Toward A Conceptual Framework Of Technology Adoption: Factors Impacting The Acceptance Of The Mobile Technology In The International Business Growth

Rafael Padilla-Vega, Cynthia Sénquiz-Díaz, Dr. Angel Ojeda

Abstract: This paper reviews a research conducted on mobile technology adoption in the international business trade. Accordingly factors were adopted from the framework technology-organization-environment (TOE) with a set of future research proposals in order to support the suggested model. The paper recommends seven (7) implementation factors that may determine the decision for adopting mobile technology in the international business. These factors have been categorized into the three dimensions of the TOE framework: external task & environment, organizational and technological. The results of the investigation revealed that the modern technology supports the efficiency of the business, reduce the internal process consuming time and increase communication. On the other hand, supports the integration in the long-distance relations.

Index Terms: Information Systems in Organization, Information Technology Adoption, International Business, Mobile Technology, Mobile Devices

————————————————◆————————————————

1 INTRODUCTION

Making business is considered a real challenge for the organizations especially for the small and medium enterprises [1]. The continuous developments in the global economy, communication systems and technology drive the firms to look for the best strategy in a short period of time [2], [3]. One of the difficulties currently faced by organizations is their capability for dealing with the proper combination of inner and outer factors to allow the provision for information at a lower cost in an advanced technology speed [4]. In spite of this, the modern technology can support the efficiency of the business; reduce the internal process consuming time, increase communication among the related parties [3]. There is no wrong in saying that business requires a combination of techniques from planning to implementation phases [5].

—————————————————

- *Rafael Padilla-Vega is currently pursuing a doctoral degree program in management information systems in Universidad del Turabo, Gurabo, Puerto Rico. In addition, Padilla-Vega has participated as speaker in local and international conferences in Holanda Email: rpadilla17@email.suagm.edu*
- *Cynthia Sénquiz-Díaz is currently pursuing a doctoral degree program in management in Universidad del Turabo, Gurabo, Puerto Rico. In addition Sénquiz-Díaz has participated as speaker in local conferences*
- *Email: csenquiz@suagm.edu.*
- *Dr. Angel Ojeda-Castro is an associate professor of information systems in the School of Business and Entrepreneurship at the University del Turabo in Puerto Rico, USA. Dr. Ojeda-Castro has published articles in peer-reviewed journals on the topics of: Big Data, Data Warehouse, Social Media, Learning Management System and Open Source Technologies. In addition, Dr. Ojeda-Castro has participated as a speaker in international conferences in the Dominican Republic, Puerto Rico, and USA. Email: ut_aojeda@suagm.edu*

Liang, Huang & Yeh [6] state that mobile technology can increase productivity and profitability by facilitating the communication among employees, customers and other business related parties. Kim et al. [2] reinforced this importance of the mobile technology indicating that is being used to keep the competitive posture while maintaining the contact with the customers "anytime and anywhere" as stated by Saidi [7] & Shiau [8]. This is not an exception when dealing with the international business strategy in the organization because, as stated by Rundh [9], it requires the activities integration for the final success of exchanging goods and services in multiple foreign countries. This combination of elements involves a demanding, continuous negotiation and coordination from all related agents using an inter-firm communication [10]. A core element on this adaptive process is represented by the technological changes necessary for a well-developed growth [11]. In congruence, DePietro, Wiarda & Fleischer [12] stated in their theory of Technology-Organization-Environment Framework (TOE) the firm responsibility to adapt to outer forces using the technology innovation for an internal linking structure on these aspects:

- **The technological context,** which "includes the internal and external technologies that are relevant to the firm;"
- **The organizational context,** which "refers to the characteristics and resources of the managerial structure, human resources, amount of slack resources, and linkages among employees;"
- **The environmental context,** which "includes the size and structure of the industry, the firm's competitors, the macroeconomic context, and the regulatory environment."

