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## **A Path Analysis of Cambodian Faculty's Research Intention: Focusing on Direct and Mediating Effects at Individual Level**

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# **A Path Analysis of Cambodian Faculty's Research Intention: Focusing on Direct and Mediating Effects at Individual Level**

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## **Abstract**

Intention to engage in research activities has probably been one of the least investigated concepts when it comes to literature on relationship among research attitudes, research behaviors and research outputs. Only few studies in the past drew on the Planned Behavior Theory to explore how research intention mediates between certain antecedent variables and research performance. Extending the previous literature, this current study aimed to use some key variables from previous theories [i.e. Planned Behavior Theory and Social Cognitive Career Theory] to predict the intention to engage in research activities of Cambodia faculty. Results from Path Analysis of 453 respondents indicated that research self-efficacy, research outcome expectation, and research interest all pose a positive, direct influence on research intention. Research interest was also detected to partially mediate the relationship between research self-efficacy and research intention. The final model (with both the direct and mediating effects) explained 39% of variation in research intention. These findings, scoped within the psychological dimensions, seemed to imply that promoting research intention and performance hinges heavily on whether participants are interested enough in research, confident enough in their ability to do research, and motivated enough to feel complicated research tasks are worth their efforts.

**Keywords:** research culture, social cognitive theory, research productivity, research attitudes

# **Un Análisis de la Trayectoria de la Intención de Investigación en la Facultad Camboyana: Efectos Directos y Mediadores a Nivel Individual**

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*(Recibido: 2 Junio 2017; Aceptado: 9 Septiembre 2017; Publicado: 25 Octubre 2017)*

## **Resumen**

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La intención de participar en actividades de investigación ha sido probablemente uno de los conceptos menos investigados cuando se trata de literatura sobre la relación entre actitudes, comportamientos y resultados de investigación. Sólo unos pocos estudios en el pasado se basaron en la Teoría del Comportamiento Planeado para explorar cómo la intención de la investigación media entre ciertas variables antecedentes y el desempeño de ésta. Extendiendo la literatura anterior, este estudio actual tuvo como objetivo utilizar algunas variables clave de teorías anteriores [es decir, Teoría del Comportamiento Planeada y Teoría Social de la Carrera Cognitiva] para predecir la intención de participar en actividades de investigación de la facultad de Camboya. Los resultados del Análisis de la Trayectoria de 453 encuestados indicaron que la autoeficacia, la expectativa de los resultados de la investigación y el interés de la misma, poseen una influencia directa positiva en la intención de la investigación. También se detectó interés en la investigación para mediar parcialmente la relación entre la autoeficacia y la intención de investigación. El modelo final (con los efectos directo y mediador) explicó el 39% de la variación en la intención de investigación. Estos hallazgos, con un alcance dentro de las dimensiones psicológicas, parecen implicar que la promoción de la intención y el rendimiento de la investigación dependen de si los participantes están suficientemente interesados, motivados y confiados en su capacidad de investigar.

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**Palabras clave:** cultura de investigación, la teoría cognitiva social, productividad de investigación, actitudes de investigación



**I**t was not until July 2010 that the Cambodian government's ministerial meeting issued the first policy on research in education sector (Ministry of Education, Youth and Sport, 2010). With that new policy as an overarching agenda, a number of activities, strategies, and collaborations have been initiated among major donors (especially, the World Bank), MoEYS, MoEYS's subordinate departments in charge of higher education and scientific research, and Higher Education Institutions (HEIs) to achieve an ideal goal: to promote research culture in Cambodia.

On the one hand, this turning point is definitely an elegant move; on the other hand, it does invite some big questions for the country's slowly-performing, teaching-based higher education sector – questions commonly posed in many such countries lacking academic and scientific research tradition. One of the hurdles is simply the lack of sound awareness about university faculty's attitudes and behaviors towards engagement in research activities and about universities' capacities and potentials to promote research culture in their own setting. That being said, a direct, specific question to ask is: Do Cambodian faculty actually have intention to engage in research activities after the release of the new policy, or they more likely desire to continue staying in their comfort zone of the teaching world? If they truly welcome research activities, what factors may or may not affect their level of intention to engage in ones in the future?

In the face of this new research policy, it should also be reminded that there have been some successful Cambodian educational policies and practices that merit applauses, but there have also been some failing ones. For instance, the policy to increase investment on building schools and universities and expanding the number of students in the Sangkum Reastr Niyum regime (1953 – 1970) ended up with the leader asking the graduates to go back to farming (Vickery, 1984 as cited in Fergusson & Masson, 1997). The policy on student-centered approach never fully changes the traditional ways of teaching and of thinking of teaching at schools in Cambodia (Song, 2015). These examples reflected the inconsistency between the policy's ideals and the practice's realities. They [the examples] imply the combined effects of the lack of comprehension of contextual situation when designing the policies and the superficial understanding of the practitioners who have little choice but to follow the imposed policies from the central level (Song, 2015). Therefore, in response to the current

research development policy for Cambodian education, the research intention of faculty becomes an important psychological aspect worth investigating, so that policy thinkers, at the least, have some lessons to learn and perspectives to anticipate before jumping to their actions.

