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ABSTRACT

Evidence suggests varied motives drives individuals to use dual-purposed systems such as social media. Current models of IT acceptance do not account for all these motives, and, while these models have been used in the context of dual-purposed systems, the focus was usually on the productivity side of use. Building on theories of motivational needs and person-environment fit, we conceptualize the construct of user-system fit - a construct that comprises four dimensions of fit – user-expression, needs-supplies, demands-abilities, and user-group fit – and which we hypothesize is positively associated with IT use. A model is developed and tested, and the results indicate that user-system fit explains 32.2% of usage.

Keywords

Dual-purposed Systems, IT adoption, IT Use, Motivational Needs, Person-Environment Fit Theory.

INTRODUCTION

Information systems research has a rich history in studying adoption and use of productivity-oriented Information systems using established models such as the technology acceptance model (TAM). Another stream of research has paid attention to hedonic systems, more often-than-not using TAM while adding relevant constructs such as perceived enjoyment (e.g., Davis et al., 1992; Van der Heijden, 2004). Not enough effort is being spent, however, on understanding the adoption and use of dual-purposed systems. These systems, such as social media, are neither purely utilitarian nor hedonic, but rather have the capability of satisfying extrinsic and intrinsic motivations (e.g., Wu & Lu, 2013).

It is imperative for organizations to understand what motivates individuals, whether customers or employees, to adopt and use dual-purposed systems, especially with these systems being increasingly viewed as an important component of organizational IT resources. A case in point is social media. Indeed, results from a McKinsey global survey show that these technologies are being used by 76% of companies surveyed for customer-related purposes, up from 45% in 2007 and that 68% of these companies use them for internal purposes, up from 50% in 2007 (McKinsey, 2013).

The limitations of current models of individual acceptance in their ability to explain adoption and use of dual-purposed systems have already been acknowledged (e.g., Parameswaran & Whinston, 2007; Van der Heijden, 2004). A key limitation is that core constructs in most of these models, such as perceived usefulness (PU) or normative beliefs, do not explicitly address the complex set of needs that motivates individuals to adopt and use dual-purposed systems. This is such that PU has been described as a black box (Benbasat & Barki, 2007).

This study uses the person-environment fit theory to develop and test a model of user-system fit that addresses some of these limitations by using constructs that are established within the nomological network of interactive psychology, and are being conceptualized and measured in a way that accounts for the diverse needs and values that come into play in adopting and using dual-purposed systems. This research hence contributes to the IT acceptance literature by introducing a model that adds to the theoretical arsenal of the IT adoption and acceptance field while contributing to a better understanding of the individual adoption and use of dual-purposed systems. For practice, our results may help organizations develop better strategies with regard to their various dual-purposed systems initiatives such as social media and mobile applications. For example, learning what motivates individuals to use dual-purposed systems may help organizations to more effectively engage their customers or plan incentives for employees to use such systems in value-added activities.

DUAL-PURPOSED SYSTEM

Dual-purposed systems are information systems that exhibit aspects of both productivity and hedonism & hence their use is argued to be driven by both extrinsic and intrinsic motivations (Soliman & Tuunainen, 2015). Dual-purposed systems take various forms and are becoming ubiquitous. They include various applications like email and calendars; web-based applications such as Dropbox and Skype; social media such as blogs, wikis and social networking (e.g., FaceBook and Twitter); mobile applications such as SMS and maps, as well as

varied devices like smartphones, tablets, and smartwatches. While current models in our field have been used in the context of dual-purposed systems, the focus in most of the studies was on the productivity perspective rather than the overall picture (For recent exceptions that considered a wider set of motivations behind dual-purposed systems adoption, please see Jung, 2014; Lin et al., 2014; Zolkepli & Kamarulzaman, 2015).

