



Expectancy Theory Analysis to Conduct Research at Malaysian Research University

Mohammad Shakir Bin Ramli^{1*}, Ahmad Bin Jusoh²

¹Department of Business Administration, Faculty of Management, Universiti Teknologi Malaysia, 81310 Skudai, Johor Bahru, Johor, Malaysia, ²Department of Business Administration, Faculty of Management, Universiti Teknologi Malaysia, 81310 Skudai, Johor Bahru, Johor, Malaysia. *Email: m-shakir@utm.my

ABSTRACT

This paper presents a study for analyzing and improving research productivity of Malaysian Research University (RU). In literature there are various general models for research and development analysis. Although many prior researchers have studied factors that influence research productivity, only a few have examined it from the behavioral perspective. From the behavioral perspective, it becomes apparent that motivation theory is the predominant theory that researchers utilized when studying research productivity. Further scrutinized of the previous studies have identified that the expectancy theory analysis was used by most of them either solely or with other theories. It has been proven that the expectancy theory when properly employed will most likely bring success to organizational change. This paper addresses the development of the proposed model to be applied at Malaysian RU.

Keywords: Expectancy Theory, Malaysian Research University, Research Productivity

JEL Classifications: I2, O3

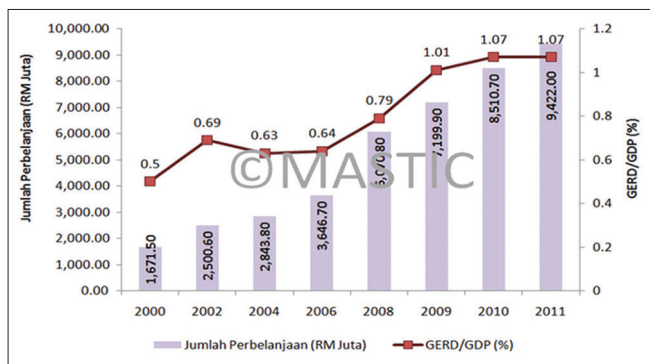
1. INTRODUCTION

The role of innovation, specifically indigenous research and development (R and D) has grown to assume great importance in many developed and developing countries including Malaysia. This is demonstrated by increasing investments on R and D in many sectors including government, academia and industry. This is based on the assumption that there is a positive relationship between amounts of resources allocated to R and D and R and D output and, therefore, the higher R and D expenses, the more effective the output. The gross expenditure (Gross Expenditures on R and D [GERD]) in Malaysia has been steadily increasing since 2000 as shown in Figure 1.

For fiscal year 2011, Malaysia recorded the highest GERD at RM 9422 million, an increase of almost three-fold over the GERD value in 2006 (RM 3646.70 million). The intensity of R and D, a measure of the percentage of GERD to gross domestic product (GDP) also shows an increment since 2004. In 2011, the GERD/GDP was

1.07%, an increment of 67.19% compared to year 2006. This achievement has exceeded the targeted GERD/GDP of 1.0% by 2015 set by the Economic Planning Unit (MASTIC, 2013).

In the 2013 National Budget, The Prime Minister of Malaysia has announced that RM600 millions to be allocated to the five research universities to conduct high-impact research in strategic fields. The Malaysian Government has committed in increasing spending in R and D for Research Universities from RM 100 million in 2006 boost to RM 600 million in 2013 (The Star Online, 2013). The Malaysian Government continues funding public research universities with the same budget for the year 2014 (The Malaysian Reserve, 2014). In the 2015 Budget recently, The Malaysian Government has committed allocation of the RM1.3 billions fund for the Ministry of Science, Technology and Innovation which would go towards research and development activities (The 2015 Budget Speech, 2014, p. 14). There is no doubt that a tremendous increase in resources devoted to R and D in this sector is needed, yet insufficient. Pushing factors to motivate faculty members to

Figure 1: R and D expenditure (2000-2011).

Source: MASTIC (2013)

participate in research activities are vital for the betterment of the university's research program.

2. RESEARCH UNIVERSITY (RU) IN MALAYSIA

Malaysia is a developing country without a strong tradition of R and D. In most countries (developed and developing alike), governments have played an active role in creating good numbers of R and D organizations including government research institutes, universities and industry for the promotion of domestic science and technological capability. These institutions are expected to play an important role in building up the nation technological competence. These institutions are seen also as important constituents of what is popularly known as National Innovation System (Nelson, 1994).

