

# Understanding Hiring Managers' Use of IT Certification in the Hiring Process

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## ABSTRACT

This paper examines whether the theory of planned behavior (TPB) provides an effective model for predicting the intention of hiring managers to use Information Technology (IT) certification in the employee selection process. Little academic research has examined IT certification, an area important to firms and their hiring managers, educational institutions and their professors and students, as well as other training centers, vendors, and other stakeholder groups. Hierarchical regression was used to investigate relationships between constructs. The model shows an impressive amount of variance explained for Behavioral Intention ( $R^2 = .640$ ). All three original TPB constructs, attitude, subjective norm, and perceived behavioral control, are significant in predicting behavioral intention. The hierarchical regression analyses also revealed that affect significantly influences attitude, providing support for the addition of affect in future research using TPB. These findings add to our understanding of the usage of IT certification in hiring decisions and provide suggestions for future work.

**KEYWORDS:** certification, theory of planned behavior, employee selection, hiring

## 1. Introduction

This research integrates the salient beliefs elicited from a previous grounded theory study into a quantitative analysis which uses the theory of planned behavior as the theoretical underpinning. One purpose of this research is to determine whether the theory of planned behavior provides an effective model for predicting the intention of hiring managers to use IT certification in the employee selection process.

Another purpose is to examine the role of affect on the traditional theory of planned behavior model. No other known studies have attempted to predict the intentions of

managers to use IT certification or to apply the theory of planned behavior to address our research question.

Little academic research has examined IT certification, an area important to firms and their hiring managers, educational institutions and their professors and students, as well as other training centers, vendors, and other stakeholder groups.

The value of certification is recognized by many professions. Over 2,500 certifications are offered across all industries including IT (Foster, 1997). Though no organization tracks the total number of obtainable IT certifications, it is estimated that as many as 450 are either in place or under development (Aienza, 2001). Worldwide spending

in IT certification was estimated to reach \$4 billion in 2003 (Chan, 2001).

Our research question is: "What factors predict hiring managers' intentions to use IT certification as a selection tool?" The theory of planned behavior (TPB) has already undergone extensive testing in multiple fields and can be used specifically to predict intention. In this study, we have chosen to use TPB, which has been used in multiple fields including information systems.

## 2. Literature Review

Our research question falls within the domains of employee selection and the prediction of behavioral intention.

### 2.1 Employee Selection

Individuals differ in terms of their knowledge, skills, abilities, and other characteristics (KSAOs), which challenges managers to assess the capabilities of job candidates (Schmitt & Chan, 1998). Organizations spend more money on employee selection than on any other area within human resource management (Schmitt & Borman, 1993). Companies that use employee selection practices often have greater profits, faster profit growth, and better overall performance than other firms (Terpstra & Rozell, 1993).

Managers often use multiple selection tools when hiring, such as testing and certification. They may prefer to use certain selection methods over others for certain types and levels of positions. Organizations may use one or more assessment methods such as interviews and testing in the hiring process. These methods provide information about the job candidate's KSAOs to the hiring organization.

Testing is often used by hiring managers to assess the knowledge, skills, and abilities of job candidates (Guion, 1998). Companies may find that developing their own test items in-house can become costly and time-consuming, with requirements such as pilot studies and reliability and validity analyses, as well as potential legal situations if the test discriminates, intentionally or not, against a protected category (Burke, 1993). Some organizations may use tests that have been

validated and have already gone through these processes.

Certification and licensure exams created by third-parties exist across many fields to test the knowledge, skills, and abilities of test-takers. A company can evaluate the competence of a potential worker claiming to possess certain expertise if a certification exists for that area (Guion, 1998). Organizations that develop their own tests may also face legal consequences if they administer tests that are determined to be biased, discriminatory, or not related to the job requirements (Arthur, 1994).

Even though companies can create and administer their own tests to potential employees, legal issues, psychometric requirements, and other factors such as overall cost may make it necessary for employers to consider alternatives, such as the use of third-party certifications, in lieu of their own testing to indicate adequate skill and knowledge levels (Arthur, 1998). Hiring managers often use the results of certification exams as a way to ensure competency in nursing, accounting, and law.

Certification is also used in some fields in Information Technology to ensure that job candidates possess certain knowledge and proficiencies (Hunsinger & Smith, 2004). Both IT certification and testing are used to screen out unqualified individuals and to help distinguish among otherwise similarly qualified candidates and both can help companies save time, money, and resources.

Some managers believe that certain IT certifications hold *more* importance than academic degrees. This is counter-intuitive to the traditional view that educational degrees, which require years of study, are more valuable than certifications that require less time and expense. Managers would rarely hold the results of standard testing (as opposed to certification) in higher regard than education or experience. Yet a trade study of hiring managers from 685 companies both inside and outside the IT industry found that "IT companies viewed certifications at least as important as a bachelor's degree while non-IT companies placed certifications slightly below a bachelor's degree in importance" (ITAA, 2001). Another study found that over half the Chief Information Officers surveyed "would hire a person with a certification, even if they had no work ex-

perience. Some even said they would not hire anyone without a certification" (Childs, 2002).

Certification also offers potential benefits not indicated in research on testing. Managers of certified employees may receive exposure to more resources such as technical support provided by vendors and discounted service level agreements. However, some research indicates that managers may have to pay more money to hire a job applicant holding certain certifications. Certification exams are usually proctored by testing centers with strict guidelines and are written by third-party vendors. Companies that conduct in-house testing must have competent test administrators to monitor the exams and must also deal with test-making requirements and associated legal issues (Arthur, 1994).