THEORETICAL BACKGROUND

Motivational needs influence the cognitive processes that produce behavioral variability (Kanfer, 1991). Latham (2007) argues that needs are crucial in predicting, explaining, and influencing motivation (Latham, 2007). Values, on the other hand, are enduring beliefs that a specific mode of conduct or end-state is preferable to its opposite (Rokeach, 1973). Values are key component of most work motivation theories (Latham, 2007). The person-environment (P-E) fit stream of research (Kristof, 1996; Kristof-Brown et al., 2005; Ostroff et al., 2005) provides a robust framework to study the relationships between motivational needs and IT use. Not only will this framework enable taking into account the reciprocal interactions between individuals and the systems they use, but the framework will also prove critical in examining the degree of congruence between the user's values and those underlying IT. P-E fit includes three categories of fit: person–job (P-J) fit, person–group (P-G) fit, and person–organization (P-O) fit (Ostroff et al., 2005). there are two core dimensions for P-J fit. The first is the demands-abilities (D-A) fit, in which employees' knowledge, skills, and abilities are commensurate with what the job requires. The second dimension is the needs-supplies (N-S) fit, which occurs when employees' needs, desires, or preferences are met by the job they perform (Edwards, 1991). P-O fit reflects the compatibility between characteristics of the individual such as personality, values, or goals and those of the organization such as culture, values, goals, and norms (Kristof, 1996; Ostroff et al., 2005; Verquer et al., 2003). P-O fit is a supplementary fit, which exists when there is a similarity between the characteristics of the individual and those of the environment (Kristof-Brown et al., 2005).

Here, we adopt the term user-expression (U-E) fit in replacement of P-O fit. We borrow the term *expression* from Markus & Silver (2008) who define *symbolic expressions* as the "communicative possibilities of a technical object for a specified user group" (p. 623). They argue that messages communicated include those related to 'technical objects' and others that are "pertaining to designers' or users' goals and values". It is in the latter type of messages that we are interested in with the user-expression type of fit. In the perspective of individual and volitional adoption and use of IT, we believe that U-E fit very well represents the perceived congruence between a user and the given system independently of whether the phenomenon happens within the structures of an organization or in his/her private realm.

P-G fit is defined as "the compatibility between individuals and their work group" (Kristof, 1996, p. 7) which may range from a small group of coworkers to a functional department, or a geographic division. This type of fit reflects psychological compatibility between coworkers and is operationalized at the individual level (Kristof-Brown et al., 2005).
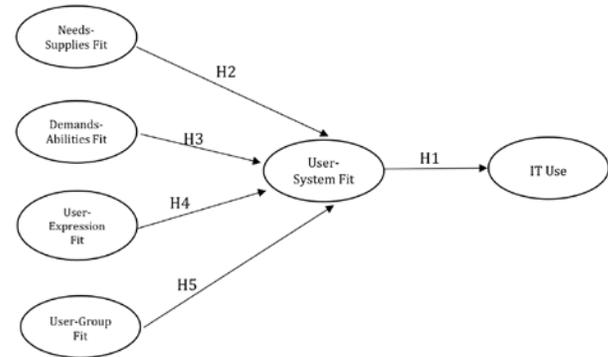

Figure 1. Research Model

A USER-SYSTEM FIT MODEL

The research model, shown in Figure 1, postulates that an individual will use a technology when s/he perceives congruence between that technology and his/her needs and values whether or not these are related to performance; when they consider being able (having the required skills and knowledge) to use the IT; and when one perceives the user group as compatible with him/her.

By adapting the various concepts of fit discussed earlier to the context of IT use, we aim to provide a theoretically sound explanation of adoption and use of dual-purposed systems by individuals. Our model suggests that user-system fit, which we define as *the perceived overall congruence between the user and the system,* will be positively associated with IT use. Perceived user-system fit comprises four dimensions representing the various facets of fit: user-expression fit, needs-supplies fit, demands-abilities fit, and user-group fit.

We theorize that the four types of fit - which tap into different facets of fit between the user and the system - will be positively associated with perceived user-system fit, such that an increase in any of the four dimensions of fit is expected to lead to better overall perceived user-system fit which in turn is hypothesized to lead to IT use. As perceived user-system fit comprises the four dimensions of fit, we hypothesize:

> H1: Perceived user-system fit will be positively related with IT use.

We adopt Edwards's (1991) conceptualization of person-job fit as needs-supplies fit and demands-abilities fit and adapt it to the IT use context. We define needs-supplies fit as *the degree to which using the system is perceived to be instrumental in fulfilling the one's desires and requirements* while we define demands-abilities fit as *the*

degree to which one believes that s/he has the skills and knowledge needed to use the system.

