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Why do Students not Major in MIS? An Application of the Theory of Planned Behavior

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ABSTRACT

A McKinsey & Company report states that a gap in information technology skills remains in the U.S. and globally. Combined with continued projections for high growth in MIS positions such as Systems Analysts and Software Applications Developers, increasing student enrollment in MIS continues to be a focus for MIS academicians and professionals. Although studies addressing MIS enrollment issues abound, the manner in which relevant factors are collected is often not systematized. The current study uses established theory and instruments to examine student perceptions of majoring in MIS. Using the Theory of Planned Behavior (TPB), we employ an elicitation-based study uncovering beliefs about majoring in MIS. We subsequently use Partial Least Squares to analyze the importance of these beliefs in influencing intentions to major in MIS. The results lead to specific recommendations for improving MIS enrollments in the U.S. and international settings.

Keywords: Theory of planned behavior, Enrollment, IS major, Student perceptions

1. INTRODUCTION

Recent data (Bureau of Labor Statistics, 2018) shows that the number of IT-related jobs in the U.S. (including computer and information research scientists, software developers, systems analysts, and information security analysts) is projected to grow "13 percent from 2016 to 2026, faster than the average for all occupations." This continued rise in demand for IT-related professionals is attributed to "greater emphasis on cloud computing, the collection and storage of big data, and information security" (p. 1), areas directly relevant to MIS professionals. However recent data also indicates a large and growing number of unfulfilled IT-related jobs. According to a recent *USA Today* report, 627,000 jobs remain open in U.S. technology-related fields (Swartz, 2017), yet the number of Computer Science and MIS Bachelors and Masters graduates in the previous year was 116,388 (National Center for Education Statistics, 2017). Applications and opportunities for analysis of big data continue to grow and will impact firms around the world. Thus, the lack of workers to fill the information technology worker pipeline is a challenge academicians and practitioners still face.

Although studies that address MIS enrollment issues abound, the manner in which relevant career-deciding factors are collected has been dominated by studies employing surveys based on literature-supplied factors, with fewer studies eliciting factors. A focus of this study is the use of established theory and instruments to elicit and analyze factors that impact MIS enrollment decisions. The use of an inductive approach to identifying important factors complements the body of deductive approaches used in many previous studies.

We use the Theory of Planned Behavior to complete an elicitation study identifying salient behavioral, normative, and control beliefs of college students concerning majoring in MIS. We begin by reviewing extant literature, followed by a discussion of the research model and hypotheses, research methodology, results, and implications. Note that throughout the paper we use the acronym MIS; however, MIS includes IS.

2. LITERATURE REVIEW

2.1 Supplied and Elicited Career Choice Factors

The largest number of studies examining MIS career choice have identified factors from previous literature which are then presented to study participants. In this deductive approach, the researchers ask participants to rate the importance of the given factors in considering an MIS major, and the highest-rated factors overall are deemed the most important (Weinberger, 2004; Walstrom et al., 2008; Hogan and Li, 2011; Li, Zhang, and Zheng, 2014; Snyder and Slauson, 2014).

Only a few studies have elicited factors important to the MIS major decision. Joshi and Kuhn (2011) examined the image students hold of the MIS major by eliciting their descriptions of a "typical MIS professional." The images gleaned from their elicitation were ones commonly found in previous studies, such as "geeky and nerdy" and "lacking social skills." Lee and Lee (2006) interviewed 21 business students to uncover factors important to them and that encourage or inhibit them in choosing their major. The interviews yielded two factors unreported by previous studies: career flexibility and promotional effort, the latter representing "efforts to advertise the major." In one of the few studies to examine factors important to non-U.S. students, Rouibah (2012) elicited factors by surveying 195 students in Kuwait, asking what factors led the student to major in MIS if the student was an MIS major, and why MIS was not attractive to the student if he/she was not majoring in MIS. Rouibah found that intellectual curiosity was a motivator for some Kuwaiti students who decided to major in MIS. Scott et al. (2009) examined factors that encourage or discourage students to major in MIS by eliciting perceptions of the MIS major from 31 students in focus group settings. A key finding of the study was that a lack of understanding about the MIS major contributes to inaccurate perceptions of MIS regarding job scope and variety of work.

