways to implementation of those solutions to bring about a stream of awareness and education by identifying and removing hurdles while designing solutions for the individual in any society. In order to help individuals be ready for such changes and enable self-sustainment, each developing country needs to be researched uniquely to bring about technically correct, institutionally practical, socially adaptable and, most importantly, sustainable solutions.

TEACHING STATEMENT

I have had the most inspiring teachers in my high school and college lives. They inspired me to be a better person and taught me there are many ways to give back to the community you live in. This is why I have been engaged with Chinese students to help them learn and improve their English language and communication skills as a volunteer.

Several of my classmates were average students like me until high school, and then they unleashed their potential to become high-achievers in college, only because of the influential teaching faculty. I became a Gold Medalist in College; I have the bragging right to claiming that I have never had to pay tuition fee ever since I passed high school, because I went through college studies on merit scholarships; then with full tuition scholarship during undergraduate studies from University of the Punjab, and later obtained MBA on a full scholarship from International Islamic University, Islamabad.

I enjoy teaching and training others. In China, I have taught subjects of Strategic Management, Marketing Management, Human resource Management and Research Methods at Wuhan University of Technology. I have also tutored students for their research projects.

I have observed that passing on the knowledge helps you gain more, refine existing knowledge and improves chances of collaboration with the right people. Educational qualification creates credibility. People perceive and process your opinion on a more serious note when they know that you are highly qualified and your education level gives weight to your opinion. This notion also boosts ones confidence and inculcates the ability to critically evaluate ideas/situations and most of all, to take criticism on oneself and learn how to agree to disagree.

I have worked in administration, finance, sales and operations while working in my roles as Accounts officer, Assistant Manager and Manager Operations. I have trained staff and helped them develop their skills over time. Along the way, I have also developed an interest in teaching as I find it a fulfilling job. Therefore, I decided to take up a Ph.D in Enterprise Management. Before that, I did my Master of Philosophy in Management and obtained an MBA degree earlier.

I believe this course filled the holes and helped me improve and harness my strategic planning abilities along with Research and pursue my goal of becoming a University Professor someday.

Teaching students while possessing a long professional field experience helps me better understand the concepts and ideas that need to be conveyed in classes I may teach in future. Relating theory with practical and real life examples from my work experiences in order to help students understand the concepts that have not experienced yet. It would help me being a faculty member at a university (which is my main objective after PhD) in making a positive impact and shall enable me impart quality education with the combination of practical experience and skills I gained during my long career and higher education/academic knowledge which I have attained during PhD and relevant research work.



武汉理工大学

WUHAN UNIVERSITY OF TECHNOLOGY

May 31, 2019

TEACHING EXPERIENCE CERTIFICATE

This is to certify that **Mr. Fawad Ahmed** has taught "Strategic Management" course to undergraduate students at Wuhan University of Technology in **spring 2018**.

His major responsibilities included preparing and delivering lecturer to the students; design, and present power point presentations to the students; deliver the practical demonstrations to the students regarding assessment, evaluation; conduct and assess the regular class tests and case study presentations; help internal assessment by compiling results of the class for final exams.

Fawad has also conducted training workshop on data analysis techniques of **PLS-SEM** using **SmartPLS** software for the Chinese and International PhD students during **spring 2019** session.

A handwritten signature in black ink, which appears to read 'Qin Yuan Jian' in Chinese characters.

Professor Qin Yuan Jian
School of Management
Wuhan University of Technology
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qyjhb@163.com



武汉理工大学

WUHAN UNIVERSITY OF TECHNOLOGY

国际教育学院
School of International Education

122 Mail Box
205 Luoshi Road, Wuchang
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EXPERIENCE CERTIFICATE

May , 2019

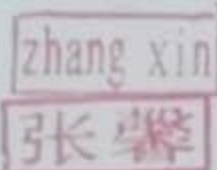
To Whom It May Concern

This is to certify that **Dr. Fawad Ahmed** S/O Mr. Riaz Ahmed has worked as a Teacher at School of International Education, Shensheng campus, Wuhan University of Technology from **October 2016 to March, 2019.**

He has been instrumental in developing the course of "Research Methods" for undergraduate students. He has tutored students from several batches in subjects of Marketing Management, Human Resource Management and E-Commerce. During his tenure with us, his students looked up to him not just as a lecturer, but also as a mentor and career counselor. Many of his students went on to study in United Kingdom due to their polished research work with Fawad's help.

To sum up, Fawad is a committed individual and enjoys his passion of teaching. We wish him best of luck for his future endeavors. Should you require any further information, please feel free to contact me

Zhang Xin



Professor Zhang Xin

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Article

Sustainable Change Management through Employee Readiness: Decision Support System Adoption in Technology-Intensive British E-Businesses

Fawad Ahmed ^{1,*}, Yuan Jian Qin ² and Luis Martínez ³^{1,2} School of Management, Wuhan University of Technology, Wuhan, 430070, China; qyjhb@163.com³ Department of Computer Sciences, University of Jaen, Jaen, 23071, Spain; martin@ujaen.edu.es

* Correspondence: fawadahmed1@live.com

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Abstract: Technology brings green sustainable management practices to the workplace. It is important to ascertain the factors that enable or inhibit employees' perceptions towards technology adoption. Corporate sustainability and sustainable management practices partially depend on employees for the successful implementation of technological changes in the workplace. This study aims at applying the technology acceptance model (TAM) from an employees' user-perspective. It addresses those factors that form employee readiness for e-business and enable their intention to use e-business technologies such as decision support systems (DSS). It focuses on technology intensive firms while combining Davis' technology acceptance model and Lai and Ong's employee readiness for e-business (EREB) model. A survey questionnaire was used to collect the data for this cross-sectional study from 331 employees of 28 well-established small and medium-sized e-businesses located in the United Kingdom. The outcomes show that the four dimensions of EREB explain the 58.2% of variance in perceived ease of use and the 50.2% of variance in perceived usefulness. Together, perceived usefulness and perceived ease of use explain the 51.8% of variance in intention to use while fully mediating the relationship between higher order EREB construct and intention to use DSS.

Keywords: employee readiness for e-business; decision support systems; TAM; perceived usefulness; intention to use

1. Introduction

Decision support systems (DSS) form part of the Internet of Things (IoT). IoT refers to a wide range of platforms, devices and technologies which are linked together on the world wide web (WWW); including varying communication patterns in different networks [1]. The idea of IoT is based on the interaction between a vast array of smart things or objects including, but not limited to, mobile phones, sensors, radio frequency identification (RFID) tags, actuators etc., in order to reach common goals via distinctive addressing schemes [2]. Therefore, DSS are essentially a part of IoT.

It was forecasted that IoT devices will be the largest category of connected devices in 2018 with 16 billion units [3]. The Internet is the infrastructure for IoT and WWW is the application that permits access to this infrastructure. DSS is one of the things in the IoT that operates through internal networks, analyzes data to generate reports, and communicates through the intranet as well as the Internet. IoT has numerous field applications, from tracking energy consumption to connecting software applications that optimize the traffic routes, enhancing fuel efficiency by reducing traffic jams [4] and extending assistance in biological studies [5].

E-business and the Internet of things (IoT) have enabled businesses to bring innovation to their processes. Schumpeter [6] defined an innovation as "something that reduces costs and increases quality and performance". So, adopting Internet based platforms and electronic commerce is

primarily an innovative step for any organization. Firms have fallen victim to technological change, sometimes due to a paradigm shift. Kodak is one such example of failure during the transition period to digital cameras and related technologies. Moreover, numerous studies have tried to determine the factors influencing the acceptance of a new technology. The contexts of these studies range from customer's perspective, industry outlook to organizational context. However, employees' perspectives are somewhat lacking when it comes to academic research and literature with respect to technology acceptance at individual level.

Adopting modern technology is a matter of survival for e-business firms due to its impact on sustainable business development. Innovation in the workplace is vastly technology-driven in modern business models and depends on information systems [7]. Sustainability of a business model depends on its ability to adapt and to be flexible towards change, especially technological change in the current business environment. Sustainable management practices, during the continuous technological evolution in the workplace, are dependent on the core change agent i.e., employee behavior in response to such changes [8,9]. This rapid change in technological environment requires continuous change management practices in the workplace ensuring that employees are ready for the challenges in future [10]. E-business information systems have huge potential to bring sustainable business development [7]. Corporate sustainability is, in part, dependent on employees' collative use of new and evolving technologies [11]. Therefore, it is important to ascertain and research such factors that enable or inhibit employee perceptions about new technologies. Employee behavior is a key factor in enabling profitable and sustainable management practices. This study aims to contribute to this effect by studying factors that cause or inhibit employee readiness in order to enable better management of human capital, and to ensure sustainable corporate practices.

Existing literature focuses on understanding the reasons behind adoption and usage of technologies, which inherently means a paperless office. Moreover the literature is mostly aimed towards sustainable business practices as part of corporate social responsibility (CSR) commitments [11]. Firms operating in competitive industries must concentrate on managing sustainable human capital proactively through methods other than conservative techniques for a positive impact on innovation capability.

Sustainable management practices require a focus on employees from a holistic point of view. Employees create relational wealth through partnerships with their employers built over time. There must be coordination and motivation among employees at operational as well as strategic levels to ensure that corporate sustainability goals are achieved. Management must make use of employee capabilities in order to be able to work towards the shared vision of corporate sustainability [12].

Bigi, Hamon-Cholet and Lanfranchi [13] studied information and communication technology (ICT) from the perspective of human sustainability during computerization in the workplace as well as from a management practice viewpoint related to organizational change. They found out that the human sustainability of ICT and management changes depends on whether or not institutional context is taken into account during the implementation phase for new technologies. Thus, an employee's role becomes vital in the institutional context.

This study mainly focuses on determinants of employee behavior towards technology use in e-business environments. The focus is narrowed down to DSS as the technology in question. DSS is, in essence, an application or software linked with one or more types of information systems. Moja, Passardi, Capobussi, Banzi, Ruggiero, Kwag, Liberati, Mangia, Kunnamo, Cinquini, Vespignani, Colamartini, Di Iorio, Massa, Gonzalez-Lorenzo, Bertizzolo, Nyberg, Grimshaw, Bonovas and Nanni [14] studied computer-based DSS linked to the health record systems of patients. Masum, Beh, Azad and Hoque [10] studied how human resource information systems (HRIS), when combined with knowledge discovery in database (KDD), perform the functions of DSS for structured, semi-structured and unstructured decisions related to human resources (HR). Thus, DSS may combine one or more features or software applications such as the web-based information system (WBIS), sales management information system (SMIS), customer relationship management system (CRMS), travel industry-specific global distribution systems (GDS), supply chain management (SCM) systems and online/e-payment systems integrated with each other. Such information systems

may have varying levels of access to personnel as determined by the hierarchical levels. The ultimate purpose of these technologies is to help staff and managers make informed and accurate decisions about sustainable technological changes.

In the midst of this fast-paced change in technology, Big Data applications and collaboration initiatives between businesses, it is imperative for e-business managers to be skilled in acquiring information on market needs; analyzing such information systematically and making use of it in the development of novel goods and services [15]. It is also crucial that managers bring employees onboard by ensuring an infrastructure that keeps employees and the workforce up-to-date with technological use. This is where the decision support systems play a vital role as an assistive technology. The sustainability of all such initiatives still relies heavily on employee behavior and competitiveness for reporting and decision-making.

Although this study's respondents are employees, the hypotheses and conceptualization do not argue for a difference in outcomes for the core technology acceptance model (TAM). This study emphasizes employees as the users of technology; the difference between the employee and customer is that of the environment and the "choice". An employee does not have a choice, but a customer does. Therefore, the factor-independent variables in this study are such factors that relate to workplace and job-related issues. It is pertinent to mention that the individual users are inherently the same human beings; the only difference is the environment i.e., the workplace for employees as compared to the marketplace for customers. Table 1 shows how the management of an organization sees the customers and employees differently.

Table 1. Difference between employees and customers as users of technology.

Employees	Customers
Employees are a resource (input) for the organizations	Customers are a source of revenue (part of output)
Employees do not have a choice to adopt or not to adopt a new technology in the workplace	Customers may choose not to adopt a new technology
Employee's perceptions about a technology's usefulness relate to career growth and rewards associated with it	Customers' perceived usefulness is related to utility and optimizing satisfaction from the use of a new technology

Sources: [8,9,16–26].

Although in recent years there has been a plethora of studies on technology readiness and technology acceptance from the consumer's perspective, industrial context, or in the organizational adoption as a whole [5,10,14,27–37], there is scarcity of research from an employee's perspective as the unit of analysis for readiness and technology acceptance [11,36,38–42] in e-business environments. Moreover, no studies of such nature are found for technology intensive environments.

Therefore, the objectives of this research are threefold:

The study of employee's behavioral intention to use DSS through TAM.

To analyze whether the four reflective dimensions of employee readiness for e-business (EREB) i.e., Benefits, Security, Collaboration and Certainty in an e-business environment, have an impact on perceived usefulness and ease of use for DSS.

To establish that the TAM model holds true for the employees as a user of high-end technologies under 'mandatory' technology use settings; as opposed to majority of past research which focuses on customers as users who have a choice to not use a given technology.

These objectives will provide an overall perspective on the managerial implications towards the identification of the role of these four dimensions in establishing positive behavioral intention to use DSS among employees for the successful roll out of new technologies in the work place. It shall support the management in proposing such measures that may help in the supervision of the four dimensions of EREB through appropriate managerial actions in order to successfully implement DSS. This study contributes in several ways. First, it combines and analyzes the relationship between

two models i.e., EREB and TAM. Second, this study examines the behavior of employees as users and the relationship with perceptions of ease and usefulness. Third, it studies the resistance caused by employee concerns about job security, which may inhibit intention to use technologies such as DSS. Fourth, it shall contribute to existing literature by adding to the knowledgebase on the relationship of the constituent factors of employee readiness for e-business i.e., Benefits, Security, Certainty and Collaboration, with the perceived usefulness and perceived ease of use for DSS, which does not exist yet. Fifth, the individual user sample in our case is predominantly skilled in technology use and innovative to a certain extent because they are in technology-intensive environments where they would not be hired and employed unless and until they are considered technologically savvy; this is not the case in the majority of past studies in extant literature where users are rarely known to be technology-savvy and are not targeted from within a technology-intensive population.

Although it can be argued that employees or customers are both in fact individuals and the expected behavioral outcomes could be similar, this study is carried out in organizations where employees must use new technology in their general tasks; whereas customers are not bound to use technologies whenever they are introduced to them by an organization, they can choose to use them or not.

The remainder of the paper is structured as follows. Section 2 discusses the relevant concepts from the existing literature related to DSS, TAM, employee readiness for e-business, and change readiness. Section 3 explains the hypotheses, methodology and measures used in this study to analyze the data. Section 4 constitutes discussion on the measurement model, structural model and mediation results along with the model strength and quality. Section 5 elaborates the application and implications of the results of our study and presents relevant suggestions for managers and practitioners. Section 6 provides concluding remarks with limitations of this research and proposed future research.

2. Literature Review

Here, we will review concepts, technologies and models that should be presented to understand the underlying proposal of this paper.

2.1. Decision Support Systems (DSS)

Decision support systems are information technology-based software applications that present employees with specific, action-able suggestions or intelligently sifted management alternatives to help make suitable decisions [14]. With advances in technology, DSS are also evolving day by day. Sprague [43] was the first to properly define the term DSS; it aims to deal with less well-structured and underspecified problems faced by top-management. DSS try to carry out a combined usage of models or analytic techniques. They offer conventional functions for data access and retrieval. More specifically, DSS focus on such features that enable ease of use for less technology-conversant people in an interactive way. In addition, DSS are more flexible and adaptable to change.