Little academic research has explored the factors which predict why managers may (or may not) use certification when hiring to fill IT positions. Managers may prefer to use certification as a selection tool for certain types and levels of positions while they may prefer other selection methods for other types of jobs. Our research will begin exploring these issues and contribute to the current employee selection literature.

## 2.2 Behavioral Intention

A small set of widely applied theories is commonly used to investigate intentions and behaviors. These include the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980), the theory of planned behavior (TPB) (Ajzen, 1991), and the technology acceptance model (TAM) (F. Davis, 1989).

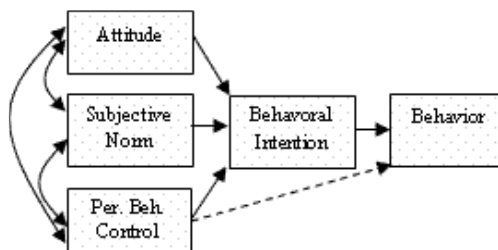
### 2.2.1 Theory of Reasoned Action

The theory of reasoned action (TRA) was introduced in 1967 and underwent multiple modifications and tests (Fishbein & Ajzen, 1975) before reaching its current form. The TRA has been applied to analyze a variety of situations and behaviors. According to the TRA, an individual's performance of a specific behavior is determined by his or her behavioral intention (BI) to perform it, which is determined by the individual's attitude (A) and the subjective norm (SN) about the behavior. Subjective norm refers to the person's perception of the social pressures associated with performing the behavior.

The usage of TRA is restricted to volitional behaviors, those in which a person can decide at will whether to perform or not perform them (Sheppard, Hartwick, & Warshaw, 1988). Performance of behaviors under incomplete volitional control may depend on availability of opportunities and resources, including time, money, skills, and others' cooperation (Ajzen, 1991).

### 2.2.2 Theory of Planned Behavior

The theory of planned behavior (TPB), shown in Figure 1, is an extension of the TRA that includes an additional antecedent of intention: the degree of *perceived behavioral control* (Ajzen, 1991). Perceived behavioral control (PBC) refers to a person's perceptions of "... the presence or absence of requisite resources and opportunities" (Ajzen & Madden, 1986). It is derived from Bandura's (Bandura, 1977) concept of self-efficacy - "the conviction that one can successfully execute (a given) behavior" (Eagly & Chaiken, 1993).



**Figure 1: Theory of Planned Behavior (after Ajzen, 1991)**

In the TPB, behavioral intention is the weighted sum of attitude, subjective norms, and PBC. Behavior is the weighted sum of intention and PBC. TPB has been used in many studies to predict intention and behavior (Ajzen, 2001; Armitage & Conner, 2000; Ingram, Cope, Harju, & Wuensch, 2000; Sutton, 1998). A review of studies using TPB found that prediction of behavior was improved by adding PBC as a predictor (Ajzen, 1991).

Measures of PBC have often been found to improve prediction of behavior above and beyond attitude and subjective norm (Ajzen & Fishbein, in press). Meta-analyses have discovered that, on average, PBC explains a significant increase of an additional two percent of the variance in behavior and an addi-

tional six percent of the variance in intentions (Ajzen & Fishbein, in press; Armitage & Conner, 2001).

### 2.2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) is an alternative to the Theory of Planned Behavior (TPB) in certain circumstances. TAM asserts that intention can be predicted given the perceived usefulness and perceived ease of use of a system (F. Davis, 1989).

TAM is mentioned in this paper since it has been used in a number of previous studies. However, while TAM may prove useful later in examining the use of IT certification, it will not be a base for this study since it was designed to predict the intent to adopt a **technology**. TRA and TPB are more general models of intention.

### 2.2.4 Joint Effects Of Affect And Cognition

Much of the research that has been conducted using TRA and TPB has paid little attention to the role of affect, even though Ajzen admits that emotions have a place in these theories (Ajzen & Fishbein, in press). Some attitude researchers have argued that a distinction should be made between evaluations based on affective responses to an attitude object as opposed to cognitive responses to an attitude object (Verplanken, Hofstee, & Janssen, 1998). Other research has suggested that the role played by affective factors in determining intentions is underestimated in research using TRA and TPB (Manstead & Parker, 1995).

### 2.2.5 Studies Of Intention Related To IT Use

Multiple studies have been conducted to determine influences on intentions in the IT area, such as the intent to adopt information technology in homes (Venkatesh, 2001) and in the workplace (Chau & Hu, 2001; F. Davis, 1989; Harrison, Mykytyn, & Riemschneider, 1997), and the intent to illegally copy software (Peace, Galletta, & Thong, 2003). TPB has been used in a number of IT intention-related studies. In general, for most IT-related studies using TPB, attitude has exhibited a stronger effect on intention than PBC and subjective norm.