Speaking of the larger theoretical context, there are also reasons why research intention should be given more attention. First, only very few studies in the past have tackled research intention in the U.S. and the U.K. contexts (see [Holttum & Goble, 2006](#); [Eke, Holttum, & Hayward, 2012](#); [Wright & Holttum, 2012](#)). Such studies have been totally absent in the developing country context regardless of the fact that this concept should be of paramount importance as it gives light to both the theoretical directions and practical focuses of research culture building. Second, focusing on the attitudinal variable like “intention” is probably more informative and not misleading in the contemporary research conditions of developing nations since publishing has not yet been a crucial part of the academic profession therein. To measure published research products or count citations objectively, as done in lots of preceding studies in the developed context (e.g. [Landry, Traore, & Godin, 1996](#); [Dundar & Lewis, 1998](#); [Teodorescu, 2000](#)), is not timely and perhaps impossible – or maybe it is possible, but the validity of the result will bring along many serious questions. All the more, “intention” is believed to be a proxy of or strongly related to actual behaviors in previous studies in various fields (e.g. [Rose, Zimmermann, Pfeifer, Unterbrink, & Bauer, 2010](#); [Côté, Gagnon, Houme, Abdeljelil, & Gagnon, 2012](#)).

After all, this particular study sought to explore research intention of Cambodian faculty by explaining why some have stronger intention to do research in the future.

### **Research Intention: Theoretical and Empirical Bases**

A number of theories have been proposed to study associations between research attitude variables and actual research behaviors. The leading one in the field of psychology is perhaps the Scientist-Practitioner Model that gives serious focuses on research training environment, believed to be a practically strong variable affecting research activity (e.g. [Gelso, Mallinckrodt, & Judge, 1996](#); [Gelso, 2006](#)). The Social Cognitive Career Theory, developed

by Lent, Brown, and Hackett (1994) as an extension of Bandura's Social Cognitive Theory (1986), has been another well-adopted, essential framework. Studies that borrowed this theoretical basis paid lots of attention on research self-efficacy and research outcome expectation, which were claimed to influence decision making and persistence in actual research behaviors. The model also looked at intention or goal for activity involvement. Another crucial theory that lends important conceptual framework in the studies of research behavior is the Planned Behavior Theory (PBT), developed by Ajzen in 1991. It is this theoretical standpoint that seriously taps into the intention construct. The theory argues that attitudes, perceived behavioral control, and subjective norms directly influence behavioral intention which further influences the actual behavior (Ajzen, 1991; France, France, & Himawan, 2007). In its application in the field of research behaviors, research intention is assumed to mediate between research antecedent variables (i.e. attitudes, perceived behavioral control, and subjective norm) and research activities.

While empirical studies of intention in general are widespread in various other fields such as business (e.g. Zhao, Seibert, & Hills, 2005), health (e.g. France, France, & Himawan, 2007), and arts (e.g. McCormick & McPherson, 2003), there have been only a few empirical studies in the past that focused on intention in the field of research behaviors. Those few studies included the line of research involved by Sue Holttum – i.e. Holttum and Goble (2006); Wright and Holttum (2012); and Eke, Holttum, and Hayward (2012). These studies looked into the field of psychology and into the developed context of the United Kingdom. The studies worked with both counseling psychologists and trainee counseling psychologists.

Based on all of the three aforementioned theories, Holttum and Goble (2006) suggested an integrated, ten-variable model that predicts research intention and research activities (see Holttum & Goble, 2006). They argued that cognitive variables (e.g. research self-efficacy, external constraints, and research intention) may mediate the relationships between environmental variables (e.g. research training environment, research mentoring, and practice context) and research activities and output of papers as well as the relationships between individual variables (e.g. sex role identity and professional identity) and research activity and output of papers. This proposed model derived from an integration of previous theories and

empirical studies within both the psychological and environmental standpoints, but it has not yet been tested fully. The latter study (in the same line) of Wright and Holttum (2012) investigated the difference in research self-efficacy and research intention between males and females and tried to test the mediation effect research self-efficacy poses on the relationship between gender and research intention. The authors found that there was a strong correlation between research self-efficacy and research intention to do research among the U.K. trainee clinical psychologists. In a similar way, a study by Giles, McClenahan, Cairns, and Mallet (2004) revealed that self-efficacy is an important predictor of intention to donate blood. These studies highlighted the important role of research self-efficacy and its relationship with behavioral intention. Eke, Holttum, and Hayward (2012) conducted a joint study, based on the Planned Behavior Theory, with the U.K. clinical psychologists to observe determinants of intention to do research. Their analysis, using Logistic Regression method, detected that attitudes (i.e. research outcome expectation), perceived behavioral controls (i.e. research self-efficacy), and normative beliefs mediate between research training environment and behavioral research intention. This study again highlighted the significant effects of research self-efficacy beliefs and research outcome expectation on research intention and research behaviors.