2 OBJECTIVES

The main objective of this paper is to propose a model implementation as part of a competitive infrastructure for a successful international venture strategy under the TOE theory scope with influencing factors that may drive its acceptance. The importance of the topic and the limited investigations about mobile technology adoption for an

international business growth suggests a literature revision as an attempt to fill this gap by providing directions for future research. Therefore, it includes a research proposition for the investigation of the components influencing the adoption of mobile technology in the international business growth. It also explores possible elements to explain mobile technology embracement that could be easily synthesized in the commerce context.

3 METHODOLOGY

The methodology consists of the best practices revision for the mobile technology tendencies based on forty (40) articles from specialized technology peer reviewed journals and secondary data from 2003-2016.

4 LITERATURE REVIEW

4.1 International Business Theoretical Foundation

In the international business dynamics the firm is the agent responsible for combining the external exposure process (adapting, positioning, sourcing and leveraging ideas) with the internal mobilization in factors related to the creation, integration and dissemination of ideas [13]. Rundh [9] emphasizes that even though a firm is doing well in a domestic market it should adopt new and innovative methods to compete in an export market. The internationalization process is considered an important part of the growth plan in the market [14]. As part of this development, the resources constraints, exogenous and endogenous factors affect the international business competition [15]. Therefore, it is a must that the organizational changes and networks are considered when adapting the business infrastructure to get access to the resources and capabilities in order to succeed in the dynamics of the international environment [3], [16]. This idea was recently established by Samans & Drzenick [17] stating in the World Economic Forum that the future of many business and countries will depend more than ever of how much the digital technology is adopted. Thomé & Medeiros [16] indicate that organizational arrangements such as networks result in an adaptive way to market institutions in emerging economies. Particularly mobile technologies research addresses the adoption at an individual, but still not enough at the organizational level [18] and "many of those who stand to gain the most are not yet connected" [17]. The individual mobile technology demand is highlighted by the International Telecommunication Union [19] showing a high growing number of mobile devices and Internet users with a 96% for the mobile phone and 38% for the individual Internet users around the world. With these facts, consideration must be taken to the essential components for a mobile adoption that increase the probability of the international business growth and dynamic as established by Anderson, Dasí, Mudambi, & Pedersen, et al. [13] and others: technology, innovation and knowledge.

Technology

Anderson, et al. [13] define technology as "tools or machines used to solve real world problems." Musteen, Datta & Butts [20] established a direct relation with the internationalization process when referring to technology as a "network that provides firms with valuable resources that

enable such internationalization without regard to psychosocial distance". Stoica, Roach & Price [21] define it as "mobile technology has more potential than internet to help diminish societal inconsistencies and diminish the digital divide." In constrast, Onetti et al. [22] imply in their description the location decision when stated "...particularly for young and new technology-based companies, location decisions are among the most relevant ones." However, the convenient mobile technology characteristics of "anytime and anywhere" are emphasized one more time by Negahban & Chung [23].

Innovation

Onetti et al. [21] refer to innovation, as "that it must be fast, instantaneous and interrelated; establishing the integration need for the international business success." Anderson et al. [13] describe it as a "new idea, more effective device or process." However, Stoica et al. [20] established the factors needed for the innovation adoption as a coordination of elements in business as "competition, consumers and suppliers."

Knowledge

Anderson et al. [13] defined knowledge under a general perspective as "understanding of something such as facts, information or skills". Musten et al. [19] accentuated the importance of knowledge in international business when stated that ".... difficulties associated with internationalization are mitigated when firms have adequate knowledge of foreign markets." Onetti et al. [21] has a more practical view of knowledge since it is linked directly to decisions "like where do we place our activities and, where do we locate our company. These choices can make the difference in terms of company's ability to access resources, develop competences, create a network, and benefit from knowledge spillovers…"