### 2.2.6 Extension to Intention Theory

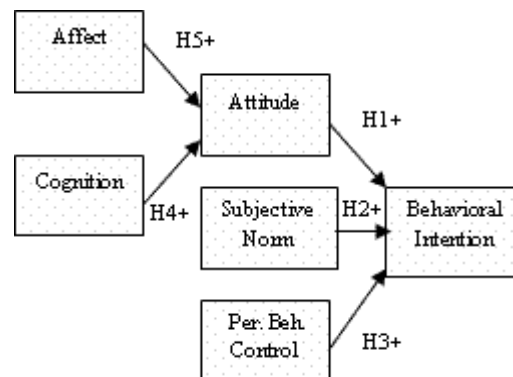
A number of researchers have constructed alternative versions of the TRA, TPB, and TAM. They have added constructs such as

descriptive norms (what significant others themselves do) (Rivis & Sheeran, 2003), past behavior (Higgins & Conner, 2003), trust (Pavlou, 2002), and background factors including demographic variables and personality traits (Ajzen & Fishbein, in press). In some cases, adding a new construct has improved the prediction of behavior above and beyond the level obtained by including only the original TPB constructs (Ajzen & Fishbein, in press).

In this research, we include affect and cognition as separate constructs in the theory of planned behavior in order to determine their importance in predicting hiring managers' intention to use IT certification in the employment process.

No known academic research has explored the factors that predict managers' intentions to use IT certification in the employee selection process. Our research will begin identifying these factors and also examine how affect and cognition affect our ability to predict intention in this domain.

## 3. Research and Measurement Model



**Figure 2: Model of Managers' Intention to Use Certification in Hiring Decisions**

Figure 2 illustrates the model from which several of the hypotheses are derived. The attitude, subjective norm, PBC, and behavioral intention constructs come from the theory of planned behavior. Since our goal is only to predict behavioral intention, the TPB actual behavior construct and associated relationships have been omitted.

According to the TPB, a person's intention to perform the behavior in question is stronger when attitude and subjective norm are more favorable and PBC is greater (L. E. Davis, Ajzen, Saunders, & Williams, 2002).

Attitude toward the behavior is the degree to which a person has a favorable or unfavorable evaluation of the behavior in question (Ajzen, 1991). In this study, the behavior is using IT certification in the hiring process in the next six months.

**Hypothesis 1: Attitude toward the behavior is significantly and positively correlated with intent to use IT certification in the hiring process.**

Subjective norm refers to the person's perception of the social pressures to perform or not perform the behavior (Ajzen, 1991).

**Hypothesis 2: Subjective norm is significantly and positively correlated with intent to use IT certification in the hiring process.**

Perceived behavioral control refers to the perceived ease or difficulty of performing the behavior (Ajzen, 1991). It is derived from Bandura's (Bandura, 1977) concept of self-efficacy – "the conviction that one can successfully execute (a given) behavior" (Eagly & Chaiken, 1993).

**Hypothesis 3: Perceived behavioral control is significantly and positively correlated with intent to use IT certification in the hiring process.**

Attitude may be better explained if we consider its affective and cognitive aspects (Ajzen, 2001; Lavine, Thomsen, Zanna, & Borgida, 1998; Manstead & Parker, 1995; Morris, Woo, Geason, & Kim, 2002; Verplanken et al., 1998). Affect is based upon emotions or feelings, while cognition is based upon beliefs. Some attitude researchers argue that a distinction should be made between evaluations based on affective responses as opposed to cognitive responses (Verplanken et al., 1998).

This study separates affective evaluations from behavioral beliefs as suggested by Manstead and Parker (Manstead & Parker, 1995). Previous studies on affect and cognition have found that they are positively correlated with attitude (Lavine et al., 1998). However, the relative effect and the signifi-

cance of affect and cognition may vary depending upon the behavior. In the case of the use of IT certification in the hiring process, results of the previous study lead us to expect that both affect and cognition will be positively related to attitude.

**Hypothesis 4: Cognition is significantly and positively correlated with attitude regarding using IT certification in the hiring process.**

**Hypothesis 5: Affect is significantly and positively correlated with attitude regarding using IT certification in the hiring process.**

The model in Figure 2 implies that the attitude construct mediates the relationship between affect and behavioral intention. A variable may function as a mediator to the extent that it accounts for the relation between the independent variable and the outcome variable (Baron & Kenny, 1986). A mediator may explain how or why certain effects occur (Baron & Kenny, 1986).

Baron and Kenny's 4-step approach (Baron & Kenny, 1986) is used to determine whether a variable acts as a mediator. The following hypotheses are suggested by the model in Figure 2:

**Hypothesis 6a: Attitude mediates the relationship between affect and behavioral intention.**

**Hypothesis 6b: Attitude mediates the relationship between cognition and behavioral intention.**

**Hypothesis 7a: The indirect effect of affect on behavioral intention via the mediator (attitude) is significantly different from zero.**

**Hypothesis 7b: The indirect effect of cognition on behavioral intention via the mediator (attitude) is significantly different from zero.**

### 3.1 Measures

We first conducted a pilot study to verify that our survey instrument possesses acceptable reliability and validity, as well as to test the temporal stability of the instrument.

Approximately 175 hiring managers located mostly in North and South Carolina in the United States were asked to participate in this pilot study. One of the authors distrib-

uted approximately 65 surveys and self-addressed stamped envelopes to Greenville, South Carolina Area Personnel Association (a chapter of the Society for Human Resource Management) members attending a meeting in October 2004, explaining the purpose of the survey to each member as materials were handed out. About 110 additional requests were emailed or faxed to other hiring managers in the Carolinas. Responses came via post, fax, or e-mail during October 2004. Incomplete questionnaires were discarded for the data analysis.