No doubt, these previous empirical works seemed to suggest that research intention has some theoretically direct and mediating roles between research behaviors and other key attitudinal variables such as research training environment, research self-efficacy, and research outcome expectation. This present study, therefore, would basically examine the effects of research outcome expectation and research self-efficacy on the behavioral research intention of Cambodian faculty. But this study went further.

What was new in this study was that it extended these past research framework in two ways. First, it did so by including another vital construct, “research interest” (whether a person likes or dislikes doing research), into the analysis, observing both its direct and mediating roles on research intention. Such inclusion conformed to the suggested model by Lent, Brown and Hackett (1994) as they theorized that interest is associated with intention/goals for activity involvement. Research interest was chosen also due to its detected significant relationship with research attitude variables (such as research self-efficacy and research outcome expectation) and its



roles in predicting research behaviors, all clearly revealed in another line of studies employing the Social Cognitive Theory (e.g. Bishop & Bieschke, 1998; Bard, Bieschke, Herbert, & Eberz, 2000). While those studies paid serious attention on the nexus between research interest and other variables, seemingly, there has yet to be an empirical examination of relationship between research interest and research intention. Second, the present study investigated the mediating roles of research interest and research self-efficacy. It should be noted that there has yet to be past critical studies in this area of research attitudes and behaviors that seriously explore and explain the possible roles of mediating variables.

### **Research Focuses**

The thrust of this study was to understand the reality of beliefs and attitudes of Cambodian academics in response to the MoEYS's issued research policy and action plan in 2010 and 2011. Specifically, the study aimed to answer two research questions: 1) what variables are the key determinants affecting the intention to engage in research activities of Cambodian faculty? and 2) are the hypothesized relationships mediated by certain variables?

This study looked at relationship among seven variables. Research outcome expectation (i.e. attitude) and research self-efficacy (i.e. perceived behavioral control) were adopted from the Planned Behavior Theory. Research interest was adopted from the Social Cognitive Career Theory. Research intention, the dependent variable, was adopted from both theories.

This partial, combined framework incorporated three more contextually-meaningful variables (believed to have relationship with research intention) as controlled predictor variables: terminal degree country, sex, and research working experience. Past studies actually had some evidence supporting these to-be-controlled variables. Eam (2015) detected that Cambodian academics who graduate from abroad tend to be more likely to engage in research activities than those who graduate locally. The significant relationship between past behavior and intention was observed in previous studies (e.g. Côté, Gagnon, Houme, Abdeljelil, & Gagnon, 2012), and the relationship between some gender characteristics and research intention was found in the study by Wright and Holttum (2012).

The following were the four main hypothesized associations, all

controlling for the effects of terminal degree country, sex, and research working experience.

**H1:** Research outcome expectation, research self-efficacy, and research interest have direct, positive effect on research intention.

**H2:** Research interest mediates the direct, positive relationship between research outcome expectation and research intention.

**H3:** Research self-efficacy mediates the direct, positive relationship between research outcome expectation and research intention.

**H4:** Research interest mediates the direct, positive relationship between research self-efficacy and research intention.

Still, we [the authors] need to make it clear here that this proposed model is not comprehensive and it also does not deny that other environmental factors such as research infrastructure and funding do not exist. Yet, this present study limited its scope to the investigation of only the above-mentioned theoretically-significant psychological variables (See Figure 1).

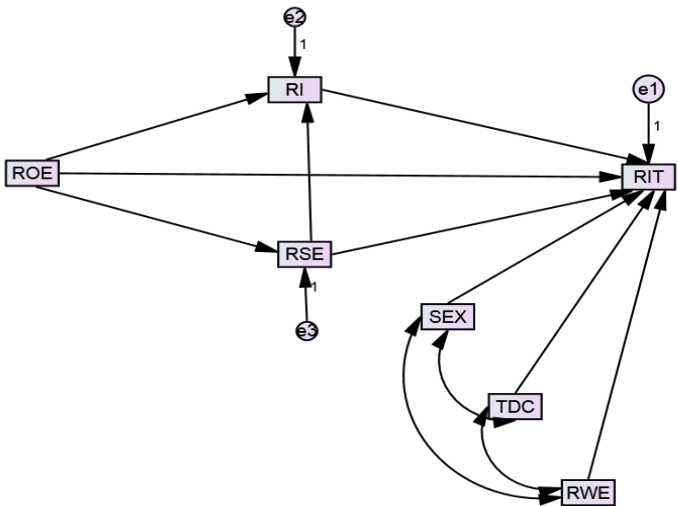


Figure 1. Initial hypothesized model of the current study

Note: ROE = Research Outcome Expectation, RSE = Research Self-Efficacy, RI = Research Interest, RIT