Holsapple and Whinston [44] classified DSS into six main types of frameworks: text-oriented, database-oriented DSS, spreadsheet-oriented DSS, solver-oriented, rule-oriented, and compound DSS. A compound DSS is currently the most commonly used classification in organizations with a hybrid system that combines two or more of the five basic structures [45].

Burstein and Holsapple [46] identified DSSs that perform selected cognitive decision-making functions and are based on artificial intelligence (AI) which they called intelligent decision support systems (IDSS). IDSS are capable of making pre-programmed decisions in pre-defined situations, such as Supply chain management; medical diagnostic systems; expert systems for scheduling operations in manufacturing firms; agricultural productions system; fraud detection and mitigating transaction delays and web-based advisory systems, which are all based on intelligent systems [45]. Such IDSS are beyond the scope of this research as they are based on samples from firms utilizing compound DSS at an individual level in daily computerized environments to make decisions based on a given set of data, reports and options generated by DSS.

2.2. E-Business Technologies and the Internet of Things (IoT)

A growing integral issue in all technology intensive organizations is to effectively incorporate network and distributed information technology to integrate resources among organizations, vendors, employees, and suppliers. Lucas H, Goh J.[47] argues that information technology can create new digitally consumed products and related services and thus possesses the power to influence transformation across industries. Organizations are thus implementing electronic business (e-business) technologies and interfaces at an accelerating pace. However, over time even those firms that are considered e-businesses have to upgrade existing technology or introduce new technology every few years. This fuels speculation about the level of employee readiness to embrace this new type of firm that has to face frequent organizational changes stemming from technological advances.

A wide range of studies have been conducted to explore issues with respect to the readiness of organizations towards adoption of e-business, and useful managerial implications and solutions have been devised. However, they either lack solid theoretical frameworks or mostly focus on technology adoption from a customer perspective, organizational perspective or geographical viewpoint [41,42,48–57], as compared to a few studies which focus on employee readiness for e-technologies at an individual level [8,41,48,58,59].

2.3. Evolution of Technology Acceptance Model (TAM)

The technology acceptance model (TAM) is the culmination of the underlying concepts of the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). Fishbein and Ajzen [60] developed the TRA which has proven to be one of the most frequently used models to study intention and is deemed suitable “to explain virtually any human behavior”[61]. The theory states that a specific behavior’s actual execution is preceded by an individual’s behavioral intention. Although it originated in social psychology, the generic nature of this model has made it successfully applicable to a diverse range of varying domains[62]. This intention is formed by constructs referred to as attitude and subjective norm. Attitude is “an individual’s positive or negative feelings (evaluative affect) about performing the target behavior”[60]. TRA had a limitation that it did not consider the underlying possibility of unavailability of resources or simply the lack of opportunity for the individuals to perform an intended behavior. Keeping in mind that only the intention may prove insufficient as a predictor of individual action, reference [61] TRA further developed into TPB. The notion that “behavioral achievement depends jointly on motivation (intention) and ability (behavioral control)” was propagated [60].

TAM caters for the individual’s perceptions from both ease of use i.e., perceived behavioral control, as well as perceived usefulness. TAM has four key variables, two of which are adopted from TRA and TPB; perceived usefulness (PU), perceived ease of use (PEU), attitude towards use (ATU) and behavioral intention to use (IU).

2.4. Employee Readiness for E-Business (EREB) Model–Predicting Employee Perceptions

The focus of this study is on the level of an employee’s readiness for e-business (EREB) as the predictor of employee perceptions of ease and usefulness of DSS leading to intention to use; it includes four dimensions i.e., Benefits, Collaboration, Security and Certainty [18].

Benefits (B): this dimension states that employees believe that benefits of e-business would include better productivity and improved efficiency. It would be helpful for them at work; employees always utilize functions provided by e-business and it enables them to be more competitive in their jobs.

Security (S) refers to the state of mind of an employee regarding job security. The employee does not worry about losing the job, changing the job, losing their influence or losing their power in the work environment.

Collaboration (C) is the readiness of employees “for interaction with each other, knowledge-sharing, working with their peers in a team and provide advice and extend a helping hand to co-workers in using e-business technologies” [18].

Certainty (T) refers to the clarity in employees’ minds regarding the purposes of e-business and the function of technologies involved in electronic business activities. Moreover, the employee believes that their organization has the capacity for the successful implementation of e-business technologies. In other words, certainty here refers to the ‘trust’ employees have in the management.

3. Material and Methods

3.1. Hypotheses and Research Model

Integrating the literature and hypotheses described below, the research model given in Figure 1 is adapted from [18] and [62]—a slight modification from the originally proposed conceptual model by [63] wherein “actual use” has been replaced by “intention to use” because the extant literature shows intention is always a precursor of actual use [64–66].

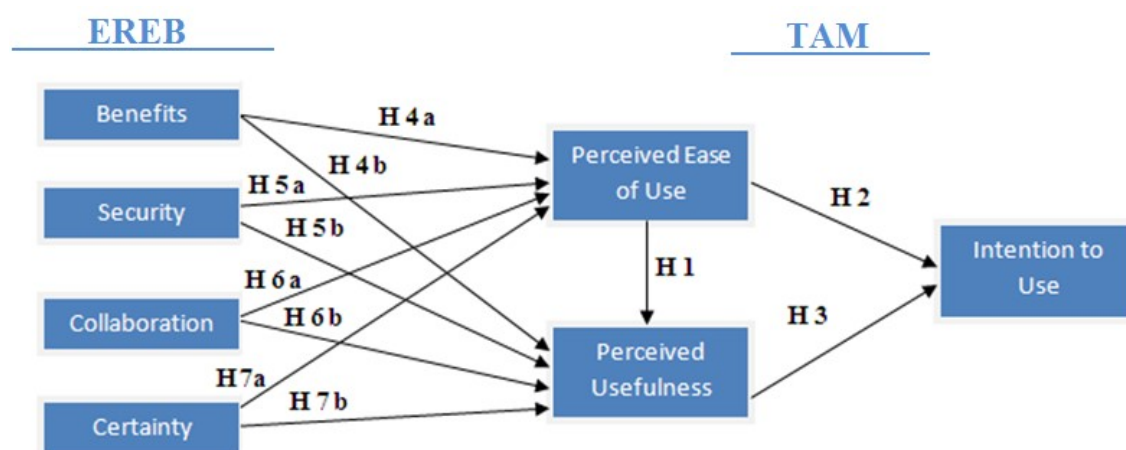


Figure 1. Conceptual model.

3.1.1. Perceived Usefulness (PU), Ease of Use (PEU) and Intention to Use (IU)

PU is an individual’s prejudiced likelihood of usage of any given new technology subject to their belief of whether the technology in question shall lead to them improving their performance at work. So, in an organizational setting, PU is the likelihood of incremental productive capacity expected to result from the use of a new technology. PEU, as the construct’s name indicates, is the degree of ease of using a particular technology, whether it is free of effort or if a minimal effort is required to use the target technology. The lesser the effort required, the higher the perceived ease of use. PEU is simply the potential user’s anticipation of the new technology being free of effort in usage [67].

TAM has stood the test of time for user acceptance prediction. It stands out as a vigorous as well as the Parsimonious model, especially in information system studies [68]. The findings of TAM have been upheld time and again by a large number of researchers through varying experiments, applications, validations and replications [67].

The primary narrative of TAM is that an individual’s internal convictions, with respect to ease of use and usefulness of any given technology, are the deciding factors in actual usage. PU has been studied as a potential customer’s subjective opinion about the utility of a specific technology, which in turn possibly leads to fulfill individual objectives [62]. PEU is included as an exogenous variable which has an indirect affect on attitude towards use or intention to use via PU, which has proven in numerous studies to have a direct affect on attitude and is a direct determinant of continued information systems IS usage intentions [49,69]. This study hypothesizes a significant path from PEU

to PU and from PEU to IU. Intention to use a DSS is modeled as a resulting construct predicted by PU and PEU.

Social science research as well as information system research has uncritically affirmed that intention to use technology always leads to actual use [64–66]. It has been well-established that intention is the predictor of behavior [70]. Similarly [61] states “intention is the immediate determinant of behavior”. Therefore, we shall also use IU as signifier of actual use. Thus, the following hypotheses are proposed:

Hypothesis 1 (H1). Perceived ease of use (PEU) of DSS will be positively related to its perceived usefulness (PU).

Hypothesis 2 (H2). Perceived ease of use (PEU) of DSS will be positively related to intention to use (IU).

Hypothesis 3 (H3). Perceived usefulness (PU) of DSS will be positively related to intention to use (IU) it.

3.1.2. Benefits

Benefits here means all such positive outcomes that an employee could perceive to result from the use of any given technology. It includes employee's beliefs that e-business and related technologies can lead to improvements in productivity, efficiency, speed, and an overall ease in their daily job performance. The employees positively consider the utility of the functions of e-business and related technologies and this positive belief enables them more competitive in their jobs [18], thus creating self-efficacy. Prior research on technology and information systems has proven a positive relationship between self-efficacy and PEU [67]. Benefits of e-business and DSS are the motivating factors for employees, similar to that which has been established in expectancy theory [71]. The supposition of association of behavior with a certain anticipated outcome is the point of focus. Employees may have an expectation of certain benefits if they adopt and use DSS.

Atkin, Chaudhry, Chaudry, Khandelwal and Verhoogen [72] invented a new cutting edge technology that reduces waste of the primary raw material and gives the technology a random subset of producers. Despite the clear net benefits for nearly all firms, after 15 months the rate of take-up remained puzzlingly low. They hypothesized that an important reason for the lack of adoption is a misalignment of incentives within firms. The key employees (cutters and printers) are typically paid piece rates, with no incentive to reduce waste, and the new technology slows them down, at least initially. Fearing reductions in their effective wage, employees resist adoption because it reduces their benefits.

Benefits could either be extrinsic or intrinsic. Extrinsic motivation involves a perceived contingency between specific behaviours and desirable consequences such as tangible incentives [39]. Whereas Kuvaas, Buch, Weibel, Dysvik and Nerstad [73] elaborate that apart from the aim to enhance performance, the role played by intrinsic motivation in energizing a variety of productive behaviours cannot be ignored. This affects both the emotions as well as attitudes resulting in the reward of the experience of autonomy and also proves a causal effect in successful implementation.

Expectancy theory [71] is a suitable approach to understand human motivation. It focuses more on outward behavior than on internal needs, on the assumption that individual behavior is associated with certain outcomes. People may expect that if they accomplish certain tasks, they will receive certain benefits. It has been found that intrinsic motivation has positive associations with optimism [73]. Employees' perceived usefulness and perceived ease of use are factors that are affected by the expected benefits or loss of benefits brought by new technologies. Thus, it is expected that the higher perceived benefits of using DSS facilitates employees' PEU as well as PU:

Hypothesis 4a (H4a). Benefits of DSS will be positively related to its perceived ease of use (PEU).

Hypothesis 4b (H4b). Benefits of DSS will be positively related to its perceived usefulness (PU).

3.1.3. Security

Security refers to the state of mind of an employee regarding job security, whether they worry about losing their job, changing their job or even losing influence or power in their work environment [18]. It also includes their emotions and their mental states such as fear, apprehension and frustration. Anxiety related to computing work has been found in technology research to impose a significant negative effect on PEU [67]. It is only natural for some individuals to present a negative affective reaction towards an advanced and modern decision support system, which in turn shall likely exert an untoward influence on the perceived usefulness and ease of use of the system.

Job insecurity is negatively related to work-related outcomes [74]. Technology adoption and employee perceptions of ease and usefulness are job-related outcomes. On the other hand, positive dispositions towards their job would help employees build suitable expectations with the new system and they shall consequently use the system for a greater duration of time, with higher intensity, and more frequently [75]. Nam [76] studied employee attitudes to technology adoption and found that their current perceptions about job insecurity are strongly related to use of technology. It has been observed that job insecurity is also associated with organizational changes, role ambiguity and the receipt of information about organizational issues [77]. Technology brings change and thus it is associated with job security amongst employees.

Previous studies have shown that job insecurity leads to a withdrawal response and has a detrimental effect on employees' job performance and affective commitment [78–82]. Better security and stability assists employees to perceive the implementation of a new system as a change that improves productivity, leading to a positive set of expectations from the system and a positive attitude toward the system [75].

In this study, Security is adopted as part of the EREB model by [18] and it refers to employees' concerns about the possibility of losing their job or the change of a job role or of loss of influence or power at the work place [83], which includes frustration, apprehension and fear. Thus, the following is expected:

Hypothesis 5a (H5a). Security concerns of using a DSS will have a negative effect on perceived ease of use (PEU).

Hypothesis 5b (H5b) Security concerns of using a DSS will have a negative effect on perceived usefulness (PU).

3.1.4. Collaboration

Lai, Kan and Ulhas [9] argue that user participation not only improves communication and enables better utilization of information but also enhances the job skills and understanding of employees. The benefits of participation are attributed to greater trust, greater feelings of control, greater identification with the organization, and higher goals. Eventually, it enhances trust and contributes to a sense of ownership and control, improving system acceptance and commitment. Upon motivation and active participation, employees reduce resistance to change and enhance acceptance of and commitment to decisions and changes [84,85]. The more the employees participate in e-business activities, the more organizational e-business readiness there would be.

"User participation not only improves communication and enables better utilization of information but also enhances the job skills and understanding of employees" [9]. The relationship between collaboration and use of e-business technology has already been proven from an intra-organizational perspective [86]. Collaboration in technology adoption research has been studied as a construct revolving around the social influence and subjective norms aspects of technology use [70].

Previous findings suggest a close association between the technical characteristics of collaborative technologies and their implementation, adoption and assimilation in organizations [41]. Once collaborative technologies are in place, researchers address the human factors in terms of individual trust, cognition and attitude involved in computer-mediated communication from the user perspective [87]. Various psychological constructs and frameworks are employed to study technology-enabled collaboration in different settings, such as semi-virtual collaboration and hybrid

team collaboration [84]. The emergence of geographic information systems (GIS) and related corporate operations (e.g., green supply chains), however, poses new challenges for the research of IT-enabled collaboration. An exploratory case study suggests that organizations need to integrate IT resources, employee effort and supply chain for the development of sustainability capabilities [88].

Technology adoption is not a one-man job. It takes the whole workforce to join hands in order to implement new initiatives. Where technology use during daily job tasks is a primary concern, it is even more important for organizations to have a workforce that collaborates for quick learning and adoption [11,86,89]. As observed by Agarwal and Karahanna [90], in any given technology's usage, frequency and acceptance can be improved during the initial mandatory usage stage of its launch in the workplace settings. This is only possible through employee participation and collaboration which eventually "enhances trust and contributes to a sense of ownership and control, improving system acceptance and commitment" [9]. Therefore, the following is proposed:

Hypothesis 6a (H6a). Collaboration has a positive relationship with perceived ease of use (PEU) of DSS.

Hypothesis 6b (H6b). Collaboration has a positive relationship with perceived usefulness (PU) of DSS.

3.1.5. Certainty

When the management provides support to individuals in the workplace, such as training sessions, guidance and counseling, it can enhance their ability to use any new technology depending on the level and extent of such support [89,91–94]. Thus, certain situational factors, such as institutional support, can prove significant in determining an employee's attitude and certainty toward the systems. Employees will feel more certain if the level of such support by management is increased, thus resulting in perceived certainty of the implementation of technology in an employee's mind, and enhancing the system PEU and PU [95].