Thirty-three useable responses were returned, a response rate of 18.9%. The participants work in a range of industries, including manufacturing, retail sales, health-care, banking, utilities, education, and the military. Small, medium, and large companies in various sized cities are represented in the pilot study.

Twenty respondents agreed to participate in a follow-up study two weeks later to measure the temporal stability of the instrument; 18 of these respondents (90%) participated.

Based upon feedback, we refined the instrument for this larger study. The survey instrument for this larger study consists of 28 questions and several background and demographic items. Many measures for this study are derived from Ajzen's suggestions for constructing a TPB questionnaire and from examples he provided in a sample instrument (Ajzen, 2002b).

### 3.1.1 Outcome Beliefs and Evaluations (Cognition)

Outcome belief measures were based on findings from the grounded theory study dealing with managers' perceptions of using IT certification in the hiring process. Respondents were asked to rate five statements on a seven-point scale ranging from Strongly Disagree (-3) to Strongly Agree (+3). Participants also indicated the outcome evaluation for each statement on a Likert-type scale ranging from Very Undesirable (1) to Very Desirable (7). The cognition measure was computed by multiplying the likelihood rating for each outcome by its outcome evaluation and summing the products.

No assumption was made about consistency of accessible beliefs; therefore, Cronbach's alpha was not computed. However, as rec-

ommended by Ajzen, temporal stability (test-retest reliability) was tested in the pilot study (Ajzen, 2002a).

### 3.1.2 Affect

Affect was measured using four previously validated measures (Crites, Fabrigar, & Petty, 1994; Simons & Carey, 1998). Participants indicated responses on a 5-point Likert-type scale. Affect was computed by averaging the responses from each participant. Cronbach's alpha was .887, which well exceeds the cutoff score of 0.7 recommended (Santos, 1999) to test construct validity.

### 3.1.3 Direct Measure of Attitude

A direct measure of attitude toward intention to use certification was computed using three statements validated in previous TRA and TPB studies that were found to exhibit high internal consistency (Ajzen, 1991; Ajzen, 2001; Sheppard et al., 1988; van den Putte, Hoogstraten, & Meertens, 1991). Cronbach's alpha was .951 for attitude.

### 3.1.4 Normative Beliefs and Motivation to Comply

To measure normative beliefs, participants rated their agreement or disagreement with four statements about the views of referent groups, such as the person's manager(s), using a seven-point scale ranging from -3 to +3. Referent groups were identified in a previous qualitative study. Respondents were also asked to rate their motivation to comply with the opinions of each referent group on a seven-point scale (+1 to +7). An indirect measure of subjective norm was calculated by multiplying each normative belief by the corresponding motivation to comply and summing the products. Cronbach's alpha for motivation to comply, .852, is acceptable (Santos, 1999). Temporal stability was used to assess the stability of the normative beliefs in the pilot study as recommended by Ajzen.

### 3.1.5 Perceived Control and Degree of Facilitation

Three statements were used to measure the strength of the respondent's control beliefs; three related statements were used to compute the perceived degree of facilitation of these beliefs. Beliefs were rated on a scale ranging from Strongly Agree (+3) to

Strongly Disagree (-3), while perceived degree of facilitation was rated using values from 1 to 7. Perceived behavioral control was calculated by multiplying each control belief by the corresponding perceived degree of facilitation and adding the products across the three beliefs. Cronbach's alpha for perceived behavioral control was .855.

### *3.1.6 Behavioral Intention*

Two previously validated items were used to measure each respondent's intention to use certification in the hiring process for a particular position in the next six months (Ajzen, 1991; Ajzen & Fishbein, 1980). Respondents rated intention on a seven-point bi-polar scale ranging from -3 to +3. Cronbach's alpha was .875 for behavioral intention.

## **3.2 Population and Sample**

The population of interest for this study is managers who hire new Information Technology (IT) employees in the United States. The population to be targeted in this study is accessible IT hiring managers located primarily in the Southeastern US.

Approximately 3,000 hiring managers located primarily in the Southeastern US were asked to participate in this study. Paper-based surveys were distributed via mail in North Carolina, South Carolina, and Florida to 815 human resource managers using the Dilman method (Dilman, 1978). 2,179 members of selected Society of Human Resource Management (SHRM) chapters in ten states were asked to participate via an online-based survey. This survey allowed participants to provide anonymous responses. Questions in both the paper-based survey and web-based questionnaire were ordered and worded the same way. Responses came via post, fax, or e-mail. Incomplete questionnaires were discarded for the data analysis.

Two hundred thirty-one (231) useable responses were received, a response rate of 7.7%. The participants work in a range of industries, including manufacturing, retail sales, healthcare, banking, utilities, education, and the military. Small, medium, and large companies in various sized cities are represented.

Data from the paper-based surveys were entered into Microsoft Excel 2003 on a Win-

dows XP machine for initial calculations. Data from the web-based surveys were exported from the Survey Monkey website into Microsoft Excel 2003. The data were then imported into SPSS 12.0.2 for hierarchical regression analysis and other tests.

Previous studies relating to Information Technology which tested TRA or TPB have often used either hierarchical regression (Chau & Hu, 2001; F. D. Davis, Bagozzi, & Warshaw, 1989; Harrison et al., 1997) or structural equation modeling (SEM) (Hardgrave & Johnson, 2003; Venkatesh, Morris, Sykes, & Ackerman, 2004). Hierarchical regression is used in this study since it allows specification of the order of entry of the variables based upon theory and previous studies. Hierarchical regression allows us to observe the change in  $R^2$  as each independent variable is entered into the model. This allows us to determine whether additional variables are significant when entered into the equation.

