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Azra Ayue Abdul Rahman
Universiti Teknologi Malaysia, azraayue@utm.my

Siti Aisyah Panatik
Universiti Teknologi Malaysia, saisyah@utm.my

Rose Alinda Alias
Universiti Teknologi Malaysia, alinda@utm.my

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The Mediating Role of Web 2.0 Usage in the Effect of Psychological Empowerment on Innovative Work Behavior among Academia in Malaysian Research Universities

Completed Research Paper

Azra Ayue Abdul Rahman
Department of Human Resource
Development,
Faculty of Management,
Universiti Teknologi Malaysia
azraayue@utm.my

Siti Aisyah Panatik
Department of Human Resource
Development,
Faculty of Management,
Universiti Teknologi Malaysia
saisyah@utm.my

Rose Alinda Alias
Department of Information Systems,
Faculty of Computing,
Universiti Teknologi Malaysia
alinda@utm.my

Abstract

Innovative work behavior is crucial to fulfill the demands for a lecturer's research activities especially at research universities. Prior literature indicated that psychological empowerment is an important predictor for innovative work behavior. Meanwhile, Web 2.0 is an indispensable tool for innovation among lecturers to facilitate their research activities. Thus, social cognitive theory was used to support the conceptual framework in identifying the mediating role of Web 2.0 usage in the effect of psychological empowerment on innovative work behavior. This study utilized quantitative approach using questionnaire as a tool to gather data from 393 lecturers of five research universities in Malaysia. Structural Equation Modeling (SEM) was used to analyze the direct and mediation effects of the variables in the conceptual framework. Web 2.0 usage was identified as the mediator for the effect of psychological empowerment on the realization of new ideas in innovative work behavior, specifically for the dimensions of meaning, competence and self-determination. Based on the results of the study, use of Web 2.0 is important among lecturers to enhance innovative work behavior.

Keywords: Web 2.0, psychological empowerment, innovative work behavior.

Introduction

The Malaysian government introduced the research university category in 2007. The decision was aimed at building new ecosystem, especially for research agenda in order to achieve government goals to strengthen research and innovation efforts in Malaysia. Universiti Sains Malaysia (USM), Universiti Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Putra Malaysia (UPM) and Universiti Teknologi Malaysia (UTM) were awarded the research university status for the significant impact they have made in research and in producing human capital for the country. The status was given by Ministry of Higher Education Malaysia (MOHE) after careful consideration on five aspects of human capital, publications, patents, intellectual property rights, and generation of income during the

audit process on the universities. In terms of human capital, the research university status must show an increase in the number of postgraduates and PhD students for the purpose of training future researchers. The publication of high impact journals from these universities must also show tremendous increase in both quantity and quality. Therefore, research universities and lecturers must be able to produce more academic researches and publication, which are lacking in Malaysia compared to other countries. Accordingly, innovation was identified as one of the important concerns of lecturers, especially in research universities, which give focal attention towards research activities.

In view of that, the role of lecturers has become more challenging. This is due to the need of fulfilling the workforce needed by research universities. As per Zaini Ujang (2010), it is important to develop innovation among lecturers through the creation of an innovative community, progressive and forward thinking individuals in terms of approach and action. Innovative work behavior is therefore needed so as to allow lecturers to accomplish their role in research activities, particularly at a time when the new environment calls for their development on innovation. For that reason, innovative work behavior is required for employees' innovation development (Messmann & Mulder, 2012). According to Messmann and Mulder (2012), innovative work behavior can be defined as employees' contribution to innovation development, which incorporates all work activities in relation to innovation development.

However, since ideas is the basis of innovation, and it is people who move it, the study of what stimulates or allows individual innovative work behavior is critical (Scott & Bruce, 1994). Consequently, individuals' empowerment plays a role in motivating or enabling their innovative work behaviors. Empowerment also enables employees to utilize knowledge and skills to respond to complexities in their profession (Masuod Taheri Iari *et al.*, 2012). Accordingly, when research universities desire innovative work behavior among lecturers to produce innovative outputs, all efforts that instill motivation should be identified. Psychological empowerment reflected the ongoing ebb and flow of a lecturer's perceptions about the self, behavior and outcomes. Lecturers, who are motivated, are said to be able to produce innovative work behavior. Therefore, it is important to focus on the aspects of psychological empowerment that affect innovative work behavior among lecturers in Malaysian research universities.