Abdinnour-Helm, Lengnick-Hall and Lengnick-Hall [96] showed that allowing users sufficient discussion can reduce uncertainty and increase trust when implementing an enterprise resource planning (ERP) system, thereby enhancing organizational readiness. The more fears and concerns employees have, the less prepared they are to embrace e-business, implying that trust can lead to e-business readiness.

Certainty and trust are supposed to contribute to employees' perceived e-business benefits due to the reduced time and effort necessary for job tasks, as e-business can provide applications that enable employees to concentrate on more value-added job tasks, rather than double-checking errors on reports; or verifying the correctness of sales and purchase orders; worrying about the security and confidentiality of data and being concerned about system crashes [9,97,98].

Phong, Hui and Son [99] conducted research involving 368 employees as respondents from 63 Chinese firms and the results showed that employee's trust in leaders is related to participative behavior. Thus, if the employees trust their employer, they will perceive new technology to be useful as well as easy to use.

Hypothesis 7a (H7a). Certainty for using a DSS will have a positive relationship with its perceived ease of use (PEU).

Hypothesis 7b (H7b). Certainty for using a DSS will have a positive relationship with its perceived usefulness (PU).

3.2. Methodology

As of December 2017, 5687 (99%) of businesses in the United Kingdom were micro, small or medium-sized businesses (0–249 employees) and account for 60% of the total employed workforce. Out of these, 5445 (95%) of businesses employed less than 10 people, these are called micro-sized businesses; 242 (5%) of businesses employed 10 to 249 employees and these are called small and medium-sized enterprises and account for 27% of the UKs employed workforce [100].

Table 2.Demographics and descriptive statistics.

	Freq.	%Age
Gender		
Male	204	61.63%
Female	127	38.37%
Age (Years)		
20–29	37	11.18%
30–39	175	52.87%
40–49	95	28.70%
50–59	19	5.74%
60 & above	5	1.51%
Experience (Years)		
01 to 02	67	20.24%
03 to 05	151	45.62%
06 to 08	63	19.03%
09 to 10	19	5.74%
More than 10	31	9.37%
Education		
High School	44	13.29%
Bachelor Degree	179	54.08%
Master Degree	108	32.63%
Designation		
CEO/G.M/M.D	6	1.8%
Manager	23	6.9%
Assistant Manager	49	14.8%
Senior Officer	108	32.6%
Officer	122	36.9%
Clerk	23	6.9%

Table 2 provides the demographics of the respondents and descriptive statistics. For the purpose of this study, data were collected from employees of small and medium-sized companies that employed more than 10 people and were essentially categorized as e-businesses. The primary reason for this was that micro businesses usually do not frequently change technology used in the workplace, nor is the technology used as advanced comparative to small and medium-sized enterprises. The authors searched the website of United Kingdom’s official registration authority “Companies House” to identify 50 small and medium-sized enterprises (SMEs). The management of each of these companies was contacted and the purpose of our study was explained to them with a request for cooperation in data collection. A total of 28 businesses eventually participated in the study. All the companies were incorporated in the UK.

The respondents were employees who had already been using internet communication technologies and some form of office support software such as DSS, enterprise resource planning (ERP), management information systems (MIS), executive information systems (EIS), supply chain management (SCM), web-based systems (WBS) and customer relationship management systems (CRMS). Hence, we conclude that all respondents were skilled in technology use and had undergone a change process with the introduction of new application software at some stage of their careers.

A total of 692 questionnaires were sent out and 336 were returned, thereby yielding a total response rate of 48.6%. After checking data for missing values, outliers and unusable responses, eventually, 331 responses remained usable, yielding an effective response rate of 47.8%. The sample size of 331 in our study is considered appropriate keeping in line with the widespread application of the “10times rule of thumb” which has recommended minimum sample size to exceed ten times the number of independent variables [101].

Furthermore, from the point of view of “maximum number of arrows pointing at a latent variable”, in our case, it was 4 arrows, which has a corresponding minimal sample size requirement

of 65 [102–104]. In addition, as recommended by [105] from a statistical power analysis point of view during use of partial least square PLS method, if the outer and inner models have maximum of five independent variables, “one would need ninety-one observations to achieve a statistical power of 80 percent, assuming a medium effect size and a 5 percent α -level” [102,103,106]. The sample size of 331 used in our study substantially exceeds all the above criteria.

Respondents belonged to varying business sectors such as banking/financial services ($n = 43$), Fast moving consumer goods (FMCG) ($n = 25$), hospitality, travel and leisure ($n = 126$), IT/SEO/web services ($n = 91$), and telecoms/call centers/business process outsourcing (BPO) sector ($n = 46$). There were 97 respondents from Greater London, 62 from Birmingham, 55 from Edinburgh, 31 from Glasgow and 86 from Manchester. Over 79% of the respondents had at least 3 years’ experience. Over 86% of the respondents had at least a bachelor’s degree.

Table 3. Technology intensiveness of respondents’ employer organization.

Types of Information Systems Used	Freq.	%Age
Global Distribution System (GDS) for Reservations	126	38%
Management/Executive Information Systems (MIS/EIS)	198	60%
SagePay or similar E-Payment Platform	126	38%
Enterprise Resource Planning (ERP) software	253	76.44%
Customer Relationship Management (CRM) Software	278	83.99%
Decision Support System (DSS)	123	37.16%
Are any two or more software applications inter-linked for Decision-Making by Managers and for Reporting purposes?		
Yes	243	73.41%
No	88	26.59%
Is there a difference in level of access to information for employees, middle managers and top management?		
Yes	229	69%
No	102	31%

As displayed in Table 3, the questionnaire included some questions to determine the types of information systems the respondents were familiar with in a workplace usage context. Although the information systems were identified by varying names, all of these mechanisms are by default synonymous with the definition of DSS because their collective purpose is report generation for decision-making. Moreover, just over 37% of respondents actually used the term DSS for the information systems used in work settings. Respondents were also asked if there was a different level of access and authority for DSS with the hierarchical levels: 69% responded yes, while over 73% responded that their work involved using two or more software systems interlinked at some stage of the work process flow. Therefore, we were led to conclude that the sample used was a true representation of technology intensive environments in e-business settings.

3.2.1. Measures

Measurement tools from several previous studies were adapted for this study to ensure that the tools and instruments being used do not have any validity or reliability issues. The current questionnaire is adapted from several different questionnaires and questions were modified for the purpose of this study. The questionnaire used for data collection was divided into two main parts: demographic questions and the other part consisted of items related to each of the constructs in the model. Respondents were given clarification that the term Decision Support System includes all such information systems generally recognized as MIS, ERP, EIS or DSS but with report generation and analysis for decision-making purposes.

The survey instruments used in this study was based on and modified from the TAM by [107] and EREB by [18]. There were 31 items in total. The original employee readiness for e-business scale by [18] consists of 18 items divided into four dimensions: Benefit (05 items) measured with items such as “Software, computers and related technologies such as decision support systems improve

productivity for me.”; Security (04 items) which was measured through statements such as “I am not threatened that technologies like decision support systems will result in a job change for me”, Collaboration (04 items) with the example statement “I am happy to provide advice and help to fellow employees on how to use MIS, ERP, EIS or DSS and related technologies” and Certainty (05 items) with the example statement “I believe that my company can implement the adoption of new software and related technologies successfully”. perceived ease of use, perceived usefulness and intention to use were measured through statements modified from [62] and [67] with five statements for PEU and PU respectively, and 3 statements for IU. A 7-point Likert scale was used and all measures were the self-assessment type. The questionnaire explained the objectives of study, assured confidentiality and anonymity of respondents and the voluntary nature of participation with a disclosure statement. All acronyms used in the questionnaire were described at the start of the questionnaire.

3.2.2. Non-Response Bias and Common Method Bias

Although the study received sufficiently high responses, the authors still made an assessment for any potential non-response bias. Early and late responses were tested by splitting the sample into two halves on the basis of response rate. The data collection period was 4 weeks and 2 days. The respondents who sent responses in the last 7 days ($n = 113$) were grouped as late responders and the rest ($n = 218$) were grouped as early responders. This analysis included one random selection of an indicator from each construct. No significant statistical differences were found between the two groups when the Mann–Whitney U-tests were performed ($p < 0.05$).

The authors also made an effort to contact the non-responding firms to enquire as to their reasons for non-participation. The companies mentioned two major reasons for non-participation, one that there was not sufficient time available to complete the survey, second that it was a simple matter of policy at those firms not to participate in such surveys for numerous reasons such as the increasing number of such requests from academic researchers. Moreover, “research has shown that the bias produced by PLS-SEM when estimating data from common factor model populations is low in absolute terms” [108].

4. Results

SmartPLS 3.2.7 (Boenningstedt, Germany)[110] and IBM SPSS Statistics 22 (Armonk, NY, USA) were used in this study. However, data analysis was conducted using smartPLS primarily because PLS-SEM is a preferred option due to its better predictive power over factor-based SEM [109]. Choosing PLS was encouraged over other CB-SEM softwares because smart-PLS can simultaneously estimate relationships between several independent as well as dependent variables in a structural model and multiple latent observed or unobserved variables in a measurement model[110].

Furthermore, PLS is believed to be a preferable approach for decision-making and management-oriented problems; it is also preferred when the study focuses on prediction [9]. In addition, PLS is the best choice in situations where other methods fail to converge; or when developed solutions are inadmissible. This holds true regardless of whether a common factor or composite model data is used [108,111]. Moreover, normality is required, and is a critical assumption of CB-SEM based software. Normality was a problem in our data when the Shapiro–Wilk test was conducted to find out if our data departed from normal distribution. Therefore, PLS was a preferred option because PLS can deal with skewed data and multi-collinearity issues more robustly [101].

4.1. Measurement Model

The assessment of the measurement model was carried out using the reliability and validity of the reflective indicators. The internal consistency reliability was established using composite reliability (CR) which has been recommended by scholars as being a better representative measure for reliability as compared to earlier practices that use Cronbach’s alpha, as PLS does not require all indicators to have equal reliability [112], which is a limitation in other softwares.

Although the majority of the items displayed outer loading of above 0.70 to ascertain the reliability of latent variables, some weaker indicators with loadings between 0.460 and 0.69 were retained because of their contribution to content validity [113]. Keeping in mind that the minimum level of 0.40 is an acceptable value for item loading [107], none of the items had to be removed because all loadings were above 0.40. Moreover, all the constructs showed high composite reliability scores of above 0.8. Table 4 shows that the values ranged between 0.832 and 0.889, thus confirming sufficient reliability [112].

Table 4. Item loadings.

ITEM		LOADINGS						
Constructs		BEN	COL	SEC	CERT T	PEU	PU	IU
Benefits (BEN)	B1	0.830						
	B2	0.652						
	B3	0.537						
	B4	0.658						
	B5	0.827						
Collaboration (COL)	C1		0.769					
	C2		0.808					
	C3		0.840					
	C4		0.766					
Security (SEC)	S1			0.905				
	S2			0.460				
	S3			0.892				
	S4			0.699				
Certainty (CERT)	T1				0.658			
	T2				0.704			
	T3				0.874			
	T4				0.729			
	T5				0.603			
Perceived Ease of Use (PEU)	PEU1					0.799		
	PEU2					0.713		
	PEU3					0.894		
	PEU4					0.713		
	PEU5					0.750		
Perceived Usefulness (PU)	PU1						0.734	
	PU2						0.782	
	PU3						0.744	
	PU4						0.542	
	PU5						0.728	
Intention to Use (IU)	IU1							0.773
	IU2							0.912
	IU3							0.871

To assess the construct validity by examining both the convergent and discriminant validity, suggestions by [114] were followed and 0.5 or higher was set as the acceptable value of average variance extracted (AVE) [116]. Table 5 shows that all the constructs had AVE values greater than 0.5 and ranged between 0.504 and 0.729, thus confirming convergent validity [115]. We assessed the discriminant validity using both Fornell–Larcker and Heterotrait–Monotrait (HTMT) criteria [111].

Table 5. Reliability and convergent validity.

	Cronbach's Alpha	RhoA	C.R	AVE
BEN	0.757	0.788	0.832	0.504
CERT	0.762	0.798	0.841	0.518
COL	0.806	0.806	0.874	0.634
IU	0.813	0.831	0.889	0.729
PEU	0.833	0.839	0.883	0.604
PU	0.750	0.763	0.834	0.505
SEC	0.726	0.769	0.838	0.579

Fornell–Larcker criterion and the examination of cross-loadings are the “dominant approaches for evaluating discriminant validity...and do not reliably detect the lack of discriminant validity” [111]. It was, therefore, decided to additionally report the Heterotrait–Monotrait (HTMT) ratio of correlations given in Table 6 below. Square roots of AVE values are shown in italics at diagonal.

Table 6. Discriminant validity: Fornell–Larcker criterion.

	BEN	CERT	COL	IU	PEU	PU	SEC
BEN	0.710						
CERT	0.500	0.719					
COL	0.410	0.673	0.796				
IU	0.423	0.550	0.435	0.854			
PEU	0.441	0.640	0.729	0.553	0.777		
PU	0.488	0.612	0.619	0.691	0.560	0.711	
SEC	−0.307	−0.159	−0.157	−0.145	−0.174	−0.273	0.761

As shown in Table 7, all of the variables displayed acceptable discriminant validity using the HTMT test as well as bearing values below thresholds of 0.90 [111,112].

Table 7. Discriminant validity: Heterotrait–Monotrait ratio (HTMT).

	BEN	CERT	COL	IU	PEU	PU	SEC
BEN							
CERT	0.616						
COL	0.496	0.868					
IU	0.535	0.666	0.534				
PEU	0.483	0.787	0.891	0.647			
PU	0.638	0.793	0.796	0.879	0.698		
SEC	0.471	0.203	0.223	0.200	0.230	0.365	

4.2. Structural Model

To assess the structural model, a three-stage approach was carried out by the authors [111–113]; firstly, the R^2 value was obtained for each latent variable. Secondly, a redundancy check of Q^2 was calculated by using a blindfolding function to ascertain the quality of predictive relevance. Thirdly, the bootstrap function was used to assess whether the path coefficients of the structural model are significant or not and if their effect size is sufficiently big enough. A one-tailed test was used because of the predetermined direction of relationship between all hypothesized variables of the theoretical framework. A 5000 bootstrap sample was used for this study constituting the same number of observations as that of the original sample in order to generate the standard errors and t-values [101]. In addition, the interaction effect was checked through f^2 values representing effect size. The coefficient of the determinant “R-square” value represents how much variance in a target variable is explained by the effect size of the independent variables linked to it [113]. Chin (1998) recommended benchmark values for R-square as 0.67 (substantial), 0.33 (moderately strong) and 0.19 (weak).

(Security $\beta = -0.121$; Collaboration $\beta = 0.296$; Certainty $\beta = 0.256$) along with PEU ($\beta = 0.085$) explained 50.2% variance in PU. Whereas 58.2% of the variance in PEU was explained by the four

EREB dimensions (Benefits $\beta = 0.102$; Security $\beta = -0.023$; Collaboration $\beta = 0.529$; Certainty $\beta = 0.230$). Moreover, PEU ($\beta = 0.243$) and PU ($\beta = 0.555$) explained 51.8 % of the variance in IU.