Eliciting beliefs can supplement our understanding of why students may or may not major in MIS; however, there are some limitations with some elicitation-based studies. One limitation is that the methods of elicitation tend to vary across studies. Lee and Lee (2006) and Scott et al. (2009) each used focus groups to elicit important factors but with different sample populations; Rouibah (2012) and Joshi and Kuhn (2011) elicited factors using researcher-developed, open-ended questions. The variation in methods is useful for discovering factors, but poses challenges in replicating results and ensuring no method-bias in the resulting factors. Second, protocols used to categorize elicited factors are not always reported or, if reported, vary across the studies. This can call into question the reliability of the factors elicited. Finally, when new factors are discovered, the relative importance of the factors to choosing an MIS career are not often examined.

2.2 Use of Theory in MIS Career Choice Research

When theory has been used to guide the identification and understanding of MIS career choice factors, two theories have been used most often: social cognitive career theory (SCCT) and the theory of reasoned action (TRA).

2.2.1 SCCT. The SCCT is derived in large part from Bandura's (1986) social cognitive theory (SCT) of human development which suggests three mechanisms that form the core of one's development: observed behavior, personal factors (cognitive and affective), and environment (social and physical). These factors are said to interact with each other to facilitate learning and determine the ongoing behavior and "life paths" taken by individuals. Bandura (1986) asserts that self-efficacy beliefs are at the very core of the personal factors component of the SCT and, when combined with other theory factors, exerts influence over which activities are actively pursued.

Lent, Brown, and Hackett (1994) applied the SCT to the study of career choices by individuals, focusing on the SCT's personal factors. The resulting theory was the SCCT. Personal factors emphasized in the SCCT include self-efficacy beliefs, outcome expectations, and goal representations. Several MIS career choice studies have used SCCT to identify and frame factors important to choosing the MIS major (Akbulut and Looney, 2007; Looney and Akbulut, 2007; Koch and Trower, 2011; Akbulut-Bailey, 2012). Looney and Akbulut (2007), Akbulut and Looney (2007), and Akbulut-Bailey (2012) supplied self-efficacy and outcome expectation-related factors to study participants who then rated their perceptions of those factors relative to majoring in MIS. The studies found self-efficacy and outcome expectations to be significant in determining students' interest towards majoring in MIS. However, the studies did not report which *specific* factors provided the most explanatory value in shaping MIS major outcome expectations or in forming self-efficacy.

2.2.2 TRA and TPB. When it comes to the study of behavioral intentions, the TRA is one of the most commonly-applied theories across a variety of disciplines. The TRA (Fishbein and Ajzen, 1975) attempts to explain how we form intentions to perform specific behaviors. The intentions are influenced by our attitudes toward performing the behavior of interest as well as subjective norms or expectations of other people.

Ajzen (1985) expanded the TRA to account for behaviors that are (or are perceived to be) non-volitional in nature. In describing the need to expand the TRA, Ajzen (1991, pp. 182-183) notes that some behaviors depend

> at least to some degree on such non-motivational factors as availability of requisite opportunities and resources (e.g., time, money, skills, cooperation of others…)… these factors represent *actual* control over the behavior… [but] of greater psychological interest than actual control… is the *perception* of behavioral control… [which] refers to people's perception of the ease or difficulty of performing the behavior of interest.

The addition of the Perceived Behavioral Control construct to the TRA forms the theory of planned behavior (TPB). A further aspect of control beliefs is the type of control being examined. *Internal* control beliefs represent the degree to which individuals view themselves as skillful enough to perform a behavior of interest (similar in concept to self-efficacy (Bandura, 1977)), versus *external* control beliefs which capture the extent to which an individual believes factors such as resources or time constraints would help or inhibit their behavior (Ajzen and Madden, 1986).

The Ajzen (1991) protocol for studying human behavior using the TRA/TPB calls for eliciting the most salient beliefs one holds about a behavior under study, as opposed to providing

intuitively-determined beliefs. Ajzen notes that elicited beliefs tend to be more closely associated with global measures of attitude than intuitively-determined beliefs (p. 192).