Universities in this age have evolved far beyond the traditional settings where university was an institution for disseminating knowledge, but today university has been running the role of country's innovation excellence where it has become a place for disseminating and producing knowledge as well as commercializing their research output which contributed largely to the country's economic development. In general, a university can be categorized according to its primary function which is related to teaching and research activities. For teaching universities, they focused more on undergraduate teaching. Whereas for research universities, the emphasis is primarily on research which leads to these universities having more significant postgraduate programs and more research-intensive academic programs in all of the faculties. In addition, universities that are categorized as research universities are often perceived as indicative of having high quality academic programs, academic staffs and students (Hu and Gill, 2000). In situations where the resources are limited, being recognized as a RU is deemed very important enable it to compete with other universities to get a significant amount of research grants (Chen et al., 2006).

To boost the achievement of R and D at the local public universities, Malaysia has taken big step by introducing the status of RU and five public universities have successfully been titled as RU, include Universiti Malaya, Universiti

Kebangsaan Malaysia, Universiti Sains Malaysia and Universiti Putra Malaysia in 2006, and Universiti Teknologi Malaysia in 2010. Being RU, these universities have been directed to upgrade research and development activities as well as commercialization (Ministry of Higher Education Malaysia, 2010). This development is seen as a catalyst to trigger healthy competitive nature within the public universities and it is hoped that this development will increase quality and quantity of countries invention and innovation.

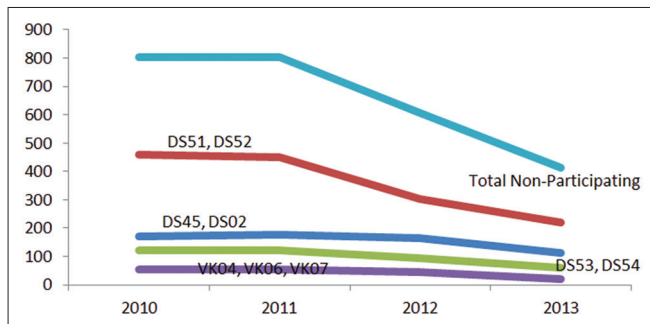
It should be noted that RU is not a title which is achieved whenever a university started to embark in research activity. However, it is awarded by the Ministry of Higher Education (MOHE) through decision by the evaluator of RU Committee, to the public university which has achieved specific criteria and passed performance assessment with 75% of total mark (MOHE, 2010). MOHE has listed down several key performance index (KPI) that must be achieved by each RU. The KPIs are:

1. At least 75% of RU lecturers are PhD holders
2. Two papers in national or international refereed and cited journals for each staff every year or cumulative impact factors for the institution of not <500 or cumulative citations index of not <5000 per year
3. Research grant for the academic staff at RM 50,000 for each staff every year of which at least 20% from international sources and 20% from private sector and research expenditure for each project must not <60% of grant attained every year
4. There should be 10 appointment of postdoctoral per year
5. Ratio of postgraduate and undergraduate 50:50.

From the above list, it is argued that the requirement of which each and every academic staff has to publish two papers in national or international refereed and cited journal every year is almost impossible to achieve. The argument behind this is that time span to publish a paper in a high impact journal takes more than a year process. While in terms of citation of the paper, this will take twice the time of paper publication in a high impact journal. Furthermore, it is also difficult to ensure 75% of RU lecturers obtain PhD within 4 years since the time normally required to finish a PhD degree is 3 years and in many cases, it exceed 3 years. With regard to research grants, sometimes it takes more than a year to finish a research and it is quite difficult to judge a RU accomplishment based on the research funding received by each academic staff every year. Looking at all these KPIs and it would appear that motivation factor is still considerably low among the academic staffs to invent and innovate whereas those two activities are the main factors that determine successful RU and entrepreneurial university.