Psychological need fulfillment plays unique and influential roles in affecting work attitudes (Cable & Edwards, 2004), and needs–supplies fit has a strong impact on individual attitudes and behavior (Kristof-Brown et al., 2005). Empirical evidence suggests that individuals adopt various social media applications to satisfy needs that include enjoyment, reputation, altruism, belonging, and achievement (e.g., Glassberg et al., 2004; Hsu & Lin, 2008; Okoli & Oh 2007).

> H2: Perceived needs-supplies fit will be positively related with perceived user-system fit.

Demands – Abilities fit may be described as the 'flip side' of the N-S fit. That is, while N-S fit deals with the extent to which environmental supplies meet individual needs, D-A fit accounts for the individual's skills meeting environmental needs (Kristof, 1996; Kristof-Brown et al., 2005). Applying Edwards' (1991) definition of D-A fit to the voluntary IT use context, this type of fit reflects the extent at which individual's abilities and knowledge are perceived as commensurate with those required to use the system. We expect a positive relationship between demands-abilities fit and perceived user-system fit.

> H3: Perceived demands-abilities fit will be positively related with perceived user-system fit.

In the context of IT use, we suggest that user-expression fit is analogous to person-organization fit and we define it as *the degree of perceived congruence between the user's values and goals and those underlying the technology.* Gillmor (2004), for example, referred to the values of freedom and empowerment that may be felt by whom he calls 'grassroots journalists' who are using tools such as blogs to break out from the monopoly long enjoyed by media giants. Compatibility between values has been found to be positively associated with outcomes such as job satisfaction and organizational commitment (Verquer et al., 2003) as well as citizenship behavior (Cable & DeRue, 2002). Higgins et al. (2007) found a significant positive association between 'compatibility with values' and relative advantage. Thus, in the context of IT use, the next hypothesis:

> H4: Perceived user-expression fit will be positively related with perceived user-system fit.

User-group fit reflects *the degree of perceived congruence between the user's characteristics and personal preferences with those of the group.* Evidence from empirical research in the contexts of both more traditional online communities of practice (e.g. Wasko & Faraj, 2005) and social media social networks (e.g. Boyd & Ellison, 2007) indicates that individuals use social networking web sites because of shared interests with other members of that network. Even in such vast communities such as Facebook, users 'cluster' in groups or clubs, and sub-clubs (Lai & Turban, 2008). It could be

argued that this social behavior is related to what Kelman (1974) calls internalization, which refers to taking action as a result of congruence between one's own and a group's shared values or goals. We expect a significant relationship between perceived user-group fit and perceived user-system fit.

> H5: Perceived user-group fit will be positively related with perceived user-system fit.

RESEARCH METHOD

For the most part, while guided by existing instruments, new measures have been developed for this study. After the initial set of items was developed, a card sorting exercise was conducted and some modifications were carried out. A pre-test was then conducted, followed by a pilot study involving 151 respondents. All items were measured using a Likert-7 scale ranging from 1 (strongly disagree) to 7 (strongly agree). Access frequency and posting frequency were each measured with a 9-point ordinal scale, with "1" indicating no access/posting and "9" indicating many times a day. A web-based survey was administered to a sample 940 undergraduate students enrolled in an "Introduction to Information Systems" course at a large Canadian university. The student population at the University is varied in terms of ethnicity, age, and gender and seems to largely use social media. Many of the students either own their own small business or study on a part-time basis while working. 53% of our respondents are females and more than 92% of them are between 20-29 years of age. 66% of respondents work either on a full-time or part-time basis. 643 valid responses were received for a response rate of 68%.

Data Analysis and Results

We used SmartPLS 2.0 for data analysis. Composite reliability for all our constructs exceeded 0.7. To assess convergent validity, we have followed Fornell & Larcker's (1981) recommendation of using the average variance extracted (AVE) as a criterion, with an AVE value of at least 0.5 indicating sufficient convergent validity. All of the constructs in our null model had AVE scores exceeding 0.5. Discriminant validity was also assessed and established. To test for the significance of the model path estimates, we have run a bootstrap algorithm with 643 cases and 500 resamples as suggested by Hair et al (2011). All hypotheses are supported at p< 0.01 level, except for H3 - postulating a positive association between Demands-Abilities Fit and User-System Fit – which was not supported.