Benefits had a significant positive effect on PEU ($t = 2.295$, $p = 0.022$) as well as PU ($t = 3.383$, $p = 0.001$). Security concerns of employees showed an insignificant (although negative) relationship with PEU ($t = 1.577$, $p = 0.115$); however, it did prove to have a significant negative relationship with PU ($t = 3.050$, $p = 0.002$) as initially hypothesized. Certainty had a significant positive relationship with PEU ($t = 4.046$, $p < 0.001$) and PU ($t = 3.669$, $p < 0.001$). Collaboration also had a significant positive effect on both PEU ($t = 10.914$, $p < 0.001$) as well as PU ($t = 5.677$, $p < 0.001$). Moreover, PEU ($t = 5.479$, $p < 0.001$ and PU ($t = 13.182$, $p < 0.001$) both had a significant positive effect on intention to use.

The t-value test for level of significance has been calculated by using two-tailed estimation (Hair et al. 2013). Table 6 shows the t-values and p-values indicating that Security did not prove to have a significantly negative relationship with perceived ease of use ($t = 0.596$, $p = 0.551$) and PEU did not prove to have any significant effect on PU ($t = 1.577$, $p = 0.115$). All other direct relationships proved to be significant with t-values well above a threshold of 1.96 and p-values of less than 0.05.

Keeping this in mind, and based on the t-value rule of thumb for interpretation of a two-tailed test i.e., $t = 1.96$, all the hypotheses were supported with two exceptions, namely H1 and H5a.

Figure 2 displays the path coefficient values and t-values (in parentheses) along with the R-square variance in perceived ease of use, perceived usefulness and intention to use, as explained by other independent variables.

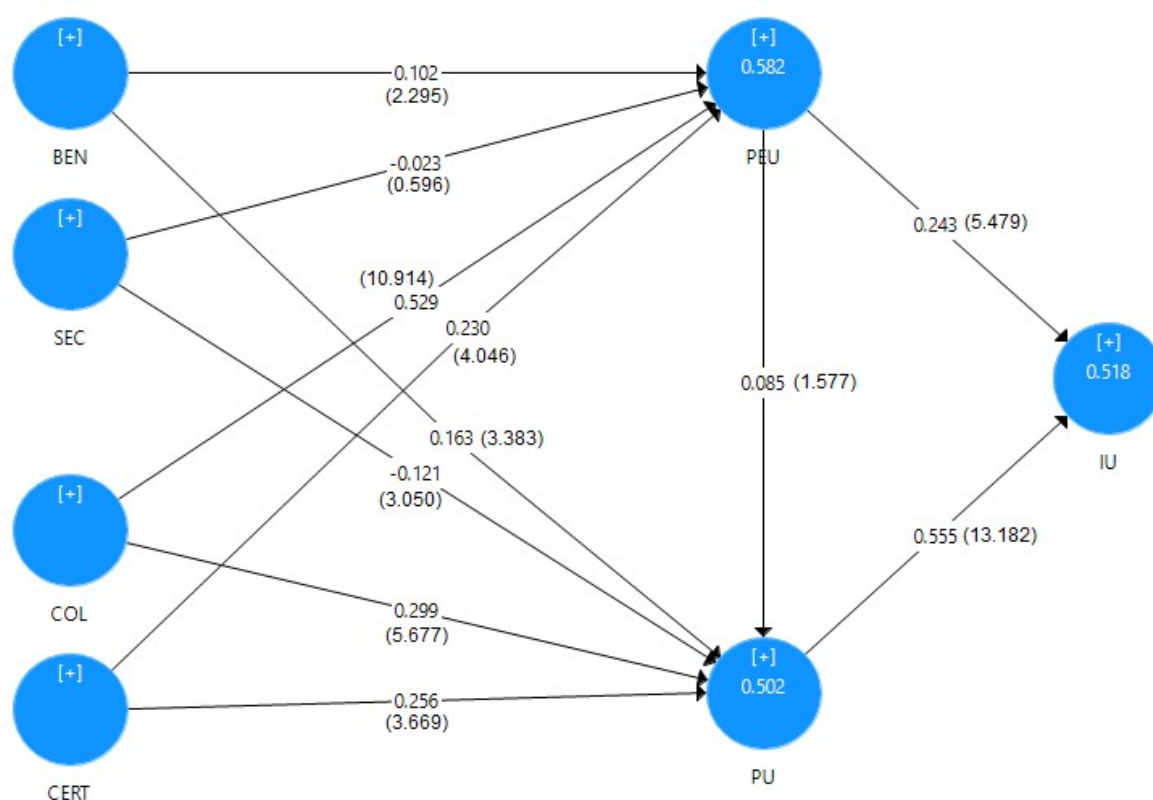


Figure 2. Results of the model.

4.3. Model Strength and Quality

As recommended by [105], f^2 values of 0.02, 0.15 and 0.35 indicate that the interaction term is low, medium, or large on the criterion variable respectively. A Q^2 value of greater than zero implies that the model has good predictive relevance [116].

Table 8 shows the results of the model obtained through PLS Algorithm function under smartPLS software calculate the table. Table 9 displays the values for f^2 were obtained from the measurement model results and the Q^2 values obtained through the blindfolding function. It is evident from the figures that the relationship paths from BEN to PEU ($f^2 = 0.017$), SEC to PEU ($f^2 = 0.001$) and PEU to PU ($f^2 = 0.006$) bear a low interaction because f^2 values are below the minimum 0.02 threshold. The strongest interaction term was between PU and IU with a substantially large f^2 value of 0.439. Similarly, the COL to PEU path was also very strong with an f^2 value of 0.362.

Table 8. Results of the model—mean, STDEV, T-values, P-values.

Hypotheses	Original Sample (O)	Sample Mean (M)	Std Dev. (STDEV)	T-Value (O/STDEV)	P Values	Results
H4a = BEN->PEU	0.089	0.093	0.039	2.295	0.023	Supported
H4b = BEN->PU	0.159	0.162	0.047	3.383	0.001	Supported
H7a = CERT->PEU	0.231	0.233	0.057	4.046	<0.001	Supported
H7b = CERT->PU	0.252	0.249	0.069	3.669	<0.001	Supported
H6a = COL->PEU	0.536	0.532	0.049	10.914	<0.001	Supported
H6b = COL->PU	0.282	0.283	0.050	5.677	<0.001	Supported
H2 = PEU->IU	0.241	0.240	0.044	5.479	<0.001	Supported
H1 = PEU->PU	0.112	0.113	0.071	1.577	0.108	Not Supported
H3 = PU->IU	0.559	0.560	0.042	13.182	<0.001	Supported
H5a = SEC->PEU	-0.023	-0.025	0.039	0.596	0.547	Not Supported
H5a = SEC->PU	-0.119	-0.120	0.039	3.050	0.002	Supported

Table 9. Model strength and quality.

	f Square			R-Square		Q Square	
	IU	PEU	PU	SEC	SSO	SSE	$Q^2 (=1 - SSE/SSO)$
BEN		0.017	0.036		1655.000	1193.519	0.279
CERT		0.062	0.060		1655.000	1165.292	0.296
COL		0.362	0.071		1324.000	817.128	0.383
SEC		0.001	0.027		1324.000	896.662	0.323
PEU	0.084		0.006	0.577	1655.000	994.740	0.399
PU	0.439			0.494	1655.000	1198.213	0.276
IU				0.515	993.000	561.904	0.434

The R-square values for IU, PU and PEU were 0.515, 0.494 and 0.577 respectively, displaying a moderately strong explanation of variance by the independent variables. The Q^2 values for all the relationships were above zero, thus meeting the minimal criterion as required by the existing literature.

4.4. Higher Order Construct of EREB

In order to check whether the relation between EREB and intention to use is partially or fully mediated by PEU and PU, higher order construct of EREB was created by using a two-step approach recommended by Becker, Klein and Wetzels [117] in cases where the different constructs have

different numbers of items in order to assure relatively lesser bias in results. To obtain this, we convert the latent variables into items for the higher order construct, i.e., in this study, Benefits, Security, Collaboration and Certainty are four variables with varying numbers of items, we shall use them as items for a higher order construct EREB. In order to achieve this, we run the four lower order variables in the model using the PLS Algorithm in SmartPLS. From the measurement model results output, all the 'Latent variable scores' were copied into the original data file and saved as new items. Then this newly changed data file is used as the source data file to create EREB as a latent variable using the latent variables Benefits, Security, Collaboration and Certainty as items. As Becker, Klein and Wetzels [117] recommended, the measurement model is run again and the reliability and validity of the higher order model is also checked, just as it was done above for the lower-order constructs. Table 10 displays the relevant values for measurement model results.

Table 10. Reliability and validity of higher order model.

	Cronbach's Alpha	Rho A	C.R.	AVE
EREB	0.714	0.767	0.826	0.552
IU	0.787	0.825	0.875	0.703
PEU	0.833	0.847	0.880	0.597
PU	0.731	0.742	0.824	0.586

The internal consistency reliability of the higher order construct EREB was established using a composite reliability value of 0.826. The rhoA value was 0.767 while Cronbach's Alpha was 0.714. Moreover, the convergent validity was established through the AVE value, which was 0.552.

Table 11. Strength and quality of the higher-order model.

	f-Square			R Square
	IU	PEU	PU	
EREB		0.387	0.295	–
IU				0.484
PEU	0.16		0.014	0.543
PU	0.41			0.469

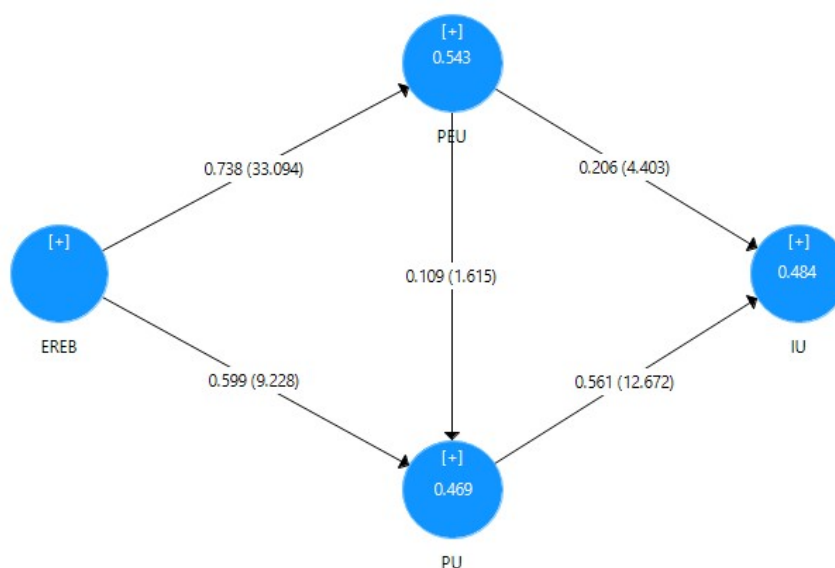


Figure 3. Results of the higher model.

A 5000-sample bootstrap was run to check the model with higher order construct. Results displayed in Table 11 and Figure 3 above indicate that that EREB explained 54.3% variance in PU and 46.9% variance in PEU. Moreover, PEU, PU and EREB together explained 48.4 % variance in IU.

All the relationship paths had f-square values of above 0.15, which signifies a moderately strong relationship [105], except for PEU to PU (f-square = 0.014) which means the relationship is not as meaningful as it was below the minimum 0.02 benchmark. This was consistent with the lower order model run previously with four latent variables of EREB

4.5. Mediation Results

Mediation was assessed using the variance accounted for (VAF) method recommended by Preacher and Hayes [118] and also suggested by Hair, Hult, Ringle and Sarstedt [106]. PU and PEU were run together in the model instead of separately. They were added one-by-one to the model, which is similar to the method adopted in a recent study by Martinez-Martinez, Herrera Madueno, Larran Jorge and Lechuga Sancho [119]. It was found that PEU and PU both fully mediate the relationship between EREB and IU, as the variance accounted for value exceeds the 80% benchmark devised by Preacher and Hayes [118]. The variance accounted for is calculated by dividing the point estimate (multiplication of path values) by the total effect of the independent variable (IV) on the dependent variable (D.V).

As per the method devised by Preacher and Hayes [118], there is no mediation if the VAF value is less than 20%; full mediation if the VAF value is 80% or above and partial mediation when the values of VAF lies between 20% and 80%. The individual paths for PEU and PU were observed to partially mediate the relationship between EREB and IU. PEU's VAF value was 29.45%, which suggests partial mediation. PU's VAF value was 60.80%, which also indicates partial mediation. The sequential path through both PEU and PU showed no mediation as the VAF value was 9.73%.

Variance Accounted for = Point Estimate/Total Effect of IV on DV

VAF = $a1b1 + a2b2 + a1c1b2 / (\text{Total Effect}) = 0.5329 / 0.533 = 99.99\%$

Table 12 shows the values and calculations involved. Individual mediations via PEU and PU were separately calculated as below:

EREB->PEU->IU = $(a1b1) / (\text{Total Effect}) \Rightarrow 0.1570 / 0.533 = 29.45\%$

EREB->PU->IU = $(a2b2) / (\text{Total Effect}) \Rightarrow 0.3241 / 0.533 = 60.80\%$

EREB-PEU-PU-IU = $(a1c1b2) / (\text{Total Effect}) \Rightarrow 0.0519 / 0.533 = 9.73\%$

Table 12. PU and PEU: mediation effect results.

Total Effect of EREB		Direct Effect of EREB		Indirect Effects of EREB				
Coefficient t	t-value	Coefficient t	t-value		Point estimate	Percentile bootstrap 95% confidence interval		
						Lower	Upper	
0.533	17.956*	c'	0.097	1.326*	a1b1 + a2b2 + a1c1b2	0.5329		
		(EREB->PEU)		(PEU->IU) = a1b1	= 0.737×0.213	0.1570	0.096	0.212
		(EREB->PU)		(PU->IU) = a2b2	= 0.585×0.554	0.3241	0.247	0.419
		(EREB->PEU)		(PEU->PU)				
				(PU->IU) = a2c1b2	= $0.737 \times 0.127 \times 0.554$	0.0519	0.004	0.096

* $p < 0.05$ ** $p < 0.01$ [based on a t distribution (4999), one-tailed test: $t(0.05; 4999) = 1.645$; $t(0.01; 4999) = 2.327$]. The bold text above shows the total indirect effect formula and its value

5. Discussion

Firstly, the results show that employees who display e-business readiness tend to focus on the benefits of the new technology or software and are more inclined to utilize it in job tasks for improved performance, efficiency and gaining greater control in job tasks leading to greater job satisfaction [18]. This helps expedite the DSS implementation process. Expected benefits from the use of technology are that it motivates employees and creates a perception of ease of use and

usefulness, as found in our study. As Lee, Park and Bakers [93] argue, in the present day competitive job market, employees must enhance skills and abilities to be of value to their employer, which is why the employees place more value on any learning opportunity that could enhance their competency. New technology introduced in the workplace is one such opportunity that brings benefits for employees and leads to satisfaction from learning achievement outcomes and job performance; as a result, bringing a perception of usefulness leading to intention to use of DSS.

Secondly, this study shows a positive relationship of Certainty with PEU and PU, portraying that employee trust in management creates better readiness. Previous research conducted from an employee perspective [9] also showed similar results where trust showed a significant effect on e-business value creation. Whenever an infrastructure for training and support is available to employees, it builds trust in management and creates certainty in their perceptions towards DSS adoption and use; employees receive it well with the certainty that the organization and management have the capability [18] to carry out the successful implementation of DSS. Employees who display higher certainty about management's capabilities and trust that e-business readiness will be helpful in supporting change initiatives, including technology changes such as DSS, simultaneously creating intention to use DSS.