3. RESEARCH MODEL AND HYPOTHESES

Numerous studies have used the TRA or TPB to explain behaviors related to health, safety, classroom behavior, consumer behavior, sports, relationships, college organizations, and social and environmental issues. In the MIS context, TRA and TPB have been used in dozens of studies examining a variety of behaviors including IT adoption (Harrison, Mykytyn, and Riemenschneider, 1997; Grandon and Mykytyn, 2004; Pavlou and Fygenson, 2006) and IT acceptance/use (Davis, Bagozzi, and Warshaw, 1989; Mathieson, 1991; Taylor and Todd, 1995). When it comes to career choice, the TPB in particular has been effective in understanding intentions to major in entrepreneurship (Sieger and Monsen, 2015), physics and media studies (Taylor, 2015), engineering (Mishkin et al., 2016), and careers in general (Amani and Mkumbo, 2016). In a review of 27 studies considering MIS career choices, only 9 of those studies utilized the TRA and TPB to explain the selection of MIS as a major. In one of the earliest studies on MIS career choice based upon the TRA, Trower, Willis, and Dorsett (1994) followed the Ajzen (1991) protocol in eliciting salient factors that influence attitude and subjective norms. Among the key findings of the study was a significant difference in the degree to which intended majors versus intended non-majors felt the MIS major provided an opportunity to graduate with a useful skill and provided a balance between business and technology (Trower, Willis, and Dorsett, 1994). The study found that intended MIS majors weighted these two factors significantly more highly than intended non-majors. Most subsequent TRA-based studies of MIS career choice have been based on work by Zhang (2007). Zhang (2007) reviewed previous literature on choosing college majors and proposed a set of behavioral and normative beliefs that would influence one's attitude and subjective norms towards majoring in MIS. Zhang categorized the supplied beliefs and included them on a survey distributed to undergraduate business students. Subsequent analysis of survey data found support for both attitudes towards majoring in MIS as well as social norms regarding majoring in MIS as being significant influences to the intention to major in MIS.

While the TRA has demonstrated utility in understanding the influencers in the decision to major in MIS, many of the TRA-based studies have been mostly deductive in nature, beginning with beliefs observed in prior research. Further, the number of studies utilizing the TPB in MIS career choice research is smaller than the number of SCCT and TRA-based studies which limits our understanding of whether control-related factors may influence the decision to major in MIS. Our research seeks to determine whether the use of an elicitation-based TPB approach can add to our understanding of the decision to major in MIS.

As previously stated, the TRA (Fishbein and Ajzen, 1975) posits that the attitudes and subjective norms of an individual influence the intentions of that individual to perform a certain behavior, and those intentions influence the actual behavior. In 1985, Ajzen expanded the TRA and labelled this expansion the TPB when he added perceived behavioral control as a third antecedent to behavioral intention. In summarizing the TPB, consistent with the TRA, Ajzen (2006) notes that individual attitudes toward a behavior emanate from underlying salient beliefs about outcomes of the behavior, and that social pressures are influenced by salient beliefs about whether others important to the individual believe he/she should perform the behavior. Thus, we hypothesize:

H1: The more positive the ***beliefs that majoring in MIS produces certain outcomes***, weighted by evaluations of the outcomes, the more positive the ***attitude*** towards majoring in MIS.

H2: The more positive the ***beliefs that specific normative referents feel a student should major in MIS***, weighted by the student's motivation to comply with the norms, the more positive the ***subjective norm*** towards majoring in MIS.

A possible explanation for the dearth of studies using the TPB in this research stream is the assumption that the decision to major in MIS is voluntary; as Zhang (2007) states "the behavior of interest… (declaring the major) is within the students' control and thus completely volitional, [therefore] it is reasonable to assume that perceived behavioral control does not affect the intentions to choose an IS major" (p. 448). However, the broader definition of perceived behavioral control (PBC) as stated in Ajzen and Driver (1991, p. 188) notes that PBC

> deals with the presence or absence of requisite resources and opportunities… The more resources and opportunities individuals believe they possess, and the fewer obstacles or impediments they anticipate, the greater should be their perceived control over the behavior.

The more obstacles students perceive they face when considering a major in MIS, the less personal control they may feel over the decision. Therefore, we examine the following hypothesis:

H3: The more positive the ***beliefs about resources required to major in MIS***, weighted by perceptions of the power of these resources, the more positive the ***perceived behavioral control*** towards majoring in MIS.

Ajzen (2006) summarizes the core constructs of the TPB and their impacts on behavioral intention. Consistent with the TRA, the TPB suggests that individuals will more likely intend to perform a behavior if they have a positive perception (attitude) toward the behavior and if they perceive favorable views from others regarding performing the behavior (subjective norm). The significance of these core constructs to the decision to major in MIS has been confirmed in prior MIS research by Zhang (2007) and others (Kuechler, McLeod, and Simkin, 2009; Croasdell, McLeod, and Simkin, 2011; Downey, McGaughey, and Roach, 2011; Kumar and Kumar 2013). Hence, we hypothesize the following:

H4: The more positive the ***attitude*** about majoring in MIS, the greater the ***intention*** to major in MIS.