Meanwhile, Web 2.0 has emerged as a very useful tool among lecturers. Bhatti *et al.* (2014) stated that web technologies has facilitated the research activities of lecturers. According to Hester (2010), Web 2.0 can be defined as a second generation internet-based computing model, which made the shift from static web pages to web applications that are more dynamic and interactive. In relation to that, it is significant to identify how psychologically empowered lecturers in research universities use Web 2.0 to facilitate their innovative work behavior. This is crucial as the use of Web 2.0 continues to grow in popularity with educational institutions. Furthermore, research on the mediating role of Web 2.0 towards the effect of psychological empowerment on innovative work behavior among lecturers in Malaysian research universities has thus far received insufficient attention, and therefore, this study aimed at filling the gap.

Literature Review

Innovative Work Behavior

Research and development requirements create the situations on proliferation of academic demands. According to Zaini Ujang (2010), innovations need to be developed among lecturers through at least several approaches such as the creation of innovative community and individuals that have the spirit to advance in their ways of thinking, approach and action in various fields. These indeed demand tremendous lecturers' innovative work behavior in fulfilling their roles for research activities, especially at a time when these new ecosystem require much of their development on innovation. Therefore, in order to improve the development of innovations, an understanding of employees' innovative work behavior is important.

Innovative work behavior can be defined as the sum of all physical or cognitive work activities employees' carry out solitarily or in a social setting in order to generate, promote and realize ideas that are new and applicable to their specific work context (Messmann *et al.*, 2010). Drawing from Kanter (1988) works and describing West and Farr (1989), Scott and Bruce (1994) assessed three dimensions of idea generation, idea promotion and idea realization to build the conception of innovative work behavior. Idea generation refer to creating new ideas for difficult issues; searching out new working methods, techniques or instruments; and generating original solutions for problems. Meanwhile, idea promotion refers to mobilizing support for innovative ideas; acquiring approval for innovative ideas;

and making important organizational members enthusiastic for innovative ideas. Accordingly, idea realization refers to transforming innovative ideas into useful applications; introducing innovative ideas into the work environment in a systematic way; and evaluating the utility of innovative ideas. This study implies the three dimensions of idea generation, idea promotion and idea realization that been distinguish from Kanter (1988), West and Farr (1989), and Scott and Bruce (1994) as its extensiveness to reflect the conception of innovative work behavior in the intended work role.

Psychological Empowerment

The organization must inspect every dimension and should be ready to take necessary actions so as to increase the level of individual agreement towards the dimensions as well as increase the level of psychological empowerment experienced by individuals. Conger and Kanungo (1988) highlighted the notions of psychological empowerment as a process that enhances self-efficacy feeling among organizational members with the help of identifying a state that causes powerlessness and also through the reduction of the powerlessness state. In accordance with Thomas and Velthouse (1990), psychological empowerment is a factor of internal motivation that shows dynamic role of employees in an organization. Accordingly, psychological empowerment is defined as a construct that is motivational and can be displayed in four dimensions, namely meaning, competence, self-determination and impact. All these dimensions show an active direction to a work role (Spreitzer, 1995).

There are studies that relate psychological empowerment with innovative work behavior. For example, Knol and van Linge (2009) investigated the relationship between structural empowerment/psychological empowerment on innovative behavior for nurses in dynamic healthcare systems. Meanwhile, Nik Azida Abd Ghani *et al.* (2009) assessed the relationship between psychological empowerment on innovative behavior among lecturers in polytechnic institutions. All these studies were related to the relationship between psychological empowerment and innovative work behavior.

This present study took a further leap as it examined the effect of psychological empowerment on innovative work behavior with the mediating role of Web 2.0 usage among lecturers in research universities. This matter is crucial due to the onset of new era academia innovation culture challenges in Malaysian higher education (Zaini Ujang, 2010, 2011).