Thirdly, based on the results, collaborative efforts create an environment of learning and knowledge sharing, which promotes the perception of ease of use and usefulness through shared experiences by employees. It implies that participative behavior promotes perceptions of ease and usefulness. Lai, Kan and Ulhas [9] also found that participation by employees was significant in creating e-business readiness. Management should thus motivate employees through a systematic method [120] both emotionally as well as technically. Encouraging employees to collaborate and participate could be done through training specific to e-business processes involving the use of DSS. This in turn can result in greater commitment towards e-business readiness and technology use while aligning business goals with employee job satisfaction.

Fourthly, contrary to the other three dimensions of e-business readiness, employee security concerns play a volatile role if not addressed properly by management. Results show that concerns were negatively related to perceived usefulness of any given technology. This brings resistance to change by employees. However, this can be countered by maintaining a healthy environment in the workplace by ensuring an individual-technology fit and task-technology fit through training. This is in line with previous studies stating that employee professional-development opportunities are important for employees to maintain their job security [93]. By knowing the capabilities of the workforce, identifying the technological knowledge gap and eliminating these gaps through training, monitoring and feedback, employee security concerns can be mitigated.

Results also showed job security has no significant impact on PEU for DSS, mainly because of the underlying fact that in case of job security concerns, an employee would not be bothered as to whether a technology is easy to use or not as they are more concerned with retaining the job role; it is not an immediate concern for an employee since it could cause them loss of influence, change in their job role or even unemployment. Employees' perceptions about job insecurity are closely associated with their behavior towards technology use [76]. It causes stress for employees and can cause anxiety and other negative outcomes [79]. Once an employee sees the technology as a threat or feels insecure, the focus shifts from the technology to his or her own survival and fear of unemployment in the long run [78]. It can, therefore, be argued that when an employee is concerned that new technology may not be useful for them, the focus shifts to job security. Stress and anxiety stemming from a new technology in the workplace make an employee indifferent to the fact of whether it is easy to use or not. Similarly, the same line of argument holds true for the insignificant path from PEU to PU. If a technology is easy to use, employees will continue to use it; they will not stress about whether it is useful or not. Job insecurity results in feedback seeking behavior by employees [82], usefulness of a technology will not depend on whether it is easy to use or not and an employee's technology usage behavior remains stable if the new technology does not threaten their job security [76].

6. Theoretical and Practical Implications

The present study contributes in three ways. Firstly, it combines and analyzes the relationship between two models i.e., EREB and TAM, which has not been done before. Secondly, this study examines the level of employees' e-business readiness and its relationship with technology acceptance. Moreover, it studies the resistance to DSS because of being inhibited by employee security concerns. Thirdly, the results above show that three constituent factors of EREB have positive effects on the perceived usefulness and perceived ease of use in the use of decision support systems.

Information systems, unlike the personal use technologies, are primarily utilized in work-settings for performance of job tasks. By assessing the IS adoption and its use, this study makes a contribution to technology acceptance model literature by empirically showing that adoption and continued usage of group-based technologies in the e-business workplace is dependent on employee readiness. This is determined by individual employee's perceptions about the four dimensions i.e., Benefits, Collaboration, Certainty and Security, stemming from existing organizational culture regarding employee preparedness.

This study not only affirms the past findings for the core constructs of the TAM model i.e., PEU and PU; it also further introduces the four constructs of EREB as predictors of PEU and PU. It studied PU and PEU strictly from an employee's point of view as a user of technology. Moreover, PEU and PU fully mediate the relationship between higher order EREB constructs and intention to use DSS. The results affirm that perceived benefits of a technology shall create a positive effect on PEU and PU. Expected benefits from the use of DSS create positive intention to use DSS through perceived usefulness. Certainty and employees' perception about the management's ability to successfully implement DSS shall lead to positive perceptions about PEU and PU and creates positive intention to use DSS. Collaboration and participation by employees accelerates the adoption as it creates a harmonious perception among employees. An environment of collaboration and sharing in the workplace shall lead to intention to use DSS and is mediated by perceived usefulness and ease of use.

Although technology has been discussed in literature with ample evidence provided by proven studies, the evaluated phenomenon on most occasions tends to be the overall ability of the organizational adaptive capability, the customer's readiness for a particular technology, or the supplier's integration with the system between buyer and supplier from a supply chain point of view. However, there is lack of substantive research on readiness of employees for e-business in conjunction with technology acceptance for a decision support system.

More specifically, technology acceptance research is comparatively much less focused on the employee as the unit of analysis. This issue lacks academic research from an employees' perspective when it comes to technology-intensive e-business firms as well. This research studies the construct "employee readiness for e-business" (EREB) proposed by [18] and developed as a multiple-item measurement scale in order to assess the level of employee readiness for e-business tasks while purely focusing on the employee's perspective as the user of technology. Thus, this study adds to the knowledgebase on the subject of technology usage behavior in e-business firms from a change management viewpoint and the employees' perceptions about new technology in the workplace. It will be useful for researchers and practitioners interested in designing, implementing, and managing e-business technologies.

New technology or software inherently brings about change [35]. Whenever an information system is introduced into the organizational setting, there is bound to be a change in the previous process and the procedures of running routine business matters and job tasks. Thus, business process re-engineering comes into play to enable a smooth transition into new procedures and processes. Readiness for change is dependent on a multiple number of factors. From the start, managers and practitioners need to create awareness and collaboration through training sessions, closed group discussions, planning and building trust with employees before a new information system is introduced.

Therefore, there is need to build an optimistic environment and minimize resistance towards technological changes in the workplace. This brings us to the widely researched task–technology–fit (TTF) concept [121] that mainly focuses on “the appropriateness of the technology to the task” and employees’ perceptions towards the degree to which functions of a technology assist them in performing their work.

More specifically, in e-business environments, in particular the benefits of using Decision Support Systems as perceived by employees, and information systems in general, is likely to increase when a task-technology and an individual-technology fit is ensured primarily because it builds a rapport of usefulness as it sits well with employee values and ease of use because they feel it is made specifically for their tasks [19].

It is argued that DSS implementation can be divided into two dimensions[122]. The first is termed ‘technology performance’ wherein DSS usage is aimed at fetching better outcomes and recommendations from the use of technology (technology performance). The second is termed as ‘task performance’, which entails utilizing outputs of a given DSS. Past empirical research shows that when technology performance enhances, it leads to better task performance [57,122,123].

Table 13 presents a matrix for a combination of anticipated perceptions that each dimension of EREB creates for employees and what steps management personnel should introduce beforehand to lead to a successful transition to a new technology or to ensure the continued use of existing technology.

Table 13.Matrix for proposed managerial actions and underlying employee perceptions.

EREB Dimensions	Employee Perceptions		Proposed Pro-Active Managerial Steps
	Extrinsic Motivators	Intrinsic Motivators	
Benefits	Be the first movers/adopters for financial gain	Getting to experience the new technology before others (for employees with personal innovativeness and high self-efficacy)	Monetary rewards to motivate early adoption of technology
Security	Possible financial loss due to fear of losing their job, loss of power or change of role in the workplace	Social norms; face-saving; loss of reputation amongst family and friends	Create individual-technology-fit; awareness campaigns; training; discussion sessions
Collaboration	Be a visible contributor for prospective promotion opportunities to managerial roles	Social acceptance/subjective norms; winning friends in the workplace	Feedback to and from employees to establish a culture of cooperation and knowledge-sharing
Certainty	Task-technology fit through better focus on learning and attaining individual-technology-fit for mandatory job tasks;	Trust in management’s ability to implement the new technology/systems; trust in cooperation	Test runs; implementation in batches of small teams

Source: Authors own construction.

Integration of resources and systemic storage, transmission and analysis of business information is an imperative objective at present day organizations as they try to integrate the operations between employees, departments, vendors, and suppliers to optimize processes and add value to business. Thus, there is an increasing focus on implementation of electronic business (e-business) activities. This issue further fuels debate on determining employee readiness towards

this new type of organization [18]. However, the firms who are considered e-businesses have to upgrade existing technology or introduce new technology with the passage of time.

A task-technology fit needs attention at the beginning of the very process of buying/building a new information system. When the task is the center of attention when building the IS, it brings harmony in job task performance without causing employees anxiety. A well-thought out DSS reduces the gap between an individual's ability to attain a certain level of expertise and the need to achieve certain level of task performance. The individual-technology fit is to be handled on a continuous level[123]. This fit, if not established by the management for the employees, leaves a gap in the employees' preparedness and readiness due to probable security concerns related to their job, arising from changes brought by the new technology i.e., information systems or decision support systems.

It is not necessarily the insecurity of losing the job altogether, but in fact, the fear of losing influence amongst peers, losing their power at workplace or simply a change in job role. Before selecting, building or introducing new information, if employee feedback is obtained to make them feel included in the process of technology adoption, it will serve as a mode of building trust, creating readiness for change, and inherently ensuring a task-technology and an individual-technology fit.

Regular and routine inculcation of training, idea-generation and feedback sessions tend to build trust and certainty among the employees and enhances their perception of the management's ability to successfully implement the new technological changes, leading to improved technology adoption behavior and continued intention towards technology use. Moreover, collectivism built by this trust also helps employees to be more open and more collaborative as a result of the environment of ease and satisfaction. It is always a collaborative effort that results in the successful implementation of technology in any organization, the employee being the basic unit of change.

7. Conclusions, Limitations and Future Research

The management has a key role to play in creating positive perceptions about the EREB dimensions i.e., Benefits, Certainty, Security and Collaboration. This can be achieved through the inculcation of regular trainings, feedback, offering rewards and ensuring a secure job environment. Moreover, employee security concerns are inversely related to ease of use and usefulness of decision support systems. The two hypotheses that were not supported i.e., Security->PEU and PEU->PU, both indicate that once an employee feels anxiety about losing power and authority in their job role or even fears unemployment due to the introduction of a new technology; the primary focus shifts from perceptions about ease of use or usefulness to anxiety, fear and survival.

It can be argued that optimizing output is inherently a key part of human nature. The behavioural outcomes with respect to perceptions about ease of use and usefulness are similar for both employees and customers because they are devoid of any influence from the environment in which a technology may be introduced i.e., whether it is in workplace settings for employees or in marketplace settings for customers. The variables PEU and PU are being measured for employees in this study with the modified version of the same scale and instrument used for customers in past studies. The results are also similar because the TAM model does not differentiate between customers and employees as "users" of technology.

This study is unique because it introduces EREB as predictor of PEU and PU in technology adoption literature. Moreover, PEU and PU fully mediate the relationship between higher order EREB construct and intention to use DSS. The results are unique and significant because they provide four new dimensions of employee behavior that are vital in building perceptions about ease and usefulness. Firstly, if employees perceive that there will be higher benefits from use of a new technology, they will be more willing to adopt it because of higher PEU and PU. Secondly, another unique and significant finding of this study is the relationship of certainty with PEU and PU. If the employee's perception about management capability to successfully implement changes at work (certainty) is high, then it shall lead to a higher level of PEU and PU leading to intention to use DSS. Collaboration and participation by employees accelerates the adoption as it creates a harmonious

perception among employees. An environment of collaboration and sharing at workplace shall lead to intention to use DSS and is mediated by perceived usefulness and ease of use.

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This study adds new theoretical perspective of employee behavior in technology adoption instead of consumer behavior. Employee is studied as a unit of analysis as against past literature which focuses on consumer as a unit of analysis for technology adoption for e-business firms. It is a theoretical contribution of this research because it uses TAM model to study user behavior from employee's perspective. Past literature on technology adoption shows studies from consumer behavior, student behavior or teacher's behavior. However, it lacks studies on behavior of employees of e-business firms.

The methodological contribution of this study is that it was known that the sample (respondents) is experienced and expert in technology use and works in a technology-intensive organization. This is different from past studies where mixed respondents have been used as sample. Either past studies do not bifurcate between experienced or non-experienced users or it is not known in majority of studies whether the sample is made of respondents who are adept in use of technology and whether they work in a technology-intensive environment or not.

Mandatory use of technology vs. choice of use; it is mandatory for individual users who do not have a choice in adoption of technology; instead they have to comply with company-wide regulations. So, this aspect makes it a certain factor that it will affect the job security of employees.

This study not only identifies four factors that shape employee behavior towards technology adoption in e-business firms, but also suggests a specific managerial course of action for each of these four factors. Managerial actions proposed above aim at creating a positive employee behavior by paying attention to the extrinsic as well as intrinsic motivational factors behind these four specific dimensions that constitute EREB.

This study also has its limitations. Firstly, this study followed a cross-sectional study design; although it is a common practice in similar research, researchers still consider this a limitation. Secondly, even though the sample size in this study was appropriate from the analysis and theoretical point of view, the authors consider the sampling method to be a limitation. Secondly, the sample was taken from the UK, a larger sample size with a more diverse geographical range of respondents from another country or multiple countries shall further enhance statistical power to achieve more generalizable results. Thirdly, the sample was also restricted to technology-intensive travel and tourism companies; it does not cater for the businesses that are not categorized as e-businesses and are potentially looking forward to becoming e-businesses. Fourthly, this paper studied the impact on employee-perceived benefits of e-business—Certainty, Security and Collaboration—as antecedents of TAM. However, these are not the sole determinants of employee readiness in a firm's overall technology readiness; the technology readiness index is one such example of another measure. Thus, technology acceptance could also be driven by certain other employee-specific or firm-specific antecedents which were not part of our study. Last but not least, this study's sample is limited to SMEs, it does not cover micro-sized organizations in the UK.

Keeping the aforementioned limitations in mind, we suggest using a wider variety of firms with a broader number of fields such as SEOs, social media marketing as well as other digital advertising and service-oriented firms for possible future research. It is suggested that micro-sized organizations in the UK may also be included in future research. We also suggest including factors other than institutional support from a firm-specific viewpoint; employees' level of 'Readiness for Change' and 'Perceived Personal Competence' in technology as antecedents of EREB or mediators/moderators between EREB and TAM. Furthermore, considering that there has been some research carried out in previous studies on relationship between the TAM and TTF models, future research may be carried out to check a moderating effect of TTF on the relationship between the dimensions of EREB and TAM.

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A Conceptual Model for Impact of Employee Readiness for E-Business on Technology Acceptance

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Abstract. This paper is part of an ongoing doctoral research and proposes a conceptual model to investigate the impact of employee readiness for E-business (EREB) on technology acceptance with respect to use of any new technology at workplace. The proposed model is based on employee readiness for E-business (EREB) by Jung-Yu & Chorng-Shyong and Davis' technology acceptance model (TAM). It is derived from the existing perspectives of organizational change management theories while focusing on the employee side by treating adoption of new technology as the change process. The model proposes that EREB has an influence on perceived ease of use and perceived usefulness, leading to actual use of technology.

Keywords: Employee Readiness for E-business, E-Commerce, Technology Acceptance, Management

1. Introduction

Organizations repetitively come across situations that create a need for change in the structure, one or all of their processes as well as technologies. This change can face resistance; to alleviate such resistance literature proposes creating readiness amongst the affected individuals [1].

Organizations are thus implementing electronic business (e-business) at an accelerating pace; even the firms which have already embraced electronic mode of business, have to upgrade existing technology or introduce new technology time and again with continuous research and development in the field of electronic gadgets, technologies, software and applications. This fuels the speculation about employee readiness to embrace this new type and state of businesses where the technology is always upgrading every few years rapidly.

2. Theoretical Background and Significance

2.1. Significance of this study

The extant literature discusses social psychology-based as well as attitude-based models that predict acceptance and actual use or intention to use. In this regard, PU and PEU are both significant in prediction of usage; however, they do not elaborate the reasoning behind an individual's attitude or behavior. Previous studies indicate a want for improved understanding of major determining factors and have extended suggestions for furthering TAM by integrating it to an extended wider model with additional variables that concern human as well as organizational aspect [2].