4.2 Role of Mobile Technology in the International Business Growth

There is a highlighted tendency for technological innovation for the upcoming years. This need is derived from the opportunities available to the firm as a result of the advances in technology [22] and the direct relation of mobile technologies, mobile consumers and the effect in electronic commerce [24]. Top countries are already recognized for their high demand of digital strategies [25]. This signifies that the international business, as part of this system, must pursue for technology tendencies that contribute in better exchange relations with other countries within the same context and in a way that wireless technologies will facilitate access to information at all times [26]. Special features were used by Picoto, Bélanger & Palma-dos-Reis [27] to promote the mobile business:

- Real time accessibility
- Multi-function and convenient
- Network constant connection
- Individualized personalization of consumers

It is expected that mobile Internet will cause a high impact due to the elevated usage from persons [28], developing countries and organizations [11] and the increasing number of organizations investing in this area [29]. The use of network technologies and innovative techniques welcome

82

the need for mobile data offloading to maintain quality of service, obtain cost reduction and the opportunity for new business [30]. Picoto et.al [27] agreed that the variety of mobile devices provide alternatives for marketing as well as opportunities of new business and stated they are the "most direct and individual way to communicate with people". One of the most important contributions of the mobile device in the technology scenario is that "without device adoption, there is no mobile commerce" [31] having a direct effect in the international business growth. The high usage and increase demand for mobile devices has driven organizations to implement the embracement for these technologies causing a big impact on the way business are managed [32]. The theme of mobility is part of the business technological agenda for most companies today. Nowadays, there is a great demand for access to business information through mobile technologies, changing the way the labor force works. New technologies of integration of mobile devices such as laptops, tablets, smart phones and the cloud computing era, make it easier than ever for workers to collaborate and businesses to communicate. These new ways of working, makes organizations more efficient and more valuable. Organizations that embrace mobility for business purposes likely will become not just more efficient, every day they are learning more about the ways mobile technology can increase their productivity and profitability. The learning of this new way mobile technology can help provides many benefits across a wide range of intra-firm and inter-firm business processes and transactions. Those benefits include the reduction of transaction costs and increasing of speed and reliability of transactions for both business-to-business (B2B) and business-to-consumer (B2C) transactions. In addition, mobile technology can improve the service offered to customers, being effective tools to improve external communications and the quality of services for customers. This leads to great flexibility in working, for example, enabling home working, or working while travelling.

Complexity in Mobile Technology
Complexity, defined as the "degree to which an innovation is perceived as difficult to understand and use" [33].

Compatibility in Mobile Technology
Compatibility, referred to the "degree to which an innovation is perceived as being consistent with the existing value, past experiences, and needs of potential adopters" [33].

Policy & Legal environment in External Task Environment
Policy & legal environment "includes all the environmental relevant governmental regulations" [34].

ICT Infrastructure in External Task Environment
Information and communication technologies (ICT) infrastructure includes "telecommunication networks as well as both the national and organizational internet, E-commerce and mobile technology infrastructure" [19].

Social Factors in the Organization
Social factors, refers to the "individual's internalization of the reference group's subjective culture, and specific

interpersonal agreements that the individual has made with others, in specific social situations" [35].

Trust in the Organization
Trust, indicates a "positive belief about the perceived reliability of, dependability of, and confidence in a person, object, or process" [36].

Organizational Culture in External Task Environment
Organizational culture refers to the "basic pattern of shared assumptions, values, and beliefs considered being the correct way of thinking about and acting on problems and opportunities facing the organization" [37].

Figure 1. *Proposed model for factors that will have an influence in the adoption of mobile technology in the international business growth Adapted from "The proposed m-commerce organizational adoption model" [18]*

4.3 Hypotheses
The literature review and conceptual research have identified relevant factors to the embracement and enriching of the mobile technology adoption while understanding its importance in the international business growth (see figure-1). The following research hypotheses are suggested to facilitate and promote future empirical research:

Hypothesis 1: Complexity in the technology context will have a positive influence on the degree to efficiency and success of mobile technology adoption in the international business growth [33].