= Research Intention, SEX = Sex, TDC = Terminal Degree Country, RWE = Research Working Experience, e = residual

## **Research Methods**

This study used quantitative survey research as the main approach to answer the two research questions. The design comprised correlational and predictive characteristics. Rather than aiming to explore in-depth features of the focused theme as generally done in qualitative analysis, the quantified data from the survey questionnaire tended more to observe the general, overall trends and patterns of relationships of the focused variables; thus, the findings would illustrate how Cambodian university lecturers in general intend to engage in research in the future and what variables would be explanatorily associated with the level of their research intention. This study was a part of a larger study of research engagement of Cambodian academics conducted in 2013.

Samples were university lecturers from 10 Cambodian universities. Considering that it is ethical to keep respondents' data confidential, the researcher did not reveal the real name of each university in this writing. The researchers contacted the university administration to distribute the questionnaire to the target respondents. The questionnaire covered the demographic variables, research engagement, attitudinal variables, and research intention, distributed and collected in May and June of 2013.

Most of the variables observed in the questionnaire were rating and multiple-choice items adopted from previous research works in the academic area of research attitudes and behaviors. All of the adopted scales were adjusted for two reasons. First, research at Cambodian higher education institutions is quite a recent phenomenon, meaning most faculty members have limited understanding and little familiarization with certain aspects or concepts (say, impact factor, journal publication, etc.). Thus, each item in the scale must be explained in a very explicit and context-related terms; those items not existing in the context had to be dropped. Second, a long list of scale items does not work in Cambodian context – as commented by previous local researchers – so most items (those not so relevant) were not included. Despite the fact that some open-ended questions were a part of the questionnaire, the data analysis in this research study did not utilize them.

The overall return rate was 44.7%. Of the total 1040 questionnaire sets

distributed, 465 were returned. Twelve questionnaire contained a high proportion of missing and erroneous responses; so, only 453 were used for the analysis in this study. Following is the detailed explanation of each key variable observed and analyzed in this study.

*Personal and professional variables* consisting of:

- Age, measured by raw score given by respondents' answer
- Sex, coded 1 for male and 2 for female
- Terminal degree country (1 = Cambodia, 2 = Foreign country)
- Research working experience (0 = No experience, 1 = Having research working experience)

*Research self-efficacy*

Research self-efficacy was adapted from the shortened Research Self-Efficacy Scale developed by Kahn and Scott in 1997. The 12 items were measured by a 1-5 Likert scale (from 1 = not confident at all to 5 = very confident). The value of Cronbach's Alpha was .935. Some of the 12 items were adjusted. Two exemplary items of research self-efficacy in the questionnaire were: "using quantitative research approach (e.g. experimental method, quasi-experimental method, correlational method)" and "using qualitative research approach (e.g. content analysis method, grounded-theory method, ethnographical analysis method)".

*Research outcome expectation*

Research outcome expectation was adapted from Chen, Gupta, & Hoshower (2006) which measured both extrinsic and intrinsic motivation of faculty. The instrument comprised 8 items and were assessed by a 1-5 Likert scale (from 1 = not important at all to 5 = very important). The value of Cronbach's Alpha was .796. Two exemplary items among the eight items were "receive increased salary or income" and "be admired or obtain recognition among peers and students".

*Research interest*

Research interest was adapted from Bishop and Bieschke (1998) as cited in Vaccaro (2009). The tool was assessed by rating 11 items, with the 1-5 Likert scale as options (from 1 = not interested at all to 5 = very interested). Five items were dropped from the original scale. The value of Cronbach's Alpha was .928. Two exemplary items among the eleven items were having "interest in conducting actual data analyses" and "interest in presenting research results in academic conference".

### *Research intention*

Research intention was the dependent variable in this study, measured by a three-item scale (adopted from Eke, Holttum, & Hayward, 2012) and appropriately rephrased. Though adjusted, the scale retained its original concepts of planning, desiring and expecting. The three items were: "I clearly plan to engage in academic research activities at my current institution in the next five years," "I have a strong desire to engage in academic research at my current institution in the next five years," and "I have a strong expectation that I can engage in academic research activities at my current institution in the next five years." The value of Cronbach's Alpha was .929.

Data were inputted, screened, recoded, computed, and analyzed using SPSS (Version 21) and AMOS (Version 21). Missing data were handled by median replacement. Path analysis, with default Maximum-Likelihood estimation used by AMOS, was employed as the main approach to observe the direct and mediating associations among the predictor variables and the outcome variable. Two technical terms were worth explaining. First, path analysis is a regression-based, data analytic technique that permits the testing of causal models using cross-sectional data (Baroudi, 1985). Second, mediator, according to Baron and Kenny (1986), refers to the third variable that accounts for the relation between independent and dependent variables, and it explains why the effect holds. While Multiple Linear Regression can also be used to analyze the mediating effects, using such plug-in tool as PROCESS, Path Analysis in AMOS is just a more specialized program designed to do such analyses.