Research is lacking and nothing much substantive is available on the relationship between employee readiness for e-business and technology acceptance. Drawing on insights from literature, this paper proposes use of the independent variable EREB developed by Jung-Yu & Chorng-Shyong [3] and technology acceptance model [4]. Moreover, this study will add to the knowledge-base on the subject of e-business and technology acceptance model from the employees' perspective in addition to the organizational change perspective. It will be useful to researchers and practitioners interested in designing, implementing, and managing e-business technologies, with the change management theories in hindsight.

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2.2. E-Business technologies and readiness of employees for change

As argued by [5], although adoption of new technologies and training users for their usage is a challenging task for pursuit of improved systems; a further and much more overwhelming job is to introduce such new systems to users for acceptance. The reason being that it could result in changes in job design and could restructure the workers duties and work environment in a multitude of ways.

It is imperative that all factors complement each other such as the infrastructure, E-commerce platforms, user innovativeness and ease of use. Though [20] conducted a study showing that cost, technology acceptance and satisfaction of employee, all play an integrated role towards building the effective E-CRM. However it was another one of those studies from the customer's perspective and ignored readiness of employee at the beginning of introducing such a technology.

Technology drives a push and switch in existing business models that range from mere concept of mass production to customization [7]. Incremental technological innovations tend to be manipulative and assemble upon current organizational knowledge. It is often mandatory for process innovators to ensure that they bring their partners onboard in advance to develop new technologies [8]. [9] opines that technology orientation is about refinement, choice, production, efficiency, selection, implementation and execution in information systems development. It focuses on the use and refinement of extant knowledge and technologies to strengthen the excellence of the present operation.

[22] argued that technology adoption at the group level did not receive much attention from information systems (IS) scholars and conducted a study to prove how it is different from individual level acceptance.

For most companies, adapting to the e-business phenomenon is an evolutionary journey from initial to final stages [10]. This kind of transformation may involve adopting new technologies, redesigning business processes, and restructuring management [10][11]. Change must be supported by a critical mass of stakeholders, including customers, partners, and especially, employees [11]. Support of employee shows his/her readiness.

2.3. Employee readiness for e-business (EREB)

The multiple-item scale developed by Jung-Yu & Chorng-Shyong [3] used for measuring EREB breaks-up the construct into four dimensions.

Benefits (B): this dimension states that an employee believes that benefits of e-Business would include improved productivity, enhanced efficiency, that it would be helpful for him/her in the job; that the employees always utilize functions provided by e-business and that it enables them to be more competitive at their jobs.

Security (S) refers to the state of mind of employees regarding the job security, whether they worry about losing the job, changing the job, losing their influence or losing their power in the work environment

Collaboration (C) refers to the willingness of employees to interact with each other through email or digital technologies, share knowledge, gladly work with co-workers on a team from anywhere and provide advice and help to fellow employees on how to use e-business.

Certainty (T) Employees have a Clear understanding of the purposes and functions of e-business, cooperates with activities regarding e-business, believes in his company's ability to successfully implement e-business and believes that e-Business is honorable.

2.4. Technology acceptance model (TAM)

[12] observed that TAM is repeatedly indicated in literature as one of the most powerful, robust and parsimonious models in order to predict user acceptance, particularly in context of information systems. In order to predict and elaborate the user's adoption behavior and acceptance for any give technology, there has been ample research conducted in past to ascertain the determinants of acceptance and use of information technology and systems [13]. Generic Theory of Reasoned Action (TRA) [14] holds as the primary stimulant for further research as it explained a user's attitude towards technology. TRA has successfully argued that an individual's behavior can be predicted by his or her behavioral intention. Working on the same lines, researchers developed a similar model, namely Technology Acceptance Model (TAM), which has been used as an even more prevalent model. TAM has been adapted from TRA. TAM was developed by [4] to explain intention to use, and acceptance of new technology in organizational settings. There are three main variables in TAM: Perceived usefulness (PU), perceived ease of use (PEU) and behavioral intention to use (BIU). This study proposes a model which uses PEU AND PU leading to Actual Use, instead of behavioral intention to use l

[21] Opined that if employees have previous exposure to technology, it will be an influential factor leading towards technology acceptance. Further, [22] states An examination of technology adoption is theoretically important because the nature of the group-driven technology usage can be different from the individual usage

Existing research contains several studies used to measure the technology readiness and technology acceptance among users [15] but there is not many studies showing Employee readiness. Moreover, no studies of such nature are found for the proposed relationship between EREB and TAM.

3. Conceptual Model and Propositions

3.1. Perceived ease of use and perceived usefulness

TAM holds that's inner beliefs concerning the usefulness and ease of use of a given technology are the primary determinants of an individual's use of the technology [16]. The proposed model shows the relation between employee readiness and acceptance of any new technology or an upgradation of existing technology or system which is intrinsic to the task for the employees. Therefore, it is imperative that the said change in technology is an integral means to achieve task objectives for employees in their daily routine business matters. Thus, we propose a significant path from PEOU to PU, but no relationship from PEOU to use. Actual use of a New technology is modeled as strictly a resultant variable influenced only by PU. The following research propositions are made to be tested for the core TAM:

Proposition1: Perceived ease of use (PEOU) of New technology will be positively associated with perceived usefulness (PU) of the software.

Proposition2: Perceived usefulness (PU) of New technology will be positively associated with actual use.

3.2. Security

Security refers to the state of mind of an employee regarding the job security, whether he/she worries about losing the job, changing the job, losing influence or power in the work environment [3], including such emotional states as frustration, apprehension, and fear. Technology acceptance scholars have found that computer anxiety has a significant negative effect on PEOU [17]. Negative affective reaction toward the use of such modern integrated Management Information systems is likely to exert negative influences on the perception of the system, and further on the use of the system. Thus, it is expected:

Proposition 3a: Security Concerns of using a new technology will be negatively associated with perceived ease of use (PEOU) of the software.

Proposition 3b: Security Concerns of using a new technology will be negatively associated with perceived usefulness (PU) of the software.

Proposition 3c: Security Concerns of using a new technology will be negatively associated with actual use

3.3. Benefits

The term benefits involves an employee's beliefs that benefits of e-Business would include improved productivity, enhanced efficiency, that it would be helpful for him/her in the job; that the employees always utilize functions provided by e-business and that it enables them to be more competitive at their jobs [3,18]. For technology adoption research, previous studies have supported the positive relationship between self-efficacy and PEOU. It is expected that higher perceived benefits of New technology use facilitates employees' PEOU:

Proposition 4: Benefits of New technology will be positively associated with perceived ease of use (PEOU).

3.4. Certainty

TRA, TPB, and TAM are such models that work on basis of an assumption of user's choice of actual use or behavioral intention to use [14]. The management's support provided to individuals at workplace, such as guidance sessions and training, can enhance their usage of any technology depending upon the level and extent of such support. As narrated by [14], institutional support is one such construct that is a sign of help or obstacle to a user's behavior related to external conditions. Thus, situational factors, such as institutional support, group (working) norms, and organization culture, may be as critical as individuals' attitude toward to the systems. The more support employees believe they receive, the greater their PEOU and PU of the system:

Proposition 5a: Certainty for using a New technology will be positively associated with perceived ease of use (PEOU) of technology.

Proposition 5b: Certainty for using a New technology will be positively associated with perceived usefulness (PU) of technology.

3.5. Collaboration

Collaboration has been introduced to technology adoption models as a construct that captures the social influence aspect of technology usage. Collaboration is a relevant construct, especially in organizational settings where mandated use is more likely to occur compared to the technology use for personal purposes. New technology is used primarily for work-related tasks, thus, its adoption is more of a collective decision-making. A technology's use can be improved at the initial stage of introduction during a mandatory usage requirement by an organization, whereas external pressures stemming from managerial and social dimensions could adversely affect the user's intention to use a certain technology in the future [19]. Therefore, it is proposed:

Proposition 6a: Collaboration will be positively associated with perceived ease of use (PEOU) of technology.

Proposition 6b: Collaboration will be positively associated with perceived usefulness (PU) of technology.

In summary, integrating the literature and propositions made above, the conceptual model is shown in Fig. 1.

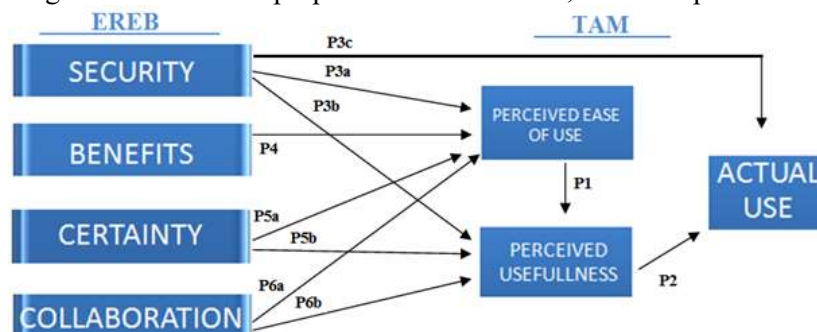


Fig. 1: Conceptual model

4. Conclusion

In conclusion, the present model shall help conduct studies which would be amongst the few studies that shall help investigate employees' acceptance and use of the modern technologies i.e. new technologies, softwares, internet or web-based applications with an extended TAM. The model generally estimates to confirm the key propositions of TAM. More importantly, the model promises a potential to lead towards studies whose findings are expected to show that both individual factors including Security and Benefits and institutional factors such as Certainty and Collaboration are significantly related to PEOU, PU, and to the actual use of a newly introduced technology. Examining the adoption and use of new technologies, the present model contributes to technology acceptance models showing that use of technology in work settings is subject more to institutional and social influences at workplace in an E-business environment.

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Employee Readiness for Acceptance of Decision Support Systems as a New Technology in E-Business Environments; A Proposed Research Agenda

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Abstract—This paper proposes a methodology for application of a conceptual model developed as part of an ongoing doctoral research in a previous paper to investigate the effects of employees' readiness for E-business on technology acceptance with respect to use of a new technology, a state of the art support software helping integrate functions across multiple departments which in turn would be helpful for an improved data-driven decision-making by managers. The proposed research model is based on the empirical study on employee readiness for E-business (EREB) by Lai & Ong and Davis' technology acceptance model (TAM). The data for this study shall be collected from employees of British tourism firms operating additional back-end support offices abroad. The results of the study are expected to show that EREB model has an influence on perceived ease of use and perceived usefulness leading to actual use of technology.

Keywords—technology acceptance model; perceived usefulness; employee readiness; change management; decision support systems

I. INTRODUCTION

It has become crucial for organizations to utilize their networks along with innovative application of technology to their business routines, to coordinate assets among associates, merchants, suppliers, representatives and to add value to existing processes, service delivery and production capacity. Firms are along these lines executing electronic business (e-business) at a quickening pace, strengthening view on need for employee preparedness to grasp new this sort of environment at workplace.

As [1] reported in their findings about readiness for e-business, they opined that earlier studies, for the most part, concentrate on process of adoption of technology or need strong hypothetical framework. Moreover, prior research also mostly focuses on adoption of technologies from the client's perspective, organization's point of view or from a country's perspective, as opposed to from the perspective of individual worker's readiness for e-business (EREB). As [4] endeavored to extend a new insight and add to knowledge for technology adoption through the concept of technology readiness.

A. Decision Support Systems (DSS)

This study proposes investigation of affects of EREB dimensions on acceptance and use of a newly introduced technology which is Decision support system (DSS). It is a state of the art upgrade on the previous multiple softwares such as email, chat, database, Management Information System (MIS), Executive Information System (EIS), and Payment collection and sales reports. It is a combination of all those features and provides employee's an all-in-one solution for not just the job tasks, but also as a work log, client database, sales reporting system, data analysis software from number of sales by employees, returning clients and type of sales (holiday packages, hotels, flights, cruises etc.); number and type of clients, destinations by continents or by airlines; leading to decision making by the management. It has clearance levels for various personnel by hierarchy. It is used at the bottom as MIS; Accounts department for charging payments with an integrated Sage-pay charging system; for HR department as monthly sales reports for determining salary and commissions amounts; Customer support departments place their feedback in the sales logs for each client; Managers use it as Executive Information System and finally it is also used as performance appraisal system at year end.

II. THEORETICAL BACKGROUND

There is not much substantive research available on employee readiness or technology acceptance in sales calls centers. Academic research on this issue is also lacking from the employees' perspective when it comes to E-business front. Drawing on insights from literature and interviews with practitioners, this paper uses the construct of "employee readiness for e-business" (EREB) proposed by [2] who developed an EREB instrument by defining, operationalizing and refining the construct to create a multiple-item measurement scale, and assessing the scale's psychometric properties.

A. E-Business Technologies and Readiness of Employees for Change

Turning into an e-business is a developmental adventure from introductory to final stages for most organizations [3]. This sort of change may include receiving new innovations,

amendments in process flow, upgrading business forms and changes in hierarchy or administration [1] [3]. Change has to be backed up by a substantial number of partners including clients, suppliers, and particularly, employees [1]. As indicated by earlier reviews [4] [5] [6], readiness does not merely refer to physical development, in fact it additionally refers to a blend of emotions and cognitions that intervene learning and lead to successful implementation of new operations. Employee's support of such initiatives shows readiness.

B. Employee Readiness for E-Business (EREB)

The multiple-item scale developed by Jung-Yu & Chorng-Shyong [2] used for measuring EREB breaks-up the construct into four dimensions.

Security (S). Security refers to job security and the employee's state of mind with respect to their concerns about possibility of losing the job, or change of a job, or loss of influence or power at the work place.

Benefits (B): this dimension refers to an employee's belief that he shall receive improvements in response to the successful implementation of E-business enabling technologies; such as improved productivity, enhanced efficiency, and that it enables them to be more competitive

Collaboration (C) refers to the willingness of employees to interact with each other through email or digital technologies, share knowledge, gladly work with co-workers on a team from anywhere and provide advice and help to fellow employees on how to use e-business.

Certainty (T) Employees have a Clear understanding of the purposes and functions of e-business, cooperates with activities regarding e-business, believes in his company's ability to successfully implement e-business and believes that e-Business is honorable.

C. Technology Acceptance Model (TAM)

Perceived usefulness (PU), perceived ease of use (PEU) and behavioral intention to use (BIU) are the main variables in TAM. PU is characterized as an individual's subjective likelihood that use of a particular application framework will build his or her capacity towards occupational productivity inside an organizational setting. PEU alludes to how much the user anticipates that the new technology framework will be free of effort [7]. TAM stands out amongst the most capable, vigorous and parsimonious model for prediction of user acceptance, particularly in IS setting [8]. The rationale behind picking TAM for this study was that TAM has been experimented and upheld through validations, applications, and replications [7]. In the literature there are several studies measuring technology readiness and technology acceptance [3] [4] [5] [8] [9] [10] [11], but there are not many studies showing Employee readiness. Moreover, no studies of such nature are found for Pakistan

III. HYPOTHESES AND RESEARCH MODEL

A. Perceived Ease of Use and Perceived Usefulness

Technology Acceptance Model (TAM) states that it is primarily the internal convictions of an individual regarding

the usefulness and ease of use for any technology in question which eventually decide that individual's actual use. Perceived usefulness (PU) is characterized as an imminent consumers subjective opinion as to whether utilizing a particular technology could add to the fulfillment of individual objectives [12]. PEOU is incorporated as an exogenous variable that indirectly affects actual usage or Behavioral intention to use through PU. As against previous works related on technology adoption, the items capturing behavioral intention to use were modified to adapt for measurement of actual use [9] directly affected by perceived usefulness. The following research hypotheses are proposed to test the core TAM in a conceptual model:

H1: Perceived ease of use (PEOU) of DSS will be positively associated with its perceived usefulness (PU).