At Universiti Teknologi Malaysia for example (Figure 2), though the number of academic staffs that did not produce any types of publication annually have decrease 50% since 2010-2013, yet the figure of non-participatory is still big. In 2013 almost 28.5% (~450) of the academic staffs (out of total 1579) did not produce any type of publications. It shows that UTM has untapped staffs potential. Therefore more incentives for the academic staffs are needed to motivate them towards these objectives.

Figure 2: Number of academic staffs that did not produce any type of publications (2010-2013).



Source: Research Management Center, UTM (2014)

Looking at the context of Malaysian RU, in order to improve the academic orientation and focus towards research, the current status of its faculties on motivation to conduct research has to be identified and made known. With this new discover information, it is hoped that these universities will provide better incentives and increase support mechanism that will encourage research activities and eventually cultivate the research culture in the long-run. Therefore, it is very important to know the motivating factors to conduct research amongst faculty members and the impact of these factors on their research productivity. In order to understand and explain how individual motivation works in organizational-change setting, the expectancy theory is employed since it has been proven that the expectancy theory when properly employed will most likely bring success to organizational change (Kini and Hobson, 2002).

Although Malaysian RUs are still in infancy stage compared to RU in the United States and United Kingdom, they hold a very promising future in establishing productive institutions in terms of producing new knowledge and expending it later on. To achieve and to maintain the status of a RU, the top management of the university together with the research management centre, the postgraduate school, the faculty and the academic staff have to actively engaged in research and other forms of intellectual activities such as publications. In short, the success and the prestige of the universities rely heavily and are direct results of highly productive research programs. Certain research culture and attitude need to be cultivated and this includes the expectancy of the faculty members. Motivating the faculty members to perform research is very important. This is particularly so in those universities that hopes to change their focus from a primarily teaching orientation to a research orientation.

3. MOTIVATION THEORY AS SUPPORTING THEORY TO RESEARCH PRODUCTIVITY

Fortunately, over recent decades, many concepts and theories have been elaborated for R and D environments, resulting in a growing stream of publications on this subject. The literature reviews indicate that there have been numerous studies investigating research productivity and these studies have used a range of different theories. In summary, the review of previous studies on research productivity from behavioral perspective found that

motivation theory is the predominant theory that researchers utilized in their study. The researchers applied various motivation theories (Table 1), such as expectancy theory, need theory, life-stage theory, socialization theory, cognitive motivation theory, efficacy theory and reinforcement theory. There are also other related factors which affect research productivity and academic staffs' behavior or willingness to perform research work. For instance: Demographic factors, environmental factors, institutional factors and personal career development factors.

Table 1 lists the range of researchers who used motivational theories in their studies of academic staffs' research productivity. All of them used the expectancy theory analysis either solely or with other related theories. Perhaps the single largest determinant of productivity among workers in all facets of life is motivation. Many organizational leaders and behavioral scholars consider the dynamic relationship between motivation and sustained effort as the key to understanding and predicting productivity of human resources. Several theories of motivation in organizational behavior research attempt to predict behavior in terms of measured productivity outcomes. Factors which alter or influence levels of motivation, such as increased job security can have a substantial impact on the production output of workers in organizations (Estes, 2012; Krautmann, 1990; Porter and Lawler, 1968; Vroom, 1964). According to Rowley (1996) motivation is key in the establishment and further development of quality in higher education.

4. MOTIVATIONAL FACTORS INFLUENCING ACADEMIC STAFFS' RESEARCH PRODUCTIVITY

In the context of higher education institution, there are some studies that have examined the motivational factors that significantly explain the research productivity (Chen et al., 2006; Fox, 1985; Goodwin and Sauer, 1995; Hu and Gill, 2000; Lee, 2004; Levitan and Ray, 1992). These factors can be categorized into two groups i.e., extrinsic and intrinsic (Chen et al., 2006). The extrinsic factors, for instance are promotion, salary, administrative assignment and teaching load. While the intrinsic factors are related to self-esteem such as peer recognition, earning respect from students, satisfying needs for curiosity and to stay abreast of the current knowledge. Brief descriptions of these factors are as follows.