Assumptions of normality, homoscedasticity, linearity, and independence were verified before data analysis using scatterplots and other tests. Results of the Durbin-Watson test ( $d=1.84$ ) for autocorrelation fall within the range 1.5 – 2.5 recommended by Tabachnick and Fidell (Tabachnick & Fidell, 2000).

## **4. Results**

Table 1 displays the correlation matrix for the constructs. The tolerance for each variable was also computed in SPSS 12.0.2. Since all correlations shown in Table 1 are below .90 and tolerance is greater than .20 for all variables, multicollinearity does not present a problem (Garson, 2005).

When using hierarchical regression, assumptions based on theory and research determine when terms should be entered into the model (Stockburger, 1998). We followed the suggestion of Ajzen and Madden (Ajzen & Madden, 1986) regarding order of entry of variables in the TPB. For the initial hierarchical regression, we entered attitude into the equation first, followed by subjective norm then PBC. Intention was the dependent variable. The results of the initial hierarchical regression analysis are provided in

	Intention	Attitude	Subjective Norms	Perceived Beh Control	Cognition	Affect
Intention	1.000					
Attitude	.767**	1.000				
Subjective Norms	.549**	.500**	1.000			
Perceived Beh Control	.359**	.279**	.265**	1.000		
Cognition	.562**	.713**	.468**	.272**	1.000	
Affect	.590**	.676**	.458**	.308**	.518**	1.000

**Table 1: Correlation Matrix (\*\* Correlation is significant at the 0.01 level)**

Table 2, which shows that all three TPB constructs are significant.

Since this study also examines the roles of affect and cognition as they relate to attitude, a second hierarchical regression analysis is performed. Attitude serves as the dependent variable, with cognition entered into the equation as the first independent variable, followed by affect. Affect is entered last since it is not explicitly measured in TRA and TPB. The results of the second hierarchical regression analysis, illustrated in Table 3, show that both Cognition and Affect are significant.

Hypothesis 1, "Attitude toward the behavior is significantly and positively correlated with intent to use IT certification in the hiring process," is supported. Attitude was entered first into the regression equation ( $\beta = .767$ ,  $p < .001$ ).

Hypothesis 2, "Subjective norm is significantly and positively correlated with intent to use IT certification in the hiring process," is supported. Attitude ( $\beta = .656$ ;  $p < .001$ ) and subjective norm ( $\beta = .221$ ;  $p < .001$ ) each contribute significantly.

Hypothesis 3, "PBC is significantly and positively correlated with intent to use IT certification in the hiring process," is supported. Attitude ( $\beta = .631$ ;  $p < .001$ ), subjective norm ( $\beta = .199$ ;  $p < .001$ ), and PBC ( $\beta = .131$ ;  $p < .01$ ) are significant in the equation.

Hypothesis 4, "Cognition is significantly and positively correlated with attitude regarding using IT certification in the hiring process," is supported. Cognition was entered first into the regression equation ( $\beta = .727$ ;  $p < .001$ ).

Hypothesis 5, "Affect is significantly and positively correlated with attitude regarding using IT certification in the hiring process," is supported. Cognition ( $\beta = .515$ ;  $p < .001$ ) and affect ( $\beta = .405$ ;  $p < .001$ ) each contributed significantly.

Hypothesis 6a, "Attitude mediates the relationship between affect and behavioral intention," is supported. The four step approach proposed by Baron and Kenny (Baron & Kenny, 1986) to test for mediation was conducted. In step 1, affect is shown to have an effect on the mediator, attitude ( $t =$

Step	IV	R <sup>2</sup>	Chg. in R <sup>2</sup>	$\beta$	p
1	Attitude	.588	.588	.767	***
2	Attitude Subjective Norm	.624	.036	.656 .221	*** ***
3	Attitude Subjective Norm Perceived Behavioral Control	.640	.016	.631 .199 .131	*** *** **

**Table 2: Hierarchical Regression Analysis using Attitude, Subjective Norms, and Perceived Behavioral Control**

**\*\*p < .01 \*\*\*p < .001 (Dependent Variable is Intention)**



13.852,  $p < .001$ ). In step 2, affect is shown to have an effect on the dependent variable, intention ( $t = 11.002$ ,  $p < .001$ ). In step 3, the mediator, attitude, affects the dependent variable, intention ( $t = 11.921$ ,  $p < .001$ ). Since these first three steps hold true, for mediation to occur, the effect of the independent variable on the dependent variable must be less in step 3 than in step 2. The final step shows that partial mediation exists since the effect of the independent variable on the dependent variable is less in the third equation ( $t = 2.269$ ,  $p < .05$ ) than in the second equation ( $t = 11.002$ ,  $p < .001$ ). Therefore, **the effect of affect on intention is partially mediated by attitude.**

Step	IV	R <sup>2</sup>	Chg. in R <sup>2</sup>	$\beta$	p
1	Cognition	.529	.529	.727	***
2	Cognition	.648	.119	.515	***
	Affect			.405	***