Web 2.0 Usage

The use of Internet has become an inescapable need for institutions of higher education (Thanuskodi, 2011). Lecturers have utilized various technologies on the Internet such as Web 2.0 since the growing access of the Internet throughout the country including in education systems. As the Web 2.0 usage continues to grow in popularity with educational institutions, Web 2.0 usage has become an evitable necessity for lecturers.

Hester (2010) defines Web 2.0 as the model for second generation Internet-based computing, that made the transition from static web pages to more dynamic and interactive web applications. In other words, Web 2.0 is technologically driven and designed to allow people to communicate, share information and create online communities (Garaba, 2012). Web 2.0 covers a wide range of technologies and open standards that underpin the Internet. For example, technologies such as story boards, graphic aids, podcast/vodcast, web-based shared calendar, blog, document and multimedia sharing, wiki, web conferencing, virtual learning environment, forum, and office online. Other examples are technologies such as social search, social bookmarking, social network, e-portfolio, web syndication, polling, word clouds/ tag clouds, prediction markets, instant messaging and news groups.

Web 2.0 usage developments have somehow provided new insight for the study on psychological empowerment, as the application has become an instrument that allows users to develop, contribute, collaborate, customize and distribute web content. There are studies that identify how Web 2.0 empowers its users. The researches by Zahurin Mat Aji *et al.* (2010), Schumann *et al.* (2012), Kmiecik *et al.* (2012), Siti Salina Saidin (2015) and Amichai-Hamburger *et al.* (2008) highlighted that the internet offers the potential to present individuals with psychological empowerment.

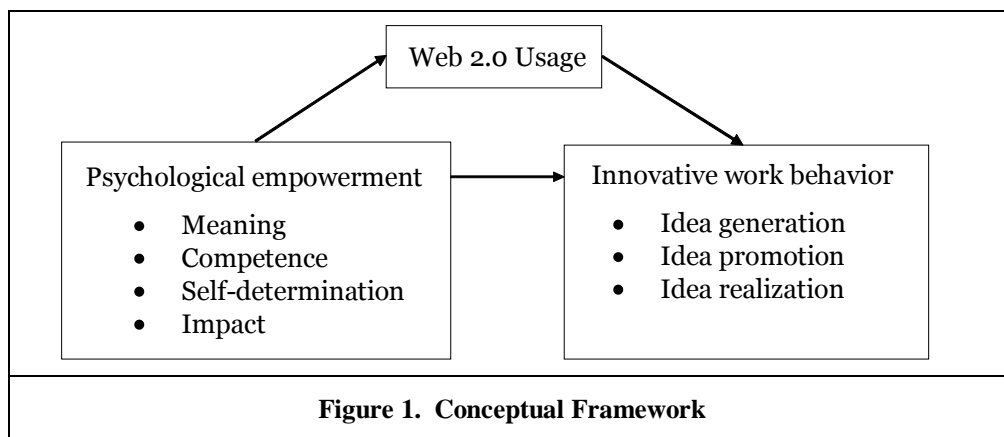
Nevertheless, as was supported by Wang (2006), there is inadequate number of studies identifying how people, who are psychological empowered, would use Web 2.0 to generate innovative work behavior. Therefore, this study attempted to fill up the paucity by focusing on lecturers, who are psychologically empowered and use Web 2.0. Besides, as per Chiang *et al.* (2009), the heterogeneity of Web 2.0, if studied appropriately, is capable of providing insight on human information behavior.

Conceptual Framework of the Study

In identifying the interaction between a person and behavior, the social cognitive theory (Bandura, 1986) is the most suitable theory for the purpose of this study. Social cognitive theory consists of interaction between personal factor, behavior and environment. It can be used for predicting, understanding and changing human behavior. According to the theory, the relation between a person and his/her behavior is influenced by his/her thoughts and actions. As far as the interaction between a person and environment is concerned, this interaction consists of cognitive ability and human beliefs, which are developed and reformed by social influences and structures present in the environment. In addition, the interaction between the environment and behavior involves one's behavior, which determines the aspects of their environment, and that environment modifies their behavior (Bandura, 1986). Thus, this theory provides a suitable lens in identifying the mediating role of Web 2.0 towards the effect of psychological empowerment (personal factor) on innovative work behavior (behavior).