Hypothesis 2: Compatibility in the technology context will have a positive influence on the efficiency and success of mobile technology adoption in the international business growth [33].

Hypothesis 3: Policy and legal environment in the external task environment context will have a positive influence in lead to the mobile technology adoption in the international business growth [34].

Hypothesis 4: ICT infrastructure in the external task environment context will have a positive influence in the performance and effort expectancy and facilitating conditions on the adoption of mobile technology in the international business growth [19].

Hypothesis 5: Social factors in the organizational context will have a positive impact to the consumer attitude toward

the intention of the adoption of mobile technology in the international business growth [35].

Hypothesis 6: Trust towards the brand image and satisfaction all directly affecting customer will have an indirect impact via satisfaction on trust towards the adoption of mobile technology in the international business growth [36].

Hypothesis 7: Organizational culture in external task environment context will have a positive consequence in setting realistic adoption targets in the adoption of mobile technology in the international business growth [37].

5 RESULTS

Per literature findings, the selected factors drive for improvements and reduction of the performance gaps among each criterion and aspect when setting the possible mobile technology adoption.

Hypothesis 1: Complexity factor in the technology context influence positively on the degree to which the efficiency and success is perceived with the use of mobile technology in the international business growth [33].

Hypothesis 2: Compatibility factor in the technology context influence positively on the degree of efficiency of the innovation is perceived with the use of mobile technology in the international business growth [33].

Hypothesis 3: The legal environment factor examines discussion regarding the possible explanations for the adoption [34].

Hypothesis 4: The ICT infrastructure criterion positively impacts the use of mobile technology due to the performance, effort expectancy, social influence and facilitating conditions it promotes [19].

Hypothesis 5: The social factor, consumers' optimistic attitude toward innovative technologies, like mobile technology, was highly influential to their intention to adopt it. Other dimensions of privacy concerns could have differential impacts depending on the information content [35].

Hypothesis 6: The trust factor showed literature revision results showed that despite customization, brand image and satisfaction all directly affecting customer trust towards the mobile technology adoption, customization and brand image equally had a stronger direct effect on trust formation. In addition, interactivity and responsiveness had no direct impact, but had an indirect impact via satisfaction on trust towards the mobile technology adoption [36].

Hypothesis 7: The organization culture factor, differences between the usage of and attitudes to mobile technology services are attributed to the different levels of collectivism and power distance among the cultures and to structural differences between the markets. An understanding of the cultural dimensions of a market can aid adopters of technology in developing mobile technology services,

marketing these appropriately and in setting realistic adoption targets [37].

6 DISCUSSION AND CONCLUSION

This paper has highlighted the gap in the research concerning mobile technology elements for its establishment in the international business. In particular, it is noted that organizational factors contributing to its embracement have not yet been conclusively investigated. To this end, this research presented the findings of an extensive literature review leading to the identification of promising factors able to support future researches on the adoption. In this case the organizational acceptance factors extracted from the literature were presumed as driving aspects for future investigations. The seven (7) research suggestions could be used to extend this development as stated above; namely a research proposition for the investigation of what elements influence the adoption of mobile technology in the international business strategy. These were categorized under the three (3) elements embracing of the technological innovation according to the TOE framework: technological, organization and environment. The research concludes by stating that innovation management is essential in modern business [38], [39] and is imperative for the proactive management in a complex and dynamic world [14]. It should be aligned to the architecture of the business functions to make profits [40] and achieve the strategic objectives [3]. In summary, it is implied that the support of more flexible working practices provided by services over the internet with the integration of mobile technology, will have a positive impact in the growth of the international business. Certainly, one of the advantages of a mobile device is that it supports this integration especially in the long-distance relations [15], [28].

REFERENCES

[1] N. Yang, "Small Business and International Entrepreneurship in the Economic Hard Time: A Global Strategic Perspective", International Journal of Entrepreneurship, 16, pp. 113-131, 2012.