4.1. Receiving Promotion or Permanent Staff Status

Dennis et al. (2005) stated that the promotion and tenure is an important career milestone for most faculty members. It is also one of the most important decisions that faculty members make that will impact the growth of the academia. The granting of promotion and tenure is normally based on the academic outputs such as publication. Previous studies have revealed that getting promotion or permanent staff status is one of the motivational factors in doing research among faculty members (Cargile and Bublitz, 1986; Hadjinicola and Soteriou, 2006; Hu and Gill, 2000; Tien, 2000).

4.2. Salary Increment

Previous studies revealed that the increment in salary as an important factor influencing faculty members to do research

Table 1: Motivational theories used in the previous research

Researchers	Title of study	Theories used
Butler and Cantrell (1989)	Extrinsic reward valence and productivity of business faculty: A within and between subjects decision modeling experiment	Expectancy theory
Blackburn and Lawrance (1995)	Faculty at work: Motivation, expectation, satisfaction	Reinforcement theory, personality and career development theories, dispositional theories, expectancy theories, attribution Theories, efficacy theories, and information-processing theories
Tien and Blackburn (1996)	Faculty rank systems, research motivation and faculty research productivity measure refinement and theory testing	Reinforcement theory and cognitive evaluation expectancy theory
Hu and Gill (2000)	IS Faculty Research Productivity: Influential factors and implications	Expectancy theory and life-cycle theory
Williams (2000a)	Research productivity of nursing faculty	Expectancy theory
Williams (2003)	A mediated hierarchical regression analysis of factors related to research productivity of human resource education and workforce development postsecondary faculty	Expectancy theory and efficacy theory
Chen et al. (2006)	Factors that motivate business faculty to conduct research: An expectancy theory analysis	Expectancy theory
Lertputtarak (2008)	An investigation of factors related to research productivity in a Public University in Thailand: A case study	Expectancy theory and efficacy theory
Estes and Polnick (2012)	Examining motivation theory in higher education: An expectancy theory analysis of tenured faculty productivity	Expectancy theory

(Baker, 1994; Broder and Ziemer, 1982; Cargile and Bublitz, 1986; Chen et al., 2006; Hadjinicola and Soteriou, 2006; Hu and Gill, 2000; Tien, 2000). It gives the researchers satisfaction and makes them believe that the universities have shown faith to them and recognized their interest and capabilities.

4.3. Holding an Administrative Post

Chen et al. (2006) stated that getting an administrative position is the least important to the faculty members and consequently it has the least impact on research productivity. It is rationally true since the nature of administrative job and academic responsibilities and its focus are distinct even though it is complementary to each other. In addition, having more tasks in administrative make a faculty spend less time in academic works which resulted in low academic productivity.

4.4. Reduced Teaching Loads

Hu and Gill (2000) have investigated the influential factors on research productivity among information systems faculty members. They found that the teaching loads are one of the significant adverse effects on research productivity. Other researchers also identified that getting reduced teaching loads is one of the factors to do researches such as Chen et al. (2006) and Cargile and Bublitz (1986). Academic staffs, who have more interest in research instead of teaching, will really appreciate it if they are given less teaching load.

4.5. Finding a Better Position at Other University

Chen et al. (2006) have found that finding a better position at other university is one of the least important factors for faculty members to do their research. Regardless of any better academic positions promised upon a faculty member i.e., full professor or associate professor or assistant professor, all of them agreed that this factor is slightly important. However, it is indicated from the study that the low ranking academic staff perceived that finding a better job at another university is more important than those in

high academic ranking. The reasonable argument is that the high ranking academic staff i.e., full professor, are stable, sound and secure in respect to their positions whereas the low academic ranking staff are eager to look for better opportunity since the journey of their career is considerably just started and they have a long way to go comparatively.

4.6. Achieving Peer Recognition

Achieving peer recognition is one of the important factors that influence research productivity (Chen et al., 2006; Hemmings and Hill, 2009). It is interesting to note that the academic world has no geographical or demographic boundaries. The peer is not limited to those who reside in the researcher's organization alone but they are situated all over the world. Through the internet technology, academic journals and publications and other academic platforms such as conferences, the academic community is getting bigger and wider to extend the community all over the world and thus peer recognition is significant intrinsically.

4.7. Achieving National/International Recognition

Through outstanding research outputs, a university as well as a researcher is able to achieve recognition in a particular academic field at the national and international level (Chen et al., 2006; Hu and Gill, 2000; Tien, 2000). The recognition gained will eventually build up good reputation and motivate researchers to do more research and to become more productive.