Web 2.0 usage is introduced as mediating variable in the effect of psychological empowerment on innovative work behavior. Mediator variable is a third variable that explains how or why two other variables are related. For example, Marane (2012) studied the effect of psychological empowerment on innovative work behavior through trust as a mediator among managers. Besides that, Singh *et al.* (2012) demonstrated the importance of psychological empowerment in fostering innovative behavior through job involvement as a mediator among women primary school teachers. However, there is a scarcity in examining internet usage, especially Web 2.0 usage, as a mediating variable towards the effect of psychological empowerment on innovative work behavior. As was highlighted by Hertogh *et al.* (2011), the use of Web 2.0 is inevitable and it is a helpful tool for research activities. However, there is a lack of research devoted to the psychological empowerment-innovative work behavior in relation with Web 2.0 usage. Therefore, it is important to set up an agenda to identify the mediating role of Web 2.0 usage towards the effect of psychological empowerment on innovative work behavior. By testing the mediating role of Web 2.0 usage among lecturers, valuable insight on its effect in the context of Malaysian research universities can be obtained.

Figure 1 shows the conceptual framework for this study that focuses on the mediating role of Web 2.0 towards the effect of psychological empowerment on innovative work behavior among lecturers in Malaysian research universities.



As in Figure 1, the conceptual framework illustrates the variables and dimensions for this study based on the literature discussed in previous sub section. In this context of study, Web 2.0 usage is the mediating variable. Psychological empowerment is the predictor variable with the dimensions of meaning, competence, self-determination and impact. Finally, innovative work behavior is the outcome variable with the dimensions of idea generation, idea promotion and idea realization.

Methodology

This study was carried out from positivist paradigm with quantitative approach. This study used surveys as research strategy by adapting questionnaire technique. A total number of 440 questionnaires were distributed and 393 questionnaires were returned, hence the response rate was 89%. The respondents were academicians from five research universities. These five universities are Universiti Malaya, Universiti Sains Malaysia, Universiti Teknologi Malaysia, Universiti Putra Malaysia, and Universiti Kebangsaan Malaysia.

Web 2.0 usage was measured using newly constructed questionnaire instrument based from Krumova (2012) model of Web 2.0. It consists of twenty one items that assessed user's degree of Web 2.0 usage. Accordingly, innovative work behavior was measured by adapting the instruments by Scott and Bruce (1994). It consists of nine items where three items each were designed to measure the idea generation, idea promotion and idea realization. The 7-points Likert scale ranging from "strongly disagree (1)" to "strongly agree (7)" were used to measure the items in the questionnaire of this study. The reason for 7-points scale was to allow the respondents of this questionnaire to have a wider choice to rightly express their agreeableness or disagreeableness on the statement in the questionnaire.

As for the data collection methods, both face-to-face survey and drop-off survey were utilized. A face-to-face survey is suitable for this study as it helps to hand respondents lists of choices from which they are to select an answer. It is also helpful when the researcher might need to give the respondents other types of visual aids such as tables/appendix to help formulate answers (Czaja *et al.*, 2005). As highlighted by Salant and Dillman (1994), face-to-face survey is best suited to maybe complex questionnaires. This is accommodating especially in Web 2.0 usage section of the survey in this study. Web 2.0 usage section contain questionnaires that might be complex as it contains technological terms and may need further clarification from the researcher to the respondents. However, there are also respondents that prefer the drop-off survey method as it is more convenient for them to give the feedback at their own suitable time.

Data collected in this study were analyzed using SPSS and SEM AMOS. The data collected were analyzed through preliminary data analysis, psychometric analysis of research instruments, and hypotheses testing.