Before the main data analysis, curved estimation was used to discern the

linearity of the relationship; the results showed that all predictor variables were sufficiently linearly related with research intention (with high F values compared to the curvilinear models and  $p\text{-value} < .05$ ). Multiple Linear Regression was used to test the multi-collinearity in the data sets with several switches of different dependent variables. Multi-collinearity refers to the situation where two or more (independent) variables are highly correlated that they both essentially represent the same underlining construct (Byrne, 2010, p. 168). The result showed that the Variance Inflation Factor (VIF) ranged from 1.12 to 1.98, suggesting that multi-collinearity was likely to be absent from our model. Normality was not the issue for scale variables (the value of skewness of all variables was within -1 and 1). The observed goodness of fit indices included: 1). The Chi-square goodness-of-fit, the root-mean-square error of approximation (RMSEA), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the normed fit index (NFI), and the comparative fit index (CFI) – all to be reported in the finding section.

## **Results**

### **Descriptive and Pearson's Correlation Statistic**

The descriptive statistic of the participants (see Table 1) showed that 79% of them were males and 21% were females. Their age ranged from 22 to 71 years old, with the average of 34.98 and the standard deviation of 8.36 years. About fifty-two percent of the respondents were graduates from local universities, and forty-eight percent were from foreign countries (e.g. Japan, France, United States, Australia and Thailand). Interestingly, 50.3% of them claimed to have involved in research activities in previous working institutions before they moved into their current university; the rest had no research working experience at all. These participants came from different fields of expertise – with social science and language and humanity the dominant groups. Based on the mean values, Table 1 showed a relatively moderate magnitude of each key independent variables (3.6 for research self-efficacy, 3.7 for research outcome expectation, and 3.71 for research interest) and of the dependent variable (i.e. 3.84 for research intention).

Table 1

*Demographic characteristics*

Variables	Descriptions	f (%)	$\bar{x}$	SD	Min	Max	Skewness	Kurtosis
<b>SEX</b>	1 = Male	358						
	2 = Female	(79)						
<b>TDC</b>		95 (21)						
	1 = Cambodia	234						
	2 = Foreign country	(51.7)						
<b>RWE</b>		219						
		(48.3)						
	0 = Do not have	225						
	1 = Have some experience	(49.7)						
<b>Age</b>		228						
		(50.3)						
	Raw score		34.98	8.36	22	71	1.03	1.1
<b>RSE</b>	12 items; 1-5 Likert scale		3.6	.74	1	5	-.25	-.26
<b>ROE</b>	8 items; 1-5 Likert scale		3.7	.72	1.75	5	-.14	-.61
<b>RI</b>	11 items; 1-5 Likert scale		3.71	.77	1	5	-.6	.25
<b>RIT</b>	3 items; 1-5 Likert scale		3.84	1.01	1	5	-.62	-.3

Note: f = Frequency, SD = Standard Deviation,  $\bar{x}$  = Mean, Min = Minimum, Max = Maximum, TDC = Terminal Degree Country, RWE = Research Working Experience, RSE = Research Self-Efficacy, ROE = Research Outcome Expectation, RI = Research Interest, RIT = Research Intention.

The first analysis conducted, after the data cleaning and exploratory data analysis, was the Pearson's correlation analyses among the studied variables. Table 2 below showed that research intention had an above moderate level of correlation with research interest ( $r = .603$ ,  $p < .01$ ) and a moderate correlation with research self-efficacy ( $r = .46$ ,  $p < .01$ ). Research intention also was correlated moderately with research outcome expectation ( $r = .32$ ,  $p < .01$ ). The relationship between research intention with terminal degree country was statistically significant but with very low magnitude ( $r = .097$ ,  $p < .05$ ). Other statistically significant relationships detected in Table 2 included the relationships between research self-efficacy and research interest ( $r = .601$ ,  $p < .01$ ), research outcome expectation and research

interest ( $r = .27, p < .01$ ), and research outcome expectation and research self-efficacy ( $r = .32, p < .01$ ). These statistical relationships suggested that these variables related to each other to a certain degree and that it is thus appropriate to mine a linear statistical model out of the data in this study.