**Table 3: Hierarchical Regression Analysis using Cognition and Affect**

**\*\*\* $p < .001$  (Dependent Variable is Attitude)**

Hypothesis 6b, "Attitude mediates the relationship between cognition and behavioral intention," is supported. Again, the four step approach proposed by Baron and Kenny (Baron & Kenny, 1986) to test for mediation was conducted. In step 1, cognition is shown to have an effect on the mediator, attitude ( $t = 16.043$ ,  $p < .001$ ). In step 2, cognition is shown to have an effect on the dependent variable, intention ( $t = 11.112$ ,  $p < .001$ ). In step 3, the mediator, attitude, affects the dependent variable, intention ( $t = 11.559$ ,  $p < .001$ ). Since these first three steps hold true, for mediation to occur, the effect of the independent variable on the dependent variable must be less in step 3 than in step 2. The final step shows that perfect mediation exists since the effect of the independent variable on the dependent variable is less in the third equation ( $t = 1.173$ ,  $p > .05$ ) than in the second equation ( $t = 11.112$ ,  $p < .001$ ). A model is fully mediated if the independent variable has no effect when the mediator is controlled.

Therefore, **the effect of affect on intention is fully mediated by attitude.**

Hypothesis 7a, "The indirect effect of affect on behavioral intention via the mediator (attitude) is significantly different from zero," is supported. The regression coefficient for the indirect effect represents the change in behavioral intention for every unit change in affect that is mediated by attitude. A version of the Sobel test (Sobel, 1982) discussed by Baron and Kenny, sometimes called the Aroian test, and Preacher's interactive calculation tool (Preacher & Leonardelli, 2005) were used for the computations.

For hypothesis 7a, the following values were entered into Preacher's interactive calculation tool for mediation tests:  $a = .714$ ;  $b = .604$ ;  $s_a = .052$ ;  $s_b = .051$ . The t-statistic for the Aroian test is 8.97 ( $p < .001$ ). The Aroian version of the Sobel test is used since it does not assume that the product of  $s_a$  and  $s_b$  is very small. However, the traditional Sobel test ( $t = 8.95$ ,  $p < .001$ ) calculates a t-statistic that is close to the results of the Aroian test for this hypothesis. Based upon the results from the interactive calculation tool, we conclude that **the indirect effect of affect on intention via the mediator (attitude) is significantly different from zero.**

Hypothesis 7b, "The indirect effect of cognition on behavioral intention via the mediator (attitude) is significantly different from zero," is also supported. The following values are entered into Preacher's interactive calculation tool for mediation tests:  $a = .069$ ;  $b = .635$ ;  $s_a = .004$ ;  $s_b = .055$ . The t-statistic for the Aroian test is 9.58 ( $p < .001$ ). Again, the Aroian version of the Sobel test is used since it does not assume that the product of  $s_a$  and  $s_b$  is very small. However, the traditional Sobel test ( $t = 9.59$ ,  $p < .001$ ) calculates a t-statistic that is very close to the results of the Aroian test for this hypothesis. Therefore we can conclude that **the indirect effect of cognition on intention via the mediator is significantly different from zero.**

## 5. Discussion and Conclusions

### 5.1 Discussion

The model shows an impressive amount of variance explained for Behavioral Intention ( $R^2 = .640$ ). All three original TPB constructs, attitude, subjective norm, and PBC, are significant in predicting behavioral intention. The hierarchical regression analyses also revealed that affect significantly influences attitude, providing support for the addition of affect in future research using TPB.

Since affect's importance has been demonstrated in previous qualitative work *and* this quantitative analysis, several stakeholder groups can benefit from this knowledge. Designers and sponsors of IT certification, including IT vendors, should attempt to appeal to managers' emotions concerning certification in order to increase the likelihood that those individuals in hiring roles will use certification as a selection tool. IT employees can benefit by knowing which certifications hiring managers are more likely to like, be excited about, or enjoy using in the selection process. CIS instructors can pass along these findings to their students, our future IT workforce. Educational institutions should further consider the role that certification plays in curriculum development.

The role of education and past experience should be further examined as it relates to the selection process for IT positions. Some managers have indicated that certification is *more* important to them than formal education or even past work experience. Several previous trade studies also support this notion. IT may be different than other fields in which education and/or experience holds more importance. Several interviewees stated that certain IT certifications hold more importance than academic degrees. One manager stated, "We think IT is a little different from other industries in that what most IT managers care about is your skill level. If you don't know how to manage a database and you have a college degree, you're absolutely of no value to that IT manager. But if you have an Oracle DBA certification and you don't have a bachelor's degree, but you're the best database person, that's what most IT managers are going to focus on." This is counter-intuitive to the traditional view that educational degrees, which require years of study, are more valuable than certifications that require less time and expense.

A recent study (Cegielski, 2004) found that HR professionals value IT certifications more highly than IT professionals when hiring for IT positions. Our research only analyzed *hiring managers'* perceptions of the usage of IT certification in the employee selection process. One participant in our study commented, "[A system administrator] was hired quickly by a misinformed HR staff (without any IT input) who thought he would come in and excel at any issue thrown at him. In reality, we had to go behind him and 'fix' the issues he never could resolve." More research should be conducted to better understand why differences exist between HR managers' and IT professionals' perceptions of certification.

## 5.2 Limitations

Our research was limited primarily to respondents in the Southeastern United States. Future studies could look at and compare other geographical areas in the United States and even examine the role of certification in other countries.