H2: Perceived usefulness (PU) of DSS will be positively associated with actual use of the software.

B. Security

Security refers to employees' concerns about possibility of losing the job or change of a job role or loss of influence or power at the work place [2], which includes frustration, apprehension, and fear. This stems from the fact that if an employee is not innovative enough or is not at par with current technological trends, he/she may feel threatened by the introduction of new technology and may experience anxiety. Technology acceptance scholars have found that computer anxiety has a significant negative effect on PEOU [7]. Negative affective reaction toward the use of such modern integrated Decision Support Systems is likely to exert negative influences on the perception of the system, and further on the use of the system. Thus, it is expected:

H3a: Security Concerns of using a DSS will be negatively associated with its perceived ease of use (PEOU).

H3b: Security Concerns of using a DSS will be negatively associated with its perceived usefulness (PU).

C. Benefits

Benefits refer to the employees' perception of what benefits could be derived through implementation of a particular technology. Would it bring any improvement in terms of their productivity or efficiency in performance of routine job-specific tasks? For technology adoption research, previous studies have supported the positive relationship between self-efficacy and PEOU [7]. As it will improve their self-efficacy, it is expected that higher perceived benefits of DSS use facilitates employees' PEOU:

H4a: Benefits of DSS will be positively associated with its perceived ease of use (PEOU)

H4b: Benefits of DSS will be positively associated with its perceived usefulness (PU)

D. Certainty

Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and TAM are such models that work on basis of an assumption of user's choice of actual use or behavioral intention to use [13]. The management's support provided to individuals at workplace, such as guidance sessions and training, can enhance their usage of any

technology depending upon the level and extent of such support, as observed by [13] and [14]. Thus, situational factors, such as institutional support, group (working) norms, and organization culture, may be as critical as individuals' attitude and certainty toward to the systems. The more support employees believe they receive the greater their PEOU and PU of the system:

H5a: Certainty for using a DSS will be positively associated with its perceived ease of use (PEOU).

H5b: Certainty for using a DSS will be positively associated with its perceived usefulness (PU).

E. Collaboration

Collaboration captures the social influence aspect of mandated technology usage. As observed by [11] a

technology's use can be improved at the initial stage of introduction during a mandatory usage requirement by an organization, whereas external pressures stemming from managerial and social dimensions could adversely affect the user's intention to use a certain technology in the future. The following hypothesis is proposed:

H6a: Collaboration will be positively associated with its perceived ease of use (PEOU) of the system.

H6b: Collaboration will be positively associated with its perceived usefulness (PU) of the system.

In summary, integrating the literature and hypotheses described above and adapted from [2], [12] and [18], the proposed research model of the current study is presented in Fig. 1.

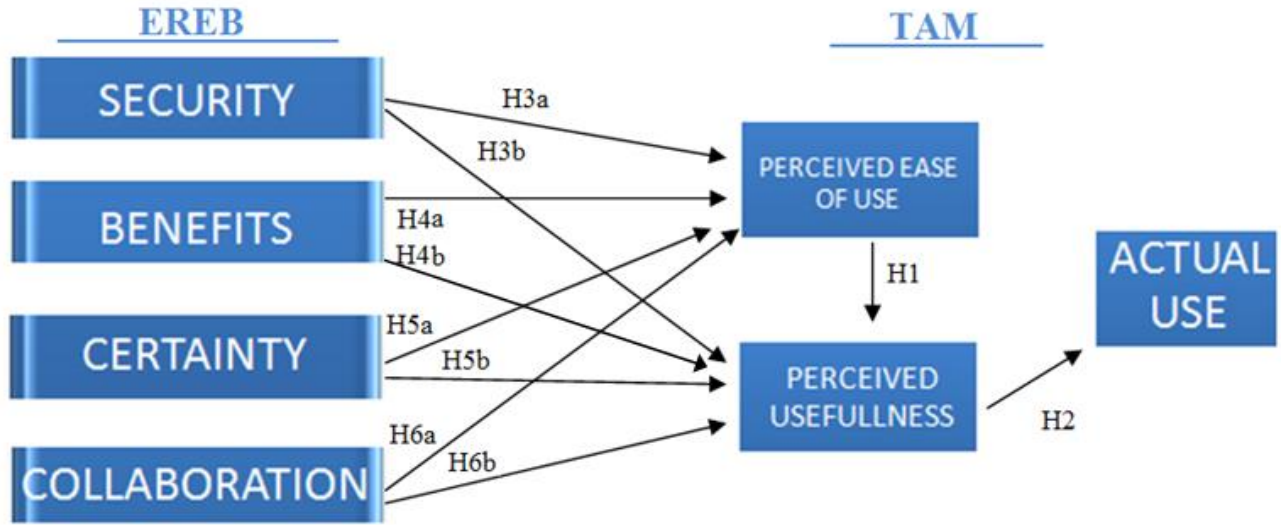


Figure 1. Hypothesized research model.

IV. PROPOSED METHODOLOGY

A. Survey Administration

To test the hypotheses, a survey shall be conducted with more than 200 employees from selective firms from call centre industry related to travel and tourism. The theoretical population of this survey is all individuals who use one or another variation of a DSS that is capable of generating reports and comparative figures and similar systems that help analyze data and make decisions. However, it is difficult to contact all such organizations or several of them simultaneously [15]. So it is initially proposed that survey is conducted at one organization and in future the sample size may be increased by adding a few more similar companies [15] [16] who use multi-function DSS for sales and client database maintenance. Another alternative is to distribute online surveys to capture a sampling frame in which every individual within the defined population has an equal opportunity of being selected for participation.

B. Proposed Measures

Employee Readiness for E-business (EREB) i.e. *Security*, *Benefits*, *Collaboration* and *Certainty* shall be measured through an EREB instrument - a multiple-item measurement scale developed by [2]. *It is proposed to measure the Perceived ease of use* with the following three statements modified from [7]. The items shall be anchored by a 7-point Likert scale ranging from “strongly disagree (1)” to “strongly agree (7)” (all statements for other variables may also be anchored by the same scale, unless otherwise indicated). *Perceived usefulness* is proposed to be measured with five statements modified from [7][16], including “I have more time to accomplish business goals since using my company's DSS,” and “Using the company's DSS increases my productivity”. *Actual use* shall be measured with the following question modified from [7] [17]: “On average, how many hours per week do you spend using your company's DSS?”

C. Data Analysis

This study intends to use path analysis based on a series of multiple regression analyses to test the hypotheses and the theoretical model presented in Fig. 1. Potential multicollinearity issues shall be detected through Pearson's correlation coefficients for all items of the survey instrument. Benchmarks shall be set up with a P-value of .05 and Chronbach alpha of minimum .70 for each item. Moreover, model fit shall be ascertained through CFI, GFI, NFI and RMSEA. In order to check for relationship between independent, dependent and mediating variables, hierarchical multiple regression shall be carried out through R^2 values.

V. PRACTICAL IMPLICATIONS AND APPLICATION

The present study shall investigate the relation between employee readiness and acceptance of an innovative modern version of Decision Support System (DSS), which is intrinsic to the task for the sales team i.e. DSS is an integral means to achieve task objectives. DSS helps eliminate data security vulnerabilities and improves accuracy. Its usage entails real-time data processing, requiring data entry into a modern integrated DSS which is connected at one end to the booking/ticketing software used by the employees, while at the front-end it is connected to the customers directly who handle their booking from payment card details to passenger names and dates of travel themselves. Furthermore, it would also be linked to a third party service provider for identity verification; Name & Address check service. Thus, giving the customer peace of mind that his/her details are not stored.

On the other hand, giving employees the freedom to focus on quality of service instead of worrying about the clerical details. Moreover, the managers and senior officials can use this system as Executive Information System (EIS) through advanced user rights provided by the IT department. The DSS also serves as a client database, performance measurement tools for sales teams. It is also used by HR department for calculating remuneration of performance-based contract employees. Thus, we hypothesize a significant path from PEOU to PU, but no relationship from PEOU to use. Actual use of a DSS is modeled as a strictly a resultant variable influenced only by PU.

Moreover, this study will add to the knowledge-base on the subject of e-business and technology acceptance model from the employees' perspective in addition to the organizational change perspective.

VI. CONCLUSION

To sum up, the present study will be amongst the few studies that shall investigate employees' acceptance and use of one of the modern technologies i.e. DSSs with an respect to TAM, as against previous trend of focus on customers and organizational change. The study generally aims to confirm the key propositions of TAM. More importantly, the study's potential findings are expected to show that both individual factors including Security and Benefits and institutional factors such as Certainty and Collaboration are significantly related to PEOU, PU, and to actual use of the systems. Unlike technologies for personal use, DSSs are used

primarily for work-related tasks. Examining the adoption and use of DSSs, the present study shall contribute to technology acceptance models by empirically showing that the use of group-based technologies in work settings is subject more to institutional and social influences.

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THE INFLUENCE OF TRANSACTIONAL LEADERSHIP ON INNOVATIVE WORK BEHAVIOR-A MEDIATION MODEL

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ABSTRACT

Highly turbulent business environment and fierce competition along with globalization have increased the competitiveness of the organizational world. Innovation originates with change and contributes towards the competitive edge. Every new idea originates in the minds of individuals which ultimately contribute to overall organizational innovation. The leader serves as a catalyst in bringing and nurturing innovation at individual, team and overall organization level. This study aimed to enrich and bridge the inconsistencies in the extant literature for transactional leadership and innovative work behavior first directly and then through mediating role of intrinsic motivation. Random sampling employed to collect data from 260 middle managers from the Power Sector of Pakistan. Partial least squares structural equation modeling (PLS-SEM) is employed to analyze the relations among constructs by using Smart-PLS 3. Findings of the study reveal that Transactional Leadership (TSL) has a direct positive relationship with Innovative Work Behavior (IWB). In addition, Intrinsic Motivation partially mediates the positive relationship of TSL with IWB. A comprehensive discussion on the results, practical implications, research limitations and directions for the future research are presented.

Keywords: Transactional Leadership (TSL), Innovative Work Behavior (IWB), Intrinsic Motivation (IM), Power Sector of Pakistan

1. Introduction

Highly turbulent business environment and fierce competition along with globalization have increased the competitiveness of the organizational world. Capability to be innovative has become a key source for organizational successes. Extant literature reveals that innovation is one of the significant drivers for the competitive edge of organizations ^[1, 2]. The fact that innovation is essential for an organization to survive, in this turbulent environment, has transformed into a broadly acknowledged phenomenon ^[3]. Consequently, today the main focus of organizations is on exploring all those aspects that can augment the innovative behavior of employees ^[4]. Every new idea, primarily, originates in the minds of individuals, thus, compelling organizations to strive for more and more creative and innovative workforce. In the same vein, innovative work behavior (IWB) appears as an important concept for strategic long-term survival and competitiveness of the organizations ^[5, 6], making innovative employees as a key asset ^[7].

The leader serves as a catalyst in bringing and nurturing innovation at individual, team and overall organization level. The role of leadership has increased many folds to foster innovativeness in their organizations ^[8-10]. Transformational (TFL) and Transactional (TSL) leadership styles are most widely known constructs of the full range leadership theory ^[11] which have effects wide range of organizational outcomes ^[12]. Transactional Leadership style (TSL) entails a relationship where a leader rewards the subordinates by their rendered services and the terms of agreement ^[13]. In its comparison with transformational leadership (TFL), transactional leadership (TSL) received the least attention of researchers and academicians. Recurrently, TSL was investigated in its comparison with transformational leadership (TFL) regarding employee or organizational outcomes. Surprisingly, authors remained unable even to find a single study solely investigating the influence of transactional leadership style (TSL) on innovative work behavior (IWB) of the employees.

Even the available findings, in the extant literature, are highly contradictory. Some found positive ^[14] while others have proved negative ^[15] besides those who even did not find any relationship at all ^[16]. Hence, these inconsistencies of results lead to anticipate that there could be additional factors which influenced the relationship of TSL with IWB. Hence, there is still a significant gap for future research to identify those mediators and moderators variables of TSL and IWB relationship. The same thought was reinforced by ^[17] to explore those variables which can be helpful in understanding the said relationship with more precision.

Employee motivation is the composing element of creativity and innovation. Literature has divided the concept of motivation into two types known as intrinsic motivation and extrinsic motivation ^[18]. Wherein, intrinsic motivation is derived from the work itself while extrinsic motivation is based on the intention to achieve positive consequences. Thus, prima-facie, intrinsic motivation seems more positively related to innovative work behavior than extrinsic motivation. Nonetheless, there are studies which considered both intrinsic motivation and external rewards relate positively with innovative work behavior ^[19]. Most recently, ^[20] argued that increase in creativity of the employees, in the presence of rewards, to some extent can be attributed to an increased intrinsic motivation for creativity.

A leader takes all those necessary steps to create and sustain the highly motivated workforce. Researchers claim that motivation is a key component of leadership ^[21]. More precisely, it can be said that without motivating the followers, leaders cannot become successful. From the above discussion, we are building an argument here that the rewards and feedback given by a transactional leader can enhance employee's intrinsic motivation which further leads to innovative work behavior.

The foremost objective of this research was to empirically test the direct impact of TSL on IWB of employees. Further, the mediation role of employees IM in relation to TSL and IWB was also under consideration of this research. Structurally this study is carried out as: next section presents a literature review and hypotheses development, then the quantitative methodology which is followed by the results and key findings. After that, discussion on the results, practical implications, research limitations, and directions for the future research are also proposed.

2. Literature Review and Development of Hypotheses

2.1 Transactional Leadership (TSL) and Innovative Work Behavior

TSL can be described as mutual contract, exchange or agreement between a leader and follower. The primary focus of such leadership is to identify specific expectations of subordinates and provide rewards in exchange for their performance ^[22]. The relationship between leaders and subordinates is dependent on their mutual benefits. A transactional leader identifies the needs of his/ her subordinates and tries to satisfy those needs with rewards when the desired performance levels are achieved ^[23]. TSL comprised the three major dimensions including contingent reward, management by exception -active, and management by exception-passive. Brief detail of each dimension is given below:

- i. **Contingent reward (CR):** Leader clarifies what the subordinates should do in order to be rewarded.
- ii. **Management by exception–active (MBEA):** Leader continuously monitors the performance and takes the corrective measures proactively throughout the process ^[24].
- iii. **Management by exception-passive (MBEP):** Simply, the leader does not deal the issues unless they arise ^[24].

It is pertinent to state that, authors have chosen only those two dimensions of TSL i.e CR & MBEA, which seem to be proactive and anticipated to have more relevance with IWB.

Since the last couple of decades, the theorists and practitioners have demonstrated a considerable interest in exploring innovative work behavior ^[25]. One reason for exploring the said concepts is due to the competitiveness of business world today that has created such a challenging environment where organizations cannot survive without incorporating at least some degree of innovation in their processes, products or operations. Innovative work behavior (IWB) is a process that contains four dimensions “*idea exploration, idea generation, idea championing, and idea implementation*” ^[26]. In recent times, ^[27] stressed that innovative work behavior includes both, that is generation and implementation of novel ideas. Hence, it can be said that every innovative employee must be creative but every creative employee may not be innovative.