Table 2  
*Pearson’s correlation and Cronbach’s Alpha statistic*

	1.TDC	2.RWE	3.RI	4.RSE	5.ROE	6.RIT
1	1	.025	.16**	.17**	-.05	.097*
2		1	.14**	.15**	.008	.086
3			1	.601**	.27**	.603**
4				1	.32**	.46**
5					1	.32**
6						1
Cronbach’s Alpha	N/A	N/A	.928	.935	.796	.929

Note: ROE = Research Outcome Expectation, RSE = Research Self-Efficacy, RI = Research Interest, RIT = Research Intention, TDC = Terminal Degree Country, and RWE = Research Working Experience, N/A = Not available, \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

**Hypothesis 1: Testing Direct Effects**

After exploring the correlation among variables, the study proceeded to run the analysis of direct relationship between the predictor variables and the dependent variable (research intention). This initial analysis was based on the relationship of the first hypothesis of the present study. The path analysis, using AMOS, indicated that the main hypothesis was acceptable. Research outcome expectation ( $\beta = .16, p < .001$ ), research self-efficacy ( $\beta = .12, p < .016$ ), and research interest ( $\beta = .52, p < .001$ ) all statistically significantly explained the variances in research intention ( $R^2 = .316$ ) (See Table 3 below for the detailed results from AMOS). The controlled variables were not statistically significant. The goodness-of-fit indices of this first direct-effect model was very low, however (see Table 7 for the detailed goodness-of-fit comparison).



Table 3

*Estimates of direct relationship between independent variables and research intention*

DV	<---	IV	Standardized Estimate	S.E.	C.R.	P
RIT	<---	RI	.524	.048	13.473	***
RIT	<---	RSE	.120	.050	3.081	.002
RIT	<---	ROE	.160	.051	4.100	***
RIT	<---	SEX	-.034	.091	-.867	.386
RIT	<---	TDC	.009	.074	.233	.816
RIT	<---	RWE	-.004	.074	-.094	.925

Note: DV = Dependent Variable, IV = Independent Variable, ROE = Research Outcome Expectation, RSE = Research Self-Efficacy, RI = Research Interest, RIT = Research Intention, SEX = Sex, TDC = Terminal Degree Country, RWE = Research Working Experience, S.E. = Standard Error, C.R. = Critical Ratio, P = P-value; \*\*\*  $p < .001$ .

### **Hypotheses 2, 3, and 4: Testing Mediating Effects of Research Interest and Research Self-Efficacy**

The second and third hypotheses aimed to test if research interest and research self-efficacy mediates the relationships between research outcome expectation and research intention. This was accomplished by setting path from research outcome expectation to research interest and research self-efficacy, making both of them become the endogenous variables (signified by the residual variance “e”). All other path relationships between predictor variables and research intention and between controlled variables and research intention remained the same. The testing of research interest and research self-efficacy as mediators had to be run separately (with one path of one mediator removed when testing the other mediator). This has been the rules for running a model with two hypothesized mediators.

In the first place, based on the rules suggested by the Baron and Kenny (1986) approach, the statistical results in this study seemed to suggest that research interest and research self-efficacy each slightly partially mediated the relationship between research outcome expectation and research intention. This was because, with the presence of the mediator, there was obviously a slight reduction in strength of the coefficient values ( $\beta = .160$  without mediator and  $\beta = .51$  with mediator) even though the relationships of both situations remained statistically significant (See Table 5). But, after the researchers run an additional bootstrapping significant test in AMOS, it

became clear that the direct effect without mediator and the one with mediator were not statistically significantly different ( $p = .077$ ). This suggested that research interest and research self-efficacy did not mediate the relationship between research outcome expectation and research intention (see Table 5). Table 4 and 6 offered the detailed estimates of the models of the two mediating variables.

However, in testing the mediating role of research interest on the relationship between research self-efficacy and research intention, an interesting result seemed to emerge. According to Table 4, research interest seemed to partially mediate the relationship between research self-efficacy and research intention as the value of  $\beta$  changed from .120 ( $p < .002$ ) (without mediator) to .113 ( $p < .016$ ) (with research interest as the mediator). To prove the significant result, again the indirect effect bootstrapping significant test method was employed in AMOS to see the p-value output. Table 5 showed that the model without the mediator and the model with the mediator were significantly different ( $p < .001$ ).

Table 4  
*Estimates of the relationship with research interest as the mediator*

DV IV	<---		Standardized Estimate	S.E.	C.R.	P
RI	<---	ROE	.087	.042	2.195	.028
RI	<---	RSE	.573	.041	14.518	***
RIT	<---	ROE	.150	.054	3.866	***
RIT	<---	RSE	.113	.064	2.412	.016
RIT	<---	RI	.493	.061	10.716	***
RIT	<---	SEX	-.032	.091	-.865	.387
RIT	<---	TDC	.009	.074	.233	.816
RIT	<---	RWE	-.003	.074	-.094	.925

Note: DV = Dependent Variable, IV = Independent Variable, ROE = Research Outcome Expectation, RSE = Research Self-Efficacy, RI = Research Interest, RIT = Research Intention, SEX = Sex, TDC = Terminal Degree Country, RWE = Research Working Experience, S.E. = Standard Error, C.R. = Critical Ratio, P = P-value; \*\*\*  $p < .001$ .