[2] S. Kim & G. Garrison, "Investigating Mobile Wireless Technology Adoption: An Extension of the Technology Acceptance Model", Information Systems Frontiers, 11(3), pp.323-333, 2009.

[3] J. Barragán & J. Vela, "Impacto de las TICs en la Gestión de Negocios Internacionales", International Journal of Good Conscience, 10(3), pp.18-33, 2015.

[4] W. Nowinski & E. Bakinowska, "A Logistic Model Study of Endogenous and Exogenous Factors Affecting Polish SMES' Internationalization Speed", Argumenta Oeconomica, 1(28), pp. 155-179, 2012.

[5] E. Junarsin, "Potential Advantages and Challenges in International Business Strategy: A Case Study", The Journal of Global Business Issues, 6(1), pp. 21, 2012.

[6]   T. Liang, C. Huang & B. Lin, "Adoption of Mobile Technology in Business: a Fit-Viability Model", Industrial Management & Data Systems, 107(8), pp.1154-1169, 2007.

[7]   E. Saidi, "Mobile Opportunities, Mobile Problems: Assessing Mobile Commerce Implementation Issues in Malawi", Journal of Internet Banking and Commerce, 14(1), pp. 1-10, 2009.

[8]   W. Shiau, "Improving Firm Performance through a Mobile Auditing Assistance System, International Journal of Enterprise Information Systems (IJEIS), 10(4), pp.22-35, 2014.

[9]   B. Rundh, "International Market Development: The Small and Medium Sized Firm's Opportunity or Dilemma", Management Decision, 53(6), pp. 1329-1354, 2015.

[10] C. Chelariu & T. Osmonbekov, "Communication Technology in International Business-to-Business Relationships", Journal of Business & Industrial Marketing, 29(1), pp. 24-33, 2014.

[11] L. Yong, "The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development", Industrial Development Report 2016, United Nations Industrial Development Organization, pp. 49, 2016.

[12] R. DePietro, E. Wiarda, & M. Fleischer, "The Context for Change: Organization, Technology and Environment", in Tornatzky, L. G. and Fleischer, M. (Eds.) The processes of technological innovation, Lexington Books: Lexington, MA., pp. 151-175, 1990.

[13] U. Andersson, A. Dasí, R. Mudambi, & T. Pedersen, "Technology, Innovation and Knowledge: The Importance of Ideas an International Connectivity", Journal of World Business, 51, pp. 153-162, 2015.

[14] A. Onetti, A. Zucchella, M. Jones, & P. McDougall-Covin, "Internationalization, Innovation and Entrepreneurship: Business Models for New Technology-Based Firms", Journal of Management and Governance, 14(3), pp. 1-32, 2010.

[15] F. David, "Strategic Management: Concepts and Cases", Prentice Hall, 13th Edition, pp. 685, 2011.

[16] K. Thomé & J. Medeiros, "Drivers of Successful International Business Strategy", International Journal of Emerging Markets, 11(1), pp. 89-110, 2016.

[17] R. Samans & M. Drzenick, "The Global Information Report", World Economic Forum, pp. 18, 2016.

[18] H. Alfahl, L. Sanzogni & L. Houghton, "Mobile Commerce Adoption in Organizations: A Literature Review and Future Research Directions", Journal of Electronic Commerce in Organizations, 10(2), pp.61-78, 2012.

[19] International Telecommunication Union, Statistics: Global ICT Developments, 2001-2016. New York, NY: Author. Recovered from http://www.itu.int/en/itu-d/statistics/pages/stat/default.aspx#, 2016.

[20] M. Musteen, D. Datta & M. Butts, "Do International Networks and Foreign Market Knowledge Facilitate SME Internationalization?" Evidence from the Czech Republic. Entrepreneurship: Theory and Practice, 38(4), pp.749-774, 2014.