In the preliminary data analysis of research instruments, it looks at the normality analysis and the multicollinearity analysis. Initially, normality test was conducted as an early step in examining the data collected. Through normality analysis, data collected were investigated whether it is approximately being normally distributed. In details, the information of skewness and kurtosis statistics and also normal quantile-quantile plot (q-q plot) were gathered to access the normality assumption. Meanwhile, multicollinearity analysis was conducted to avoid the cause of strange results when attempting to study how well individual independent variables contribute to an understanding of the dependent variable.

As for the psychometric analysis of research instruments, it looks at the exploratory factor analysis (EFA) for Web 2.0 usage variable and confirmatory factor analysis (CFA) for the innovative work behavior variable. In this study, the measurement items for Web 2.0 usage variable were newly developed based on Krumova (2012) model of Web 2.0 items. Therefore, this study has taken the effort to conduct the exploratory factor analysis (EFA) to examine the newly developed questionnaires for Web 2.0 usage. For the newly developed measurement, EFA can be executed in the early stages of scale development to determine the number of latent constructs underlying a set of items (Wegener & Fabrigar, 2000). Accordingly, the confirmatory factor analysis (CFA) was employed to test the measurability of variables by testing the extent to which, observed items are linked to their underlying latent factors (Byrne, 2010).

Meanwhile, in the hypotheses testing, it looks at the model fit and path analysis. Model fit were measured to estimate how well a model fits the data. Accordingly, this study conducted path analysis to test the standardized path estimated (* $p < .05$) for the effect of Web 2.0 usage on innovative work behavior. Path analysis provides estimates of the magnitude and significance of hypothesized causal connections between sets of variables.

Findings

This study found that the respondents' age profile indicates that 7.9% or 31 respondents are at the 20-30 years old age categories. Meanwhile, almost half of the respondents (55.2% or 217 respondents) are at the age categories between 31 to 40 years old. Subsequently, 28.2% or 111 respondents are at the age categories between 41 to 50 years old. Lastly, 8.7% or 34 respondents are at the age categories between 31 to 40 years old. As for the respondents' gender profile, it indicates that 45.5 % or 179 respondents are male and 54.5% or 214 respondents are female.

Meanwhile, Table 1 shows the model fit for the mediating role of Web 2.0 usage.

Fit Index	X ² / df	CFI	GFI	IFI	NFI	RMSEA
Model	2.075	0.996	0.991	0.996	0.992	0.052
Recommended Criteria	≤5	≥0.90	≥0.90	≥0.90	≥0.90	≤0.10

Note: Recommended criteria by Hair *et al.* (2010)

Results showed that the measurement model obtained an observed norm X^2/df of 2.075, which was smaller than the recommended value of 5, and thus suggested a good fit for the measurement model. Furthermore, other index values such as CFI, GFI, IFI and NFI exceeded the recommended threshold value of 0.90 (i.e. 0.996, 0.991, 0.996 and 0.992 respectively). Also, the RMSEA value was 0.052, which was below the cut-off level of 0.10. All in all, the findings indicated that the measurement model fits the data well.