From extant literature, there exists a significant relation between TSL and the effectiveness of the leader which ultimately yields positive work outcomes or performance ^[28, 29]. However, in its comparison with transformational leadership (TFL), TSL has received exceptionally less attention from the scholars in its relation with IWB. Possibly because this style is more tasks oriented and promotes status-qua for achieving desired performance which does not seem appropriate for innovation. However, a keen perusal of the existing literature on the relationship of TSL to IWB revealed an abundance of inconsistencies in the findings. This could be ranged from directly negative ^[22] to directly positive ^[30] and sometimes even no relationship ^[31]. Such state of affairs of the extant literature established a significant gap for future research to explore additional factors causing such differences in the findings.

Tyssen ^[32] argued that a transactional leader gives followers material and psychological rewards by their achievements of tasks. Most recently ^[33] while comparing TFL and TSL about IWB, have also found the direct and positive relationship of TSL to IWB. Relying on findings of recent studies, we proposed the following hypothesis:

H-1: Transactional Leadership has direct positive influence on employees Innovative Work Behavior.

2.2 Transactional Leadership (TSL) and Intrinsic Motivation (IM)

The desire to perform an activity for its own sake to experience pleasure and satisfaction innate in that activity is called intrinsic motivation ^[34]. In contrary, extrinsic motivation typically defined as the desire to perform an activity with the intention to achieve positive consequences such as an incentive or to avoid negative consequences such as a punishment ^[35]. Researchers, usually, argued that these two streams of motivation are likely to be negatively related ^[36] and increase in one would be at the cost of losing another. However, relying on expectancy theory ^[37], ^[38] anticipated that intrinsic and extrinsic motivation could mutually positively predict work performance and employee well-being. In the same vein, behavioral modification theorists also demonstrated meta-analytically that the combination of tangible and intangible incentives could have a synergistic effect on performance ^[39]. Situations where a person does well enough to get a higher level of reward that indicate his/ her excellent performance reduces the controlling aspect of rewards and can enhance his / her intrinsic motivation ^[36]. In such cases, an employee can perceive the contingent rewards offered by a transactional leader as a symbol of his / her competence and capability. Therefore, the following hypothesis was developed:

H-2: Transactional Leadership has positive influence on employees Intrinsic Motivation

2.3 Intrinsic Motivation (IM) and Innovative Work Behavior (IWB)

Motivation plays a key role towards employee innovative work behavior ^[6]. Leaders should keenly observe and understand what motivates an individual towards innovativeness. Motivated employees find enjoyment in their work ^[40], thus are more likely to engender innovative behavior. They feel self-satisfaction and enthusiasm while putting efforts towards job outcomes. When employees have intrinsic motivation, they become offensive, frank and intend to accept new ways of doing which are conducive to creativity and innovation ^[41]. Given the existing literature, the following hypothesis was proposed:

H-3: Employees Intrinsic Motivation has positive influence on their Innovative Work Behavior.

2.4 Mediating role of Intrinsic Motivation between the relationship of TSL and IWB

Cognitive evaluation theory advocates that it depends on the interpretation of individuals how they see the effects of rewards on their intrinsic motivation and creativity^[36]. Individual may perceive these rewards as controlling or a symbol of their competence to deserve these rewards. Accordingly, employees may observe the contingent rewards on their performance as an opportunity, symbol of their competence and autonomy, thus having positive effects on their intrinsic motivation^[42]. Findings of the recent meta analysis conducted by^[43] found significant positive relationship of intrinsic motivation with employee performance when rewards were indirectly attached to the performance. An implied assumption was that tangible incentives or contingent rewards provided by a transactional leader could be positively related to intrinsic motivation of employees which further leads to their innovative work behavior. Thus, the following hypothesis was presented as an outcome of the above stated argument:

H-4: Intrinsic Motivation (IM) mediates the positive influence of TSL with IWB.

3. Theoretical Framework

After reviewing the extant literature, authors prepared a framework linking all the constructs in pictorial representation. The model is placed at the end of this paper at **Figure-1**.

4. Research Methodology

4.1 Measures:

All the measurement scales used in this study were chosen from previous studies with established reliability and validity. For all the items, five-point Likert scale was used with range from “Strongly Disagree” as (1) to “Strongly Agree” as (5). The questionnaire was in English language because in Pakistan it is the official language. De Jong and Den Hartog developed a scale to measure **IWB**^[26] the same was used in this study. **TSL** was measured by using the questions from The Multifactor Leadership Questionnaire MLQ (5X) scale developed by Bass & Avolio. Questions were retrieved from the study of Antonakis^[44]. Four items were adopted from the work of Amabile^[45] and used by Tierney et al^[46] to measure the construct of **IM**.

4.2 Sample Design and Collection of Data

For data collection, authors have selected employees working at the middle management level of the Power Sector of Pakistan. This sector was selected because it is bureaucratic and often has a transactional leadership style. Besides, this sector is believed to have innovative practices to meet the challenging requirements and energy crisis of Pakistan. Google Forms were used to design an online questionnaire. Online link to the questionnaire was sent to four hundred (400) randomly selected employees. In total 271 filled responses were received out of those 260 responses were useable; eleven were discarded because of zero variation in the responses or incompleteness.

4.3 Sample Profile

Summary of the sample profile is given in **Table-1** which gives a comprehensive picture about the nature of organization, gender, age, job nature, position, experience, and educations of the participants.

5. Results and Analysis

For this study, we used “Partial Least Squares Structural Equation Modeling (PLS-SEM)” which is a composite based approach and best suits even when the sample size is small ^[47, 48]. Measures of validity and reliability of the constructs along with descriptive statistics calculated with the help of Smart-PLS 3 ^[49] software are presented in **Table-2**. It is pertinent to state that even though PLS-SEM is not sensitive to non-normal data and can handle it efficiently, ^[50] we still confirmed its normality by assuring the values of skewness and kurtosis are inside the authorized limits of -2 to 2 ^[51]. Hence, there is no issue of non-normality of the data and it is sufficiently good to be analyzed with structural equation modeling (SEM).

5.1 Assessment of the Measurement Model

All the constructs were reflective in nature were evaluated together for the assessment of measurement model. Values of Cronbach alpha, composite reliability (CR), and average variance extracted (AVE) were used to assess the reliability and validity of the constructs ^[47, 50, 52].

First, the indicators and constructs reliability was measured to establish reliability of the measurement model. Only those indicators were retained which had values above 0.6 while removing those with lesser values i.e the minimum threshold. Internal consistency and reliability of the measurement model were assured in **Table-2** by established criteria of Cronbach alpha and composite reliability values more than 0.6 and 0.7 respectively ^[53]. Then, convergent and discriminant validity of all the constructs were used to confirm the construct validity. The values of average variance extracted (AVE) for all the constructs were greater than the minimum threshold of 0.5, thus confirming the convergent validity.

The degree to which a construct is different from all the other constructs in a given model is known as discriminant validity of that construct ^[47]. According to Fornell and Larcker, discriminant validity is proved “if the square root of AVE for each construct is higher than its correlation coefficient with all other constructs” ^[48]. In PLS-SEM analysis ^[54], Heterotrait–monotrait (HTMT) is more recent method to establish discriminant validity. It is recommended to have an HTMT value below 0.90 to confirm discriminant validity for alike constructs ^[54]. **Table-3** proved the discriminant validity of all the constructs with both the approaches discussed earlier. To conclude, Cronbach Alpha, CR, and AVE values of the constructs were above 0.6, 0.7, and 0.5 respectively. Thus the minimum requirement of values was fulfilled ^[54, 55].

5.2 Assessment of the Structural Model

The relationship between the endogenous and exogenous constructs was estimated while assessing the structural model through values of R^2 , beta coefficients and their direction^[52, 56]. SmartPLS 3^[49] was used for the assessment of structural model. Path weighting scheme was run with default settings of the said software with a maximum of 300 iterations and a stop criterion of (1×10^{-7}) . The bootstrapping procedure was run with 5000 subsamples, and no sign changes option was chosen. Significance levels for one-tailed testing along with bias-corrected and accelerated bootstrap were the other options selected to run the procedure. Most recent trends in research advocate the use of bias-corrected confidence intervals in addition to p-value to confirm the significance and acceptance or rejection of any hypotheses^[52, 55]. To establish the significance of a path coefficient at an error level probability of 5%, the 95% confidence interval (bias-corrected and accelerated) should not contain a zero value^[52, 55]. Results in **Table-4** represent the detail of all the hypotheses where the results were confirmed through both bias-corrected confidence intervals and t-values.

6. Discussion

This study aimed to investigate the influence of transactional leadership (TSL) on innovative work behavior (IWB) and to explore the mediating role of intrinsic motivation (IM) in the said relationship. Results revealed that TSL has a positive impact on IWB, which is consistent with the results of the prior studies^[33] and in contrary to other studies^[22]. Besides, mediating role of IM has also been empirically proved. The later result has significantly advanced the debate regarding the TSL, IM and IWB relationship. Specifically, our analysis suggests that feedback and contingent rewards of TSL can be pooled in a synergistic manner with IM which further leads to predict IWB of employees. Hence, results corroborate with Self-determination theory which suggests that some forms of extrinsic rewards (like contingent rewards of TSL) can positively affect IM through the identification and integration processes^[57]. This study has also validated that rewards enhance creativity and innovation as confirmed by several other studies^[58, 59].

7. Practical Implications

Results of this study stressed that transactional leadership is instrumental in increasing employee innovative behavior. Hence, the superiority of transformational leadership style to generate innovative behavior among employees has been challenged. Now, it can be argued that transactional leadership can be considered at par with transformational leadership in the similar contexts where this research is carried out. Moreover, it would be also interesting for the leadership of organizations that contingent rewards and feedback can enhance even the intrinsic motivation of employees which further leads to positive work outcomes like innovative work behavior. Further investigation about what kind of rewards and performance standards can more motivate the employees intrinsically in achieving IWB will help the leadership to bring and retain innovativeness in their organizations.

8. Limitations of the Study and directions for future Research

Results of this study are subject to the following limitations: At the outset, this is a cross-sectional study and thus it is incapable to provide inference on causality. This limitation can be clarified with longitudinal research. Besides, this study was based on self-reporting which can be subject to social desirability bias. Although, this inherent issue of self-reporting is generally acceptable in management research, however, through the cross-rating scheme, i.e. including ratings of the leaders about IWB of the subordinates can mitigate this bias. Further, this study just explored and tested the relationships of TSL with IM and IWB, however, why TSL positively relates to IM and IWB attracts further research efforts regarding consideration of potential mediators and moderators. Personality differences like locus of control and creative self-efficacy could be the consideration of aspirant researchers. Finally, this study was carried out in a specific cultural and contextual setting of organizations in Pakistan which can considerably differ from Western culture and context. To claim enhanced generalizability, the present research requires further validation through similar studies carried out in different cultural settings.

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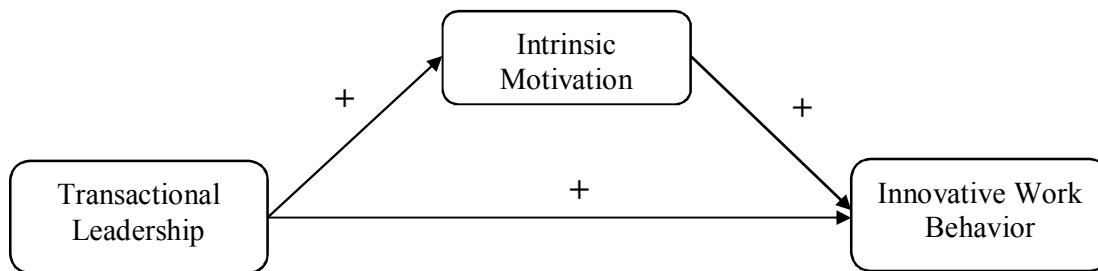


Figure-1: Theoretical Framework

Table-1: Sample Profile

Gender	Male (71%)		Female (29%)		
Age (Years)	18 to 25 (23%)	26 to 35 (36%)	36 to 45 (25%)	46 to 55 (12%)	Above 55 (04%)
Job Nature	Technical (63%)		Non-Technical (37%)		
Position	Assistant Manger (46%)		Deputy Manager (31%)	Manager (23%)	
Experience(Years)	Less than 1 (8%)	1-5 (18%)	6-10 (37%)	11-15 (26%)	Above 15 (11%)
Education	Below Graduation (07%)		Graduation (24%)	Masters (67%)	Ph.D (02%)

Table-2: Descriptive Statistics, Reliability and Validity of the Constructs, and R²

Name of the Constructs	Items	Loadings	Mean	SD	Skewness	Kurtosis	t-value
Transactional Leadership (TSL) Alpha=0.833, CR=0.878, AVE=0.548	CR1	0.755	3.351	1.139	-0.304	-0.714	08.785
	CR2	0.716	3.212	1.141	-0.204	-0.627	05.148
	CR3	0.809	3.061	1.212	-0.183	-0.823	06.669
	MBEA1	0.813	3.209	1.088	-0.387	-0.499	08.340
	MBEA2	0.769	3.047	1.104	-0.313	-0.681	05.498
	MBEA3	0.543*	3.368	1.187	-0.454	-0.598	03.144
Intrinsic Motivation (IM) Alpha=0.848, CR=0.897, AVE=0.685, R ² =0.066	IM1	0.862	4.087	0.800	-1.062	1.244	15.159
	IM2	0.861	4.015	0.781	-0.763	1.178	16.913
	IM3	0.836	4.226	0.794	-1.009	1.366	16.349
	IM4	0.752	3.980	0.838	-0.604	-0.074	08.219
	OE1	0.445*	3.067	0.967	0.043	-0.268	03.190
Innovative Work Behavior (IWB) Alpha=0.926, CR=0.939, AVE=0.631, R ² =0.260	OE2	0.652	3.891	1.001	-0.936	0.609	05.845
	IG1	0.791	3.949	0.935	-0.465	-0.722	07.728
	IG2	0.744	3.734	0.912	-0.581	0.430	14.136
	IG3	0.815	3.746	0.935	-0.314	-0.751	11.966
	IC1	0.743	3.620	1.039	-0.313	-0.791	05.432
	IC2	0.832	3.891	0.960	-0.758	0.265	10.416
	II1	0.821	3.687	0.975	-0.239	-0.699	10.363
	II2	0.869	3.804	0.966	-0.664	-0.010	17.250
	II3	0.858	3.949	1.022	-0.946	0.326	15.612

Note: CR (Contingent Reward), MBEA (Management by Expectations Active), OE (Opportunity Exploration), IG (Idea Generation), IC (Idea Championing), II (Idea Implementation). * Items dropped due to low loading i.e. 0.6.

Table-3: Discriminant Validity of the Constructs

	IM	IWB	TSL
IM	0.828	0.480	0.289
IWB	0.444	0.794	0.384
TSL	0.257	0.357	0.741

Note: Diagonal values represent the square root of AVE's while values of HTMT are shown above the diagonal. Besides, values of the correlations among the constructs are shown below the diagonal.

Table-4: Results of Hypotheses

No	Hypothesis	Beta	SE	t-value	Bias Corrected Confidence Interval		Decision
					5 % LL	95% UL	
1.	H1: TSL -> IWB	0.260	0.064	4.044	0.143	0.355	Accepted
2.	H2: TSL -> IM	0.257	0.063	4.087	0.140	0.349	Accepted
3.	H3: IM -> IWB	0.377	0.071	5.316	0.262	0.490	Accepted
No	Hypothesis	Indirect Effect	SE	t-value	Bias Corrected Confidence Interval		Decision
					5 % LL	95% UL	
4.	H4: TSL -> IM -> IWB	0.097	0.032	3.032	0.052	0.154	Accepted