[21] M. Stoica, W. Roach & D. Price, "Wireless Business and The Impact on Firm Performance: The Strategic Move to Adopt a New Technology", International Journal of Management & Information Systems, 16(1), pp. 45, 2012.

[22] J. Rowley, A. Baregheh & S. Sambrook, "Towards an Innovation-Type Mapping Tool", Management Decision, 49(1), pp.73-86, 2011.

[23] A. Negahban & C. Chung, "Discovering Determinants of Users Perception of Mobile Device Functionality Fit", Computers in Human Behavior", 35, pp.75-84, 2014.

[24] R. Tiwari, R. Buse & C. Herstatt, "From Electronic to Mobile Commerce: Opportunities through Technology Convergence for Business Services", Asia Pacific Tech Monitor, 23(5), pp.38-45, 2006.

[25] R. Crotti, "The Top 10 Countries from Embracing IT", World Economic Forum, pp. 10, 2014.

[26] P. Benou & C. Vassilakis, "The Conceptual Model of Context for Mobile Commerce Applications", Electronic Commerce Research, 10(2), pp.139-165, 2010.

[27] W. Picoto, F. Bélanger & A. Pala-dos-Reis, "A Technology-Organisation-Environment (TOE)-Based M-Business Value Instrument", International Journal Mobile Communications, 12(1), pp. 78-101, 2014.

[28] S. Dutta, B. Osorio & R. Greenhill, "The Global Information Technology Report", World Economic Forum, pp. 48, 2012.

[29] D. Amoroso & M. Ogawa, "Comparing Mobile and Internet Adoption Factors of Loyalty and Satisfaction with Online Shopping Consumers", International Journal of E-Business Research (IJEBR), 9(2), pp.24-45, 2013.

[30] A. Aijaz, A. Hamid & M. Amani, "A Survey on Mobile Data Offloading: Technical and Business

Perspectives", IEEE Wireless Communications, pp. 104-112, 2013.

[31]   S. Sarker & J. Wells, "Understanding Mobile Handheld Device Use and Adoption", Communications of the ACM, 46(12), pp. 35-40, 2003.

[32]   K. Ortbach, T. Brockmann & S. Stieglitz, "Drivers for the Adoption of Mobile Device Management in Organizations", Twenty Second European Conferences on Information Systems, Tel Aviv 2014.

[33]   M. Lu, S. Hu, L. Huang & G. Tzeng, "Evaluating the Implementation of Business-to-Business M-Commerce by SMEs based on a New Hybrid MADM Model", Management Decision, 53(2), pp. 290-317, 2015.

[34]   A. Henten, H. Olesen, D. Saugstrup & T. Su-En, "Mobile Communications: Europe, Japan and South Korea in a Comparative Perspective", The Journal of Policy, Regulation and Strategy for Telecommunications, Information and Media, 6(3), pp.197-207, 2004.

[35]   J. Hwang & L. Good, "Intelligent Sensor-Based Services Success: The Role of Consumer Characteristics and Information", European Journal of Marketing, 48(3), pp.406-431, 2014.

[36]   S. Yung & Y. Li, "Building Trust in M-Commerce: Contributions from Quality and Satisfaction", Online Information Review, 33(6), pp.1066-1086, 2009.

[37]   P. Harris, R. Rettie & C. Cheung, "Adoption and Usage of M-Commerce: A Cross-Cultural Comparison of Hong Kong and the United Kingdom", Journal of Electronic Commerce Research, 6(3), pp.210-224, 2005.

[38]   G. Hammel, "The Why, What, and How of Management Innovation", Harvard Business Review, pp. 72, 2006.

[39]   J. Heskett, "What is Management's Role in Innovation?" Harvard Business School Working Knowledge, pp. 1-2, 2007.

[40]   E. Turban, L. Volonino & G. Wood, "Information Technology for Management-Digital Strategies for Insight, Action, and Sustainable Performance", 10th Edition, WILEY, pp. 297, 2015.