Almost all of the respondents in this study were members of either the Society for Human Resource Management (SHRM), whose chapters are located across the US, or The Employers Association, an organization based in Charlotte, North Carolina. Using these groups may have introduced bias since the only respondents were hiring managers that belonged to one of these organizations. Hiring managers in areas without a nearby SHRM chapter and firms that are not SHRM members were not included in the study unless they were a member of The Employers Association.

This study only looked at hiring managers' intention to use IT certification in the hiring process within a specified timeframe. Managers' perceptions and opinions concerning IT certification may not remain static. A longitudinal study may provide insight on whether hiring managers' perceptions of IT certification change over time.

Our research only explores the predictive power of TPB even though other theories may better explain managers' intent to use certification in the hiring process. Greater institutional forces may influence a hiring manager's decision whether to use certification. Other conceptual frameworks should be considered to take into account the

broader institutional forces beyond the individual manager.

### **5.3 Ideas for Future Work**

In addition to the areas noted earlier, researchers may also wish to further explore the usefulness of TPB in explaining the phenomenon by using a greater sample size. Future researchers could examine how the relative significance of model constructs differ depending on the field or level of position for which the job candidate is considered.

As security has become increasingly important to companies, the number of information technology security certifications has grown exponentially. While only a few security certifications were available in the early 2000s, now there are a plethora of options, making it more difficult for stakeholders to decide which ones to pursue or require. Various studies could be done to examine the impact of security certifications to multiple stakeholder groups, including vendors, managers, and IT employees.

Future researchers may wish to further examine affect and cognition to determine which exerts the prevalent influence on attitude. Other theories, including Task-Technology Fit (Goodhue & Thompson, 1995) and the Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003), may provide additional insight about the use of IT certification in the employee selection process. Other training and learning studies (Alliger & Janak, 1989; Kirkpatrick, 1959, 1960; Kraiger, Ford, & Salas, 1993) may also help explain the value of certification to managers and its importance to other groups of stakeholders.

More insight may be provided in future work by expanding the current model to look more broadly at IT hiring decisions, using IT certifications as one of multiple variables. This might help us better understand the use of IT certification within the broader context of IT hiring decisions.

Future work should also further explore the salient beliefs elicited for this study. Are there other salient beliefs that were not uncovered in this research? Are there other referent groups that the managers in our sample did not mention? Also, more research should be conducted concerning the

elements that make up the affect construct. Perhaps there are other measures that can be included to provide a better picture of the role of emotions when using certification in the hiring process.

### **5.4 Summary**

Questions used in the survey instrument were generated from attitudes and beliefs identified in a previous grounded theory study and were modeled on questions used in other TPB surveys and by the author of the theory. As expected, this quantitative study found that attitude, subjective norm, and perceived behavioral control are each significantly and positively correlated with intent to use IT certification in the hiring process. In addition, both cognition and affect are significantly and positively correlated with attitude regarding using IT certification in the hiring process.

We discovered that the attitude construct partially mediates the effect of affect on behavioral intention and fully mediates the effect of cognition on behavioral intention. We also found that the indirect effect of both affect and cognition on intention via the mediator (attitude) is significantly different from zero.

This study shows that affect significantly influences attitude. We discovered that all three constructs of the TPB (attitude, subjective norm, and PBC) increase the predictive power of the overall model. An impressive amount of variance (64%) in Behavioral Intention is explained by the TPB constructs.

Our analysis found that attitude, subjective norm, and perceived behavioral control are each significantly and positively correlated with intent to use IT certification in the hiring process. In addition, both cognition and affect are significantly and positively correlated with attitude regarding using IT certification in the hiring process.

The results of our study can be used to better understand the use of IT certification in the employee selection process. We provide evidence of the influence of affect on attitude. The significance of affect as it relates to attitude, as well as the strong feelings expressed by several respondents toward the usage of certification, suggest the inclusion of affect in future research.

These findings are important to hiring managers as well as to other groups including current and future IT employees (including students), training and higher learning institutions, and even IS professors. Having a better understanding of the role of IT certification in the employee selection process will help these groups make informed decisions about gaining, teaching, and recommending certifications in the future.

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## Appendix – The Survey

### BACKGROUND QUESTIONS

1. Within the next six months, how likely are you to hire a new IT employee?
  - Very likely
  - Somewhat likely
  - Not sure
  - Somewhat unlikely
  - Very unlikely
2. For which IT field are you most likely to hire your NEXT new IT employee?
  - Networking or telecommunications
  - Database administration
  - Programming
  - Systems Administration
  - Other
3. If you chose "Other", please specify which IT field you are most likely to hire your next new IT employee.

4. For which level are you most likely to hire your NEXT new IT employee?

- Entry-level / technical
- Mid-level / technical
- Upper-level / technical
- Managerial

5. Which IT certification(s), if any, would you most likely want your next new IT employee to hold? (Please check all that apply).