H5: The more positive the level of ***subjective norm*** towards the MIS major, the greater the ***intention*** to major in MIS.

In a study examining MIS career choice using a modification of the TPB framework, Ferratt et al. (2010) elicited behavioral beliefs via a survey with open-ended questions devised by the researchers. The study elicited beliefs not previously identified in MIS career choice research such as the ability to have a practical application of MIS coursework. However, the strength and contributions of the elicited factors in predicting intentions to major in MIS were not examined. Heinze and Hu (2009) studied students' choice of IT as a major using a model that integrates the TPB with the SCCT. The beliefs were not elicited or weighted; however, the PBC construct was found to be significantly related to the intention to pursue an IT major, highlighting the potential of the TPB in explaining the MIS career choice. Their finding is consistent with Ajzen (1991) who suggests that the greater one perceives his/her ease of performing a behavior, the stronger his/her intention to perform the behavior should be, leading to the following hypothesis:

H6: The more positive the ***perception of control*** over the ability to major in MIS, the greater the ***intention*** to major in MIS.

Both the TRA and the TPB indicate that a central factor in predicting *actual* behavior and the immediate antecedent to *actual* behavior is the individual's *intention* (readiness) to perform that behavior, and that the stronger the *intention* to engage in the behavior, the more likely the *actual* behavior will be achieved (Ajzen, 1991, 2006). Therefore, we hypothesize:

H7: The more positive the ***intention*** to major in MIS, the greater the likelihood of actually ***majoring*** in MIS.

To summarize, the decision to major in MIS has been widely-studied. For those utilizing a theory-driven approach, few empirically examined all theory components using protocols described for the theory. Our study addresses this gap by examining the decision to major in MIS using the TPB and its measurement protocols, with the goal of identifying and explaining factors that best influence the decision to major in MIS. The use of the TPB allows us to examine a richer set of factors which include the possibility of perceived internal and external barriers to majoring in MIS. We elicit salient factors from students, as salient beliefs that students hold about majoring in MIS may have changed over time. Figure 1 depicts the proposed research model for this study.

4. METHODOLOGY

Data was collected in two phases. In the first phase, we elicited salient beliefs concerning the study of MIS in college. In the second phase, we conducted the full study using survey questions based on established TPB protocols including elicited beliefs from the first phase.

4.1 Phase I – Elicitation

We elicited beliefs regarding majoring in MIS from a population of 150 students from a university in the southwest region of the United States as well as a university in Zambia, both of which are private universities. We chose this mixture of universities in order to get a broader representation of student beliefs about majoring in MIS. Details of the elicitation study are reported in Chipidza, Green, and Riemenschneider (2016a); a brief summary follows.

Elicitation survey questions were drawn from prior TPB research and consistent with protocols suggested by Ajzen and colleagues (Ajzen and Fishbein, 1980; Ajzen and Driver, 1991), with modifications to suit the context of our study. In total, 136 students completed the survey (response rate of 90%) with 110 usable responses in the final analysis. Of the 110 usable responses, 52% of the sample was female, 43% was classified as juniors or seniors, and 97% was from the U.S. university. Survey responses were coded using content analysis protocols consistent with the approach explicated in Hsieh and Shannon (2005). Two researchers independently coded the responses, with an overall inter-rater agreement rate of 90%. Cohen's kappa ranged from 61% to 100% for the different questions, indicating good to excellent agreement (Fleiss, 1981). Descriptive statistics of elicited beliefs are shown in Table 1.