DISCUSSION AND CONTRIBUTIONS

Our results provide support to four of our five hypotheses suggesting that User-System Fit is a third-order construct formed by User-Expression Fit, Needs-Supplies Fit, and User-Group Fit. This is in line with the integrative view which researchers have suggested to take when dealing with various dimensions of fit (e.g., Cable & Edwards,

2004; Kristof, 1996). Our results suggest that – through its dimensions- the user-system fit construct is capable of capturing needs satisfaction and value similarity, thus representing an important addition to the current constructs in our field, especially in the case of dual-purposed systems that cater to a myriad of needs over and above productivity-related ones. Our results also indicate a significant positive association between User-System Fit and social media use. Furthermore, the results show an acceptable explanatory power for our model with 32% of the variance of social media use explained.

This study provides several contributions to research. First, relying on motivational needs and person-environment fit as a theoretical lens, the construct of user-system fit provides a complementary perspective to current models of acceptance and allows for an improved understanding of triggers of dual-purposed systems adoption and use. User-system fit, as a multi-dimensional construct, is a step toward opening the black box of perceived usefulness (e.g., Benbasat & Barki, 2007). Second, our results confirm, integrate, and expand results from prior studies. For instance, our results confirm Zolkepli & Kamarulzaman's (2015) and Lin et al's (2014) results indicating that social influence and interaction and the need to belong are triggers of social media adoption and use. Further, as Jung (2014), we found the need to communicate to drive usage. By providing a preliminary empirical validation of the user-system fit construct, the study contributes to the research efforts aiming to better explain and predict IT adoption and use. Since many dual-purposed systems are mainly used on a voluntary basis, understanding what contributes to their adoption and use is important both for research and practice.

The study also offers a number of contributions for practice. First, being aware of the various needs users have may help organizations deploy the right features and functionalities to cater to their various stakeholders' needs be they employees, clients, investors, or business partners. Our results suggest that these stakeholders most likely have various needs that a given system has to cater to, ideally offering personalized interface/functions based on users' needs. In a similar vein, application and device development organizations can benefit from results of studies such as this one to develop dual-purposed systems and technologies that will be more *useful* for their target markets. Our results indicate that Needs-supplies fit is the most important part of user-system fit for our respondents. This implies that applications and devices that can help/support users in fulfilling underlying needs such as the needs to belong or to connect may be more readily and widely adopted and used by young educated adults.

Established models like TAM have greatly contributed to our understanding of adoption and use of IT. However, the rich and complex nature of dual-purposed systems requires constructs and models that address their complementary aspects in a more comprehensive way so

to further our understanding of their adoption and use by individuals. As IT becomes increasingly dual-purposed, we trust such dual-purposed constructs are needed for better prediction and explanations of IT use by individuals.

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REFERENCES

1. Benbasat, I., & Barki, H. (2007). Quo vadis TAM?. *Journal of the Association for Information Systems*, 8(4), 211-218.

2. Boyd, D. M. and Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. Journal of Computer-Mediated Communication, 13(1), (http://jcmc.indiana.edu/vol13/issue1/boyd.ellison.html)

3. Cable, D. M., & DeRue, D. S. (2002). The convergent and discriminant validity of subjective fit perceptions. *Journal of Applied Psychology*, 87(5), 875-884.

4. Cable, D. M., & Edwards, J. R. (2004). Complementary and supplementary fit: a theoretical and empirical integration. *Journal of Applied Psychology*, 89(5), 822-834.

5. Higgins, C. A., Compeau, D. R., & Meister, D. B. (2007). From prediction to explanation: reconceptualizing and extending the perceived characteristics of innovating. *Journal of the Association for Information Systems*, 8(8), 409-439.

6. Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of applied Social Psychology*, 22(14), 1111-1132.