Table 5

*Synthesis of the mediating effects*

<b>Mediating Relationship</b>	<b>Direct effect without mediators</b>	<b>Direct effect with mediators</b>	<b>Indirect effects (Bootstrapping significance test)</b>	<b>Interpretation</b>
ROE-RSE-RIT	.160 (.000)	.151 (.000)	P = .077 (Not Sig)	No Mediation
ROE-RI-RIT	.160 (.000)	.151 (.000)	P = .077 (Not Sig)	No Mediation
RSE-RI-RIT	.120 (.002)	.113 (.017)	P = .001 (Sig)	Partial Mediation

Note: ROE-RSE-RIT = RSE as the mediator between ROE and RIT; ROE-RI-RIT = RI as the mediator between ROE and RIT; RSE-RI-RIT = RI as the mediator between RSE and RIT, P = p-value

Table 6

*Estimates of the relationship with research self-efficacy as the mediator*

<b>DV</b>	<b>&lt;---</b>	<b>IV</b>	<b>Standardized Estimate</b>	<b>S.E.</b>	<b>C.R.</b>	<b>P</b>
RSE	<---	ROE	.318	.046	7.139	***
RI	<---	RSE	.601	.039	15.966	***
RIT	<---	ROE	.151	.054	3.887	***
RIT	<---	RSE	.113	.065	2.380	.017
RIT	<---	RI	.495	.060	10.773	***
RIT	<---	SEX	-.032	.091	-.865	.387
RIT	<---	TDC	.009	.074	.233	.816
RIT	<---	RWE	-.003	.074	-.094	.925

Note: DV = Dependent Variable, IV = Independent Variable, ROE = Research Outcome Expectation, RSE = Research Self-Efficacy, RI = Research Interest, RIT = Research Intention, SEX = Sex, TDC = Terminal Degree Country, RWE = Research Working Experience, S.E. = Standard Error, C.R. = Critical Ratio, P = P-value; \*\*\* p<.001.

## Final Model

After running all the tested hypotheses of direct and mediating effects, we run the final model that excluded all insignificant controlled variables (i.e. sex, terminal degree countries and research working experience). This was because including these variables did not improve the model. So, Figure 2 below was the final trimmed model to predict research intention of Cambodian academics. This time we included all the significantly-tested direct and mediating paths to obtain the final coefficients and predicting power. This final model revealed that research outcome expectation ( $\beta = .15$ ,  $p < .001$ ), research self-efficacy ( $\beta = .12$ ,  $p < .001$ ) and research interest ( $\beta =$

.50,  $p < .001$ ) all directly and positively predicted research intention. Research interest additionally mediated the relationship between research self-efficacy and research intention. The model explained 39% of variances in research intention of Cambodian faculty.

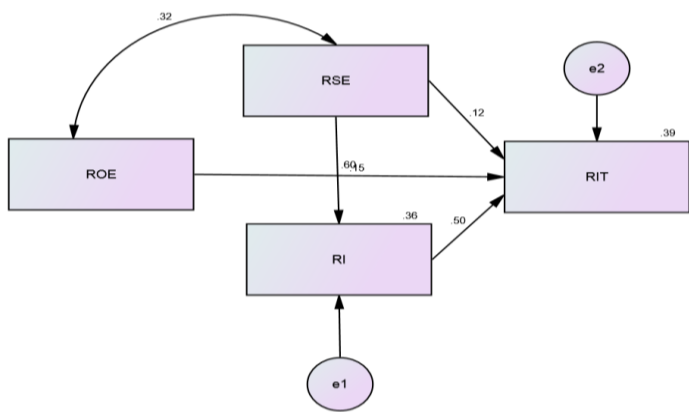


Figure 2. Final Model; Note. ROE = Research Outcome Expectation, RSE = Research Self-Efficacy, RI = Research Interest, RIT = Research Intention, SEX = Sex, TDC = Terminal Degree Country, and RWE = Research Working Experience, e = residual.

Table 7 below compared the goodness-of-fit indices among the initial direct-effect-only model, the mediating effects models, and the final model. In current Structural Equation Modelling (SEM) perspectives, the value of RAMSEA that reflects model fit should be less than .08. However, according to RAMSEA originator, Steiger, RAMSEA value below .1 is considered “good” and below .05 “very good” (Loehlin, 2004, p. 69). So the value of .092 in this current study was quite acceptable to suggest that the final model fit the data to a certain degree. Other indices (GFI = .995; AGFI = .948, CFI = .992, and NFI = .992) confirmed that the final model did achieve the goodness of fit and that this final model was the best fitted

model compared to other run models.