- Cisco Certified Network Associate (CCNA)
- Network+ (CompTIA)
- Cisco Certified Network Professional (CCNP)
- Microsoft Certified Professional (MCP)
- Microsoft Certified Systems Administrator (MCSA)
- Microsoft Certified Systems Engineer (MCSE)
- Microsoft Certified Solution Developer (MCS D)
- Microsoft Certified Database Administrator (MCDBA)
- Oracle Certified Professional Database Administrator (OCP DBA)
- Certified Information Systems Security Professional (CISSP)
- Security+ (CompTIA)
- A+ (CompTIA)
- Certified Novell Administrator (CNA)
- Certified Novell Engineer (CNE)
- Other
- None

6. If there are other IT certifications you would want your next new IT employee to hold, please list them here:

7. How familiar do you consider yourself with IT certifications in the area in which you are hiring?

- Very familiar
- Somewhat familiar
- Neutral
- Somewhat unfamiliar
- Very unfamiliar

#### IT CERTIFICATION SURVEY

8. Using IT certification in the hiring process in the next six months for the position I described: (strongly disagree to strongly agree)

- Would make it easier for me to match applicant's skills with the department's needs.
- Would enable me to save time and resources.
- Would result in the hiring of employees able to hit the ground running.
- Would ensure that job candidates possess at least a base level of knowledge.
- Would decrease the risk of making a poor hiring decision.

9. \_\_\_\_\_ think I should use IT certification in the hiring process for the position I described in the next six months.

- My co-workers
- Hiring managers outside my company
- Other hiring managers within my company
- My managers

10. I \_\_\_\_\_ to use IT certification to hire a job applicant for the position I described in the next six months.

- Have the resources
- Have the knowledge
- Have the authorization

11. \_\_\_\_\_ in the hiring process for the position I described in the next six months.

- To the extent possible, I would use IT certification
- I intend to use IT certification

12. Generally speaking, I do what \_\_\_\_\_ think I should do.

- My managers
- My coworkers
- Hiring managers outside my company
- Other hiring managers within my company

13. Having the \_\_\_\_\_ to make the hiring decision would make it [much easier-----much more difficult] to use IT certification in the next six months as part of the hiring process for the position I described.

- Knowledge
- Resources
- Authorization

14. Using IT certification in the hiring process for the position I described in the next six months is a \_\_\_\_\_ idea.

- Very Good
- Good
- Somewhat Good
- Neutral
- Somewhat Bad
- Bad
- Very Bad

15. Using IT certification in the hiring process for the position I described in the next six months is a \_\_\_\_\_ idea.

- Very Positive
- Positive
- Somewhat Positive
- Neutral
- Somewhat Negative
- Negative
- Very Negative

16. Using IT certification in the hiring process for the position I described in the next six months is a \_\_\_\_\_ idea.

- Very Helpful
- Helpful
- Somewhat Helpful
- Neutral
- Somewhat Unhelpful
- Unhelpful
- Very Unhelpful

17. Please rate the following statements on a scale from Very Undesirable to Very Desirable.

- Hiring employees who are able to hit the ground running is...
- Easily matching applicants' skills with the department's needs is...
- Decreasing the risk of making a poor hiring decision is...
- Ensuring that a job candidate possesses at least a base level of knowledge is...
- Saving time and resources is...

18. I would \_\_\_\_\_ IT certification in the next six months as part of the hiring process for the position I described.

- Love Using
- Somewhat Love Using
- Neutral
- Somewhat Hate Using
- Hate Using

19. I would \_\_\_\_\_ IT certification in the next six months as part of the hiring process for the position I described.

- Be Calm Using
- Be Somewhat Calm Using
- Neutral
- Be Somewhat Tense Using
- Be Tense Using

20. I would \_\_\_\_\_ IT certification in the next six months as part of the hiring process for the position I described.

- Be Excited Using
- Be Somewhat Excited Using
- Neutral
- Be Somewhat Bored Using
- Be Bored Using

21. I would \_\_\_\_\_ IT certification in the next six months as part of the hiring process for the position I described.

- Be Happy Using
- Be Somewhat Happy Using
- Neutral
- Be Somewhat Bored Using
- Be Bored Using

#### DEMOGRAPHIC QUESTIONS

22. Approximately how many people are employed by your company?

- Less than 25
- Between 25 and 99
- Between 100 and 999
- Between 1,000 and 2,500
- Over 2,500



23. Which of the following best describes the industry in which your company is located?

- Manufacturing
- Retail & Wholesale Sales
- Healthcare
- Banking, Finance, Insurance
- Utilities & Energy
- Services
- Education
- Government or Military
- Media or Communications
- Technology
- Other

24. If you answered "Other" for the previous question, please specify the industry in which your company is located:

25. Approximately how many people live in the city where this position is located?

- Less than 10,000
- Between 10,000 and 49,999
- Between 50,000 and 99,999
- Between 100,000 and 500,000
- Over 500,000

26. How familiar are you with IT certifications in general?

- Very familiar
- Somewhat familiar
- Neutral
- Somewhat unfamiliar
- Very unfamiliar

27. Approximately how often have you previously used IT certification in the hiring process in the past three years?

- Five or more times
- Three or four times
- Twice
- Once
- Never

28. Which IT certification(s), if any, do you currently hold? Indicate all that apply.

- Cisco Certified Network Associate (CCNA)
- Network+ (CompTIA)
- Cisco Certified Network Professional (CCNP)
- Microsoft Certified Professional (MCP)
- Microsoft Certified Systems Administrator (MCSA)
- Microsoft Certified Systems Engineer (MCSE)
- Microsoft Certified Solution Developer (MCSD)
- Microsoft Certified Database Administrator (MCDBA)
- Oracle Certified Professional Database Administrator (OCP DBA)
- Certified Information Systems Security Professional (CISSP)
- Security+ (CompTIA)
- A+ (CompTIA)
- Certified Novell Administrator (CNA)
- Certified Novell Engineer (CNE)
- Other
- None