7. Edwards, J.R. (1991). Person–Job Fit: A Conceptual Integration, Literature Review and Methodological Critique. *International Review of Industrial/Organizational Psychology* (6), pp. 283–357.

8. Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 382-388.

9. Gillmor, D. 2004. We the Media: Grassroots Journalism by the People, for the People (http://oreilly.com/catalog/wemedia/book/index.csp)

10. Glassberg, B., Grover, V., and Teng, J. "The Measurement of Perceived Social Usefulness," in *Proceedings of the 10th Americas Conference on*

Information Systems, New York, NY, USA, 2004, pp. 1348-1355.

11. Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152.

12. Hsu, C. L., & Lin, J. C. C. (2008). Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation. *Information & Management*, 45(1), 65-74.

13. Jung, Y. (2014). What a smartphone is to me: understanding user values in using smartphones. *Information Systems Journal*, 24(4), 299-321.

14. Kanfer, R. (1991). Motivation theory and industrial and organizational psychology. In M. D. Dunnett & L. M. Hough (Eds.), Handbook of industrial and organizational psychology (Vol. 1, pp. 75-170). Palo Alto, CA: Consulting Psychologists Press.

15. Kelman, H.C. (1974). Further Thoughts on the Processes of Compliance, Identification, and Internalization. In Tedeschi, J.T. (Ed.), Perspectives on Social Power (pp. 126-171). Chicago: Aldine.

16. Kristof, A. L. (1996). Person-organization fit: an integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology*,49(1), 1-49.

17. Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals 'fit at work: a meta-analysis of person–job, person–organization, person–group, and person–supervisor fit. *Personnel Psychology*, 58(2), 281-342.

18. Lai, L. S., & Turban, E. (2008). Groups formation and operations in the Web 2.0 environment and social networks. *Group Decision and Negotiation*, 17(5), 387-402.

19. Latham, G.P. Work Motivation: History, Theory, Research, and Practice, SAGE, Thousand Oaks, 2007.

20. Lin, H., Fan, W., & Chau, P. Y. (2014). Determinants of users' continuance of social networking sites: A self-regulation perspective. *Information & Management*, 51(5), 595-603.

21. McKinsey & Company (2013). Evolution of the networked enterprise: McKinsey Global Survey results,http://www.mckinsey.com/insights/business_technology/evolution_of_the_networked_enterprise_mckinsey_global_survey_results, retrieved May 26, 2015.

22. Markus, M. L., & Silver, M. S. (2008). A foundation for the study of IT effects: A new look at DeSanctis and Poole's concepts of structural features and spirit.

Journal of the Association for Information Systems, 9(10), 609-632.

23. Okoli, C., & Oh, W. (2007). Investigating recognition-based performance in an open content community: A social capital perspective. *Information & Management*, 44(3), 240-252.

24. Ostroff, C., Shin, Y., & Kinicki, A. J. (2005). Multiple perspectives of congruence: Relationships between value congruence and employee attitudes. *Journal of Organizational Behavior*, 26(6), 591-623.

25. Parameswaran, M., & Whinston, A. B. (2007). Research issues in social computing. *Journal of the Association for Information Systems*, 8(6), 336-350.

26. Rokeach, M. (1973). The Nature of Human Values, Free Press, New York.

27. Soliman, W., & Tuunainen, V. K. (2015). Understanding continued use of crowdsourcing systems: an interpretive study. *Journal of Theoretical and Applied Electronic Commerce Research*, 10(1), 1-18.

28. Van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, 695-704.

29. Verquer, M. L., Beehr, T. A., & Wagner, S. H. (2003). A meta-analysis of relations between person–organization fit and work attitudes. *Journal of Vocational Behavior*, 63(3), 473-489.

30. Wasko, M. M., & Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 35-57.

31. Wu, J., & Lu, X. (2013). Effects of extrinsic and intrinsic motivators on using utilitarian, hedonic, and dual-purposed information systems: A meta-analysis. *Journal of the Association for Information Systems*, 14(3), 153-191.

32. Zolkepli, I. A., & Kamarulzaman, Y. (2015). Social media adoption: The role of media needs and innovation characteristics. *Computers in Human Behavior*, 43, 189-209.