Table 7

*Goodness-of-fit indices for all models*

Models	Chi-Square (df)	AGFI	GFI	CFI	NFI	RMSEA
Direct Path	307.95 (15)***	.691	.835	.434	.429	.208
RSE as Mediator	55.74 (10) ***	.910	.968	.912	.897	.101
RI as Mediator	50.95 (9) ***	.907	.970	.919	.905	.102
Final Model	4.79 (1) ***	.948	.995	.992	.990	.092

Note: df = degree of freedom, RMSEA = root-mean-square error of approximation, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normed fit index, CFI = comparative fit index, RSE = Research Self-Efficacy, RI = Research Interest, \*\*\*  $p < .001$ .

## Conclusions, Discussions, and Limitations

The study had two-fold purposes. First, it tested the direct effects of research outcome expectation, research self-efficacy, and research interest on research intention of Cambodian faculty. Second, it explored the mediating roles of research self-efficacy and research interest in the associations between various variables. Two of our hypotheses were significant. The finding suggested that there were positive, significant, direct effects of all key predictor variables (i.e. research outcome expectation, research self-efficacy, and research interest) on research intention. As for mediating effects, research interest partially mediated the positive relationship between research self-efficacy and research intention. The other two hypotheses were insignificant; that is to say, research interest did not mediate the relationship between research outcome expectation and research intention, and neither did research self-efficacy.

It is clear that these separate analyses of each predictor variables found results that, to some extent, supported the theoretical claims of previous theories, such as that of the Planned Behavior Theory and Social Cognitive Career Theory. Research self-efficacy, a proxy of perceived personal control, was found to be a positive predictor of research intention (e.g.

Wright & Holttum, 2012). Research outcome expectation, a proxy of attitudes in the PBT, also depicted a moderate level of relationship with research intention (e.g. Eke, Holttum, & Hayward, 2012). Interestingly, research interest, despite not being tested in the previous works, showed a strong relationship with research intention ( $\beta = .50$ ,  $p < .001$ ) in this current study. All the more, it [research interest] seemed to mediate the direct, positive relationship between research self-efficacy and research intention.

This study found these key variables to explain just about 39% of the variances in the research intention. The value seemed to be less than the effect size of previous studies. For instance, France, France, and Himawan (2007) studied the intention to re-donate blood among experienced blood donors and found that the Planned Behavior Theory variables accounted for 65% of variances in intention. Côté et al. (2012) used Planned Behavior Theory constructs to predict intention of nurse to integrate research evidence into clinical decision making and could detect up to 70% of intention variances explained by moral norm, normative beliefs, perceived behavioral control, and past behaviors. We [the authors of this present study] believed that the lower detected explained variances in our study was due to our specifically trimmed framework that tapped only into few key variables. Those previous studies incorporated more predictor variables.

Our findings offer some practical and theoretical implications. First, it indicates that mechanisms to promote intention to engage in research activities in the future should take into account how much faculty are interested in research activities, how much capable they are in performing research tasks as well as how they should be motivated. It further suggests that the understanding of the level of liking and not liking doing research may give a deeper explanation for the relationship between one's belief in their skills and knowledge of research and their level of intention to engage in research activities in the future. Regardless of our zero focus on the actual research performance in this study, the detected knowledge of research intention is crucial. As was detected in previous studies, intention is indicative of actual behaviors and it accounts for a large portion of variation in the actual behaviors. Armitage and Conner (2001) (as cited in Eke, Holttum, & Hayward, 2012), for example, claimed that intention alone explained 25% of variance in actual behavior. It is clear that understanding intention should give some light to the improvement of the actual research

behaviors – whether it is research engagement, publication, or research application. Nevertheless, the authors strongly hope that the future studies of the Cambodian context specifically measure and explore actual research activities or products in its context.

The second implication is theoretical. This study extends the literature in that it supports research interest to be an important, significant predictor of research intention. That previous studies seemed to pay not much attention on the role of research interest in the causal model of research intention may create a missing picture of any theoretical framework to be formulated. This study suggests that further works in this area should explore the roles of research interest.

Nonetheless, there were some limitations to explicate in this study. The first caveat was the inclusion of only a limited number of key variables from previous theories, so making the study postulate only a small scheme of the relationship. The study, for instance, did not look at the environmental variables such as research infrastructure, research funding, teaching hours, etc. The authors have to acknowledge that these physical environmental variables should also be of critical importance in explaining research behaviors. The second problem pertained to generalizability. The authors have to call for cautions in attempts to make any generalization from this study. More rigorous testing and investigations are needed to do so.

All things considered, this current study acknowledged the importance of psychological variables and theories (based on psychological and sociological standpoints) in explaining the intention to do research of academics in developing countries. To ensure that the future of research engagement and performance of Cambodian university academics can catch up with the trend of the region and the world, individual's social and psychological conditions of faculty with regards to research behaviors should not be overlooked. The authors should like to call for further rigorous studies from the structural perspectives as well. Things like information about research opportunities and practical mechanisms aimed to increase values of academic research should be streamlined into the university research culture from now on. Understanding from all these social, psychological, cultural and structural factors may help policy makers and practitioners alike to come up with effective tools to demote potential challenges of research development in the near future.

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