4.8. Attaining Respect from Students

Chen et al. (2006) states that attaining respect from students is one of the factors that influences researchers to do more research. This is particularly so in the environment where research is the main focus of a university. Academic staffs that have excellent research outputs such as books, journal articles, conference papers and book chapters will be perceived as knowledgeable lecturers and as a result, they will gain respect from students on the merit of their research work. Thus it will drive a staff to put more effort and focus on research works.

4.9. Satisfying One's Needs to Contribute to New Knowledge

The issues of job satisfaction for academic staff do not only reside with how well they can share and impart current knowledge to the students or community through lectures or publication but more than that, it would be delightful for them if they can contribute new knowledge that they have discovered in their research to the world. Thus the expected findings (i.e., knowledge creation) of a research will motivate academic staff to do more research (Chen et al., 2006; Chow and Harrison, 1998; Hu and Gill, 2000).

4.10. Satisfying One's Needs for Creativity or Curiosity

Researchers do the research because they want to satisfy their needs for creativity or curiosity (Chen et al., 2006, Hu and Gill, 2000; Tien, 2000). Creativity and curiosity are two very important elements that allow researchers to formulate their own scientific questions and find ways to satisfy their curiosities through a very systematic research.

4.11. Satisfying One's Needs to Stay Current in the Field

Chen et al. (2006) have mentioned that one of the motivational factors in doing research is satisfying the needs to stay current in the field. Research works demand a very comprehensive review of related literature, hence these make researcher alert on the current development of knowledge in the area of studies. Besides, by revealing and publishing new findings of a study in refereed journals, the expertise and capability of a researcher is known and it makes them stays in touch with relevant and current issues.

4.12. Satisfying One's Needs to Support the University's Vision

In general, the university's visions are firstly, to develop human capital at national, regional or international level; and secondly, to contribute to the economic development through research, development and commercialization activities. Chen et al. (2006) reveals that satisfying the need to support the university's vision is one of the factors that motivate faculty members to do research and publish their research output. The motive becomes more important particularly in a university that focuses more on research instead of teaching.

5. EXPECTANCY THEORY ANALYSIS AS A PREDICTOR OF RESEARCH PRODUCTIVITY

Expectancy theory could predict the academic staff's motivation, and consequently relate to research productivity. The central theme of expectancy theory is the rather simple concept that an individual's behavior is a function of the degree to which the behavior is instrumental in the attainment of some outcomes, and the evaluation of these outcomes (Lewin, 1935; Tolman, 1932). Historically, this conception of motivation had its origins in the ancient Greek principle of hedonism, which assumes that behavior is directed toward pleasure and away from pain. The individual will choose from alternative courses of action that behavior which he thinks will maximize his pleasure or minimize his pain. The ancient principle was resurrected in the nineteenth century

utilitarian philosophy developed by Jeremy Bentham and John Stuart Mill, and it appeared in the works of the early psychologists (James, 1890).

Researchers of the expectancy theory of motivation draw upon the early works of several theorists, among them Vroom (1964), Peak (1955), and Porter and Lawler (1968). According to Vroom (1964), expectancy theory states that an individual tend to act in a certain way based on the expectation that the act will be followed by a given outcome and on the attractiveness of the outcome to the individual. It include three variables i.e. expectancy, instrumentality and valence. Expectancy is the probability perceived by the individual that his or her effort will lead to a certain level of performance. Instrumentality is the perceived relationship between successful performance and obtaining the reward. Valence is the importance that the individual places on the potential outcome that can be achieved on the job. Therefore, the motivational force (M) for a behavior, action or task is a function of a three perceptions: $Motivation = Expectancy \times Instrumentality \times Valence$.

The original Vroom model has been modified by subsequent researchers. The previous studies have shown that instrumentality and valence can also predict motivation and performance (Chen et al., 2006; Mitchell, 1974; Schmitt and Son, 1981; Tien, 2000) and it is known as the modified expectancy theory. According to this modified theory, the action is a means for obtaining rewards (Butler and Cantrell, 1989). Looking at the context of this study, one has to publish research works and consequently to obtain rewards. At the same time, one has to place significant value on the rewards. If the individual does not value the rewards, he or she will not work hard to publish. Therefore, according to modified expectancy theory, the motivation to do research can be expressed in Figure 3.