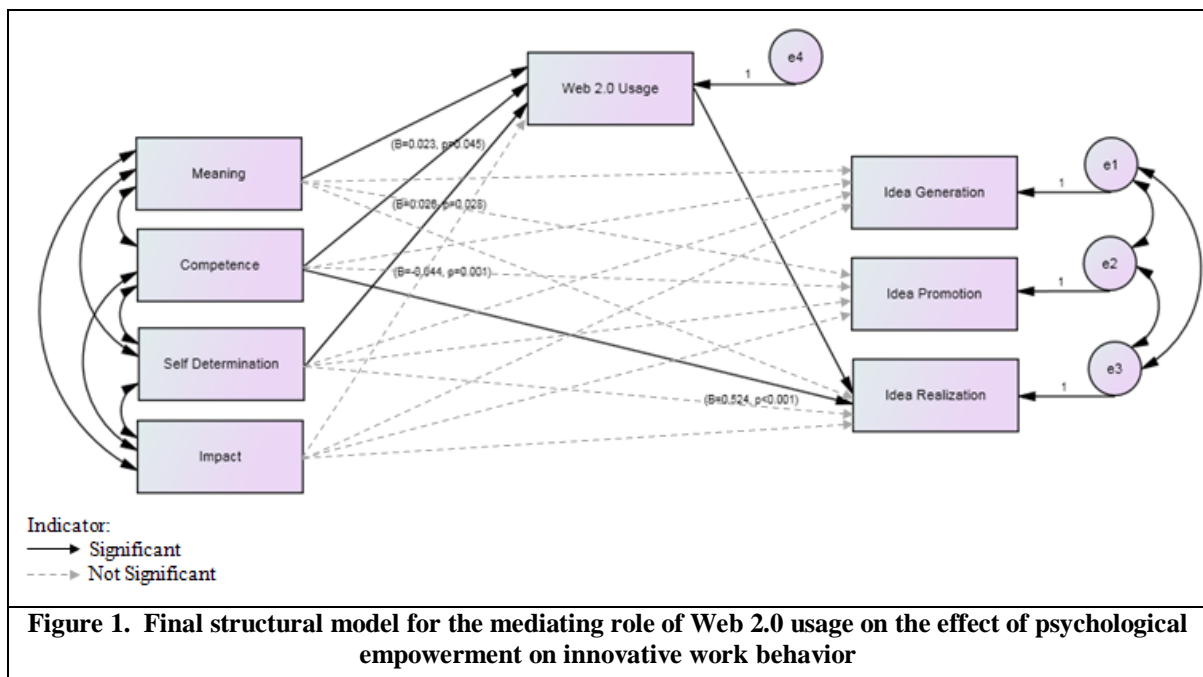
As for the path diagram of competence-Web 2.0 usage-idea realization, it showed the result of partially mediated. However, the path diagram of self determination-Web 2.0 usage-idea realization also corresponds to this mediation analysis by showing the result of fully mediated. In brief, Table 2 summarized the overall result of the Hypothesis 4 testing. The number of bootstrap resample was 2000.

Structural Path	Standardized Indirect Effect		Standardized Direct Effect		Remarks
	β	p	β	p	
Meaning → Web 2.0 Usage → Idea Generation	0.005	0.465	0.032	0.585	Not mediated
Competence → Web 2.0 Usage → Idea Generation	0.005	0.449	0.665	0.001	Not mediated
Self-determination → Web 2.0 Usage → Idea Generation	-0.009	0.438	0.068	0.183	Not mediated
Impact → Web 2.0 Usage → Idea Generation	0.004	0.499	0.097	0.057	Not mediated
Meaning → Web 2.0 Usage → Idea Promotion	0.005	0.374	0.045	0.356	Not mediated
Competence → Web 2.0 Usage → Idea Promotion	0.006	0.370	0.381	0.001	Not mediated

Self-determination → Web 2.0 Usage → Idea Promotion	-0.010	0.345	-0.005	0.871	Not mediated
Impact → Web 2.0 Usage → Idea Promotion	0.004	0.466	0.403	0.001	Not mediated
Meaning → Web 2.0 Usage → Idea Realization	0.023	0.045	0.083	0.109	Fully mediated
Competence → Web 2.0 Usage → Idea Realization	0.026	0.028	0.524	0.001	Partially mediated
Self-determination → Web 2.0 Usage → Idea Realization	-0.044	0.001	-0.045	0.447	Fully mediated
Impact → Web 2.0 Usage → Idea Realization	0.018	0.146	0.108	0.006	Not mediated

Note: Number of bootstrap resamples was 2000; $\beta < 1.00$; $p < 0.05$

To reiterate the findings, it was identified that only the associations of meaning on idea realization as well as self-determination on idea realization were fully mediated by Web 2.0 usage. In addition, Web 2.0 usage was also found to partially mediate the effect of competence on idea realization. In this study, meaning, self-determination and competence were dimensions of psychological empowerment, while idea realization was a dimension of innovative work behavior.



Discussion and Conclusion

Results of this study showed that Web 2.0 usage fully mediated the effects of the meaning dimension of psychological empowerment on the idea realization dimension of innovative work behavior. The mediation analysis demonstrated that Web 2.0 usage significantly mediated the effects of the meaning dimension on idea realization. This suggested that Web 2.0 usage was able to help lecturers

harmonize their personal value systems with the organizational mission and vision in the process of demonstrating their idea realization.

The founder of Web 2.0, O'Reilly (2005), highlighted that the application is superseding the predominantly publishing model of web-based services. Accordingly, information is now more dynamic, and undeniably, is able to facilitate in transforming innovative ideas into useful applications. For example, with the presence of Web 2.0 usage, (e.g. web conferencing), the top management of a university, which governs the research university's mission and vision, is able to use Web 2.0 as a medium to engage with the lecturers' personal value systems.

Additionally, through the usage of Web 2.0, lecturers deem that idea realization (e.g. transforming innovative ideas into useful applications with other researchers, either from local and/or foreign universities) is feasible. Therefore, the harmonious combination of both organizational and personal values, which was mediated by Web 2.0 usage, demonstrated idea realization. The characteristics of Web 2.0 enabled the variable to fully mediate the effects of the meaning dimension of psychological empowerment on the idea realization dimension of innovative work behavior.

This study also showed that Web 2.0 usage fully mediated the effects of the self-determination dimension of psychological empowerment on the idea realization dimension of innovative work behavior. The mediation analysis indicated that Web 2.0 usage significantly mediated the effects of self-determination dimension on idea realization. This suggested that Web 2.0 increased lecturers' self-determination, which also addressed the traditional bureaucratic social structures in the Malaysian workforce.

The rigid characteristics of hierarchy, formalization and centralization in research management at research universities constrain lecturers from enjoying a certain degree of freedom that is concerned with work. However, the characteristic of Web 2.0 is an "antidote" that improves the situation. The functionality of Web 2.0 is democratic and there are no hierarchical structures. In addition, it is based on participation. For example, with Web 2.0 usage (e.g. office online, document and multimedia sharing) lecturers are able to exert their own control and skip unnecessary protocols in sharing and managing information about their research activities. Moreover, the usage of Web 2.0 enhances the feeling of self-determination among lecturers in research universities so that they are more likely to realize new idea (e.g. transforming innovative ideas into useful applications).

This study also showed that Web 2.0 usage partially mediated the effects of the competence dimension of psychological empowerment on the idea realization dimension of innovative work behavior. Results indicated that the competence dimension had a direct effect on the idea realization dimension, and at the same time it was also ascertained that Web 2.0 usage significantly mediated the effects of the competence dimension on idea realization. The administration of research universities should also sustain the environment of knowledge culture as it upholds the knowledge and skills among competent lecturers. This could be done by maintaining up the "climate". For example, conducting inaugural speeches by professors from various fields and niche areas as well as inviting speakers from various industries to encourage knowledge and skills exchange. From the individual aspect, lecturers should update themselves with current knowledge and skills such as taking the initiative to attend e-learning and e-training courses.

Accordingly, as shown in this study, lecturers who have the ability to perform their work with the needed knowledge and skills would use Web 2.0 to implement new ideas in their work role, group and institution. This is due to lecturers having multiple applicable methods, either by conventional ways (e.g. sitting together to produce useful applications from innovative ideas) or by using Web 2.0 (e.g. document and multimedia sharing, office online, web-based shared calendar and web conferencing) in their idea realization phase. As such, the usage of Web 2.0 was found to partially mediate the effects of the competence dimension on idea realization.

Interestingly, findings of this present study showed that the mediating role of Web 2.0 usage was only on the effects of the meaning, competence and self-determination dimensions on the idea realization dimension. As such, the other two dimensions of innovative work behavior (i.e. idea generation and idea promotion) were not found to have any mediation effects. This implied that in realizing new ideas, the mediating role of Web 2.0 usage was significantly relevant among lecturers in Malaysian research universities. This owed to lecturers needs on a reliable medium such as Web 2.0 to mediate the effects of transforming innovative ideas into useful applications. In addition, this study also showed that there was no mediating role of Web 2.0 usage on the effects of the impact dimension on innovative work behavior.

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