6. THE PROPOSE RESEARCH MODEL

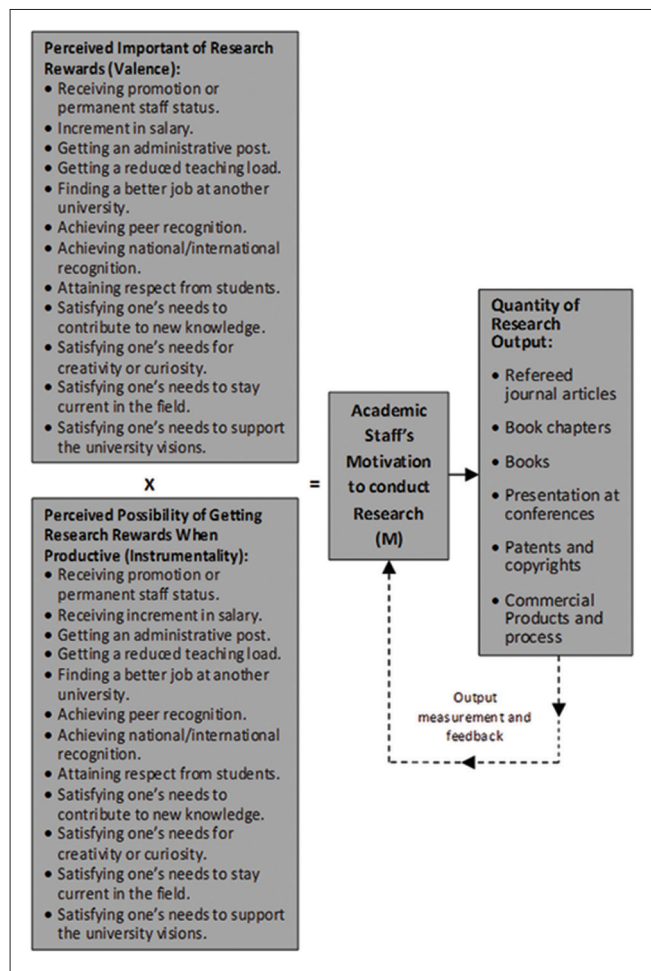
The theoretical framework discussed above could be enhanced and simplified into a research model (Figure 4) that incorporate all of the specified factors/variables, thus could be verified in empirical settings. The model apply the expectancy theory analysis adapted from Chen et al. (2006), Mitchell (1974), Schmitt and Son (1981), and Tien (2000), where, $M = V \times I$. The academic staff's motivation (M) to conduct research is the function of the perceived important of the research reward (valence) times the perceived possibility of getting research reward when productive (instrumentality). The model depicts the relationship between academic staff's motivation to conduct research and

Figure 3: The expectancy theory analysis

M	=	V x I
Where:		
M	=	Motivation to do research;
V	=	Valence or Value of rewards;
I	=	The instrumentality or perceived probability that being productive in research will lead to receive rewards.

Source: Adapted from Chen et al. (2006), Mitchell (1974), Schmitt and Son (1981), and Tien (2000)

Figure 4: The propose research model



productivity (quantity of research output). Simple definition of research productivity is the number of publications per researcher, distinguishing it from impact (Abramo and D'Angelo, 2014). Research productivity is an outcome measurement of scholarly effort (Jacobs et al., 1986; Kurz et al., 1989), and has two components that are knowledge creation (research) and knowledge distribution (productivity) (Gaston, 1970).

Overall, expectancy theory research supports the idea that individuals choose to alter inputs based on preferences among desired outcomes and the probability of attaining those outcomes at a satisfactory level. Studies have shown that each component of expectancy theory is an important factor in determining the extent to which an individual is motivated to increase or decrease productivity (Mitchell and Biglan, 1971; Nadler and Lawler, 1977; Porter and Lawler, 1968; Vroom, 1964). This model would be applied in collecting data from surveys and a number of field studies. The results will be used to improve the model as well as recommending points of improvement for Malaysian RU.

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