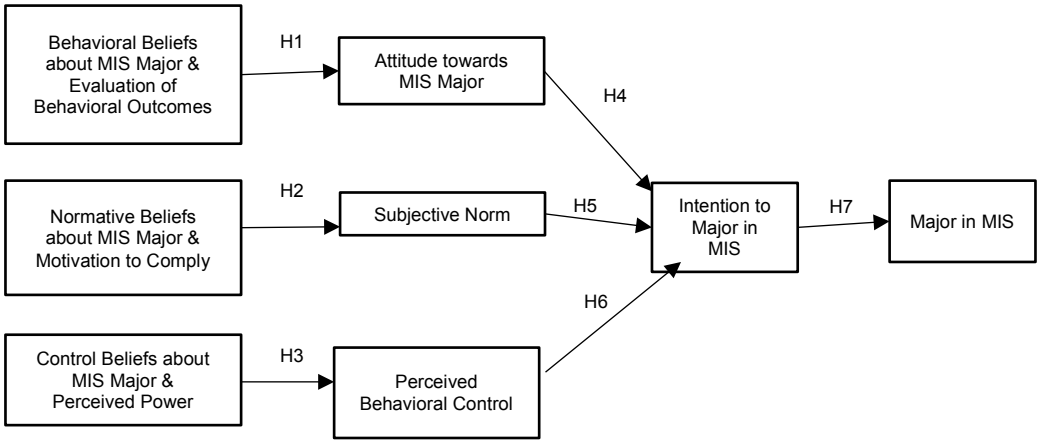

Figure 1. Research Model

Beliefs	Question	Total	Mean Beliefs per Person (SD)	Percent of Respondents Supplying Three or more Beliefs	Cohen's Kappa
Behavioral (attitude towards majoring in MIS)	Like or enjoy	263	2.39 (1.64)	39%	0.86
	Advantages	384	3.49 (1.41)	77%	0.70
	Dislike or hate	206	1.87 (1.72)	29%	0.61
	Disadvantages	252	2.29 (1.78)	39%	0.75
Control (barriers, facilitators)	Easy	180	1.64 (1.39)	20%	0.81
	Difficult	216	1.96 (1.46)	13%	0.85
Normative Referents	Individuals, Groups	146	1.42 (1.67)	21%	1.00

Table 1. Descriptive Statistics for Elicited Beliefs (adapted from Chipidza, Green, and Riemenschneider, 2016a)

We utilized the "Top 10" rule to select salient beliefs in the behavioral and normative categories which yielded 10 behavioral and 5 normative beliefs (Ajzen and Fishbein, 1980; Sutton et al., 2003). There was an overlap in elicited control and behavioral beliefs. To resolve, we selected those salient control beliefs that were not already covered in the behavioral category for inclusion in the full study, resulting in five control beliefs. Table 2 shows the salient beliefs.

Using the Ajzen (1991) approach to eliciting salient beliefs, we found it interesting that some elicited beliefs overlap between Behavioral Beliefs and Control Beliefs, specifically beliefs expressing "Lack of Interest" and availability of "Job Opportunities." Regarding "Lack of Interest," the overlap between belief constructs may suggest that students view "Lack of Interest" as both an attitude (e.g., "no interest in MIS career") and a perceived obstacle that they feel is difficult or costly to change (e.g., "do not enjoy MIS," "not technology-inclined," "no interest in problem-solving"). Similarly, "Job Opportunities" surfaced as both positive attitudes about majoring in MIS ("competitive advantage"" and "high salary") as well as beliefs about the MIS major that would make it easy or less costly to major in MIS (e.g., "job placement"). These results suggest the possibility of measurement and/or theoretical overlaps between behavioral and control beliefs for this particular set of elicited beliefs. According to Fishbein and Ajzen (2011), this overlap of beliefs is highly probable in empirical research.

Belief Type	Belief Description	Number of Respondents	Percent of Respondents
Behavioral	Job Opportunities (competitive advantage)	92	84%
	Acquisition of Technical Skills	90	82%
	Negative Image	83	75%
	Difficult Classes	82	75%
	Time-Consuming	51	46%
	Constantly-Changing Technology	48	44%
	Lack of Interest	47	43%
	Job Opportunities (high salary)	43	39%
	Personally Rewarding	37	34%
	Difficulty with Programming	31	28%
Normative	Family	24	71%
	Friends	14	41%
	MIS/IT Professionals	7	21%
	Advisors	5	15%
	Educators	2	6%
Control	Too much Additional Effort	47	46%
	Lack of Interest	39	38%
	Lack of Ability/Self-Efficacy	39	38%
	Job Opportunities (job placement)	20	21%
	Individual Support System	12	12%

Table 2. Behavioral, Normative, and Control Beliefs Included in Full Study

4.2 Phase II – Full Study

4.2.1 Survey Development. Phase II of our study collected data to study the decision to major in MIS. Items to measure beliefs about majoring in MIS, as well as items that provide for direct assessment of attitude (ATT), subjective norm (SN), perceived behavioral control (PBC), and intention (INT) constructs closely followed guidelines published in Ajzen (2002), modified to fit the context of majoring in MIS. Items to measure the behavioral, normative, and control beliefs were created from the most common items elicited in Phase I. For example, the first behavioral belief provided in Table 2 is "competitive advantage" and the resulting question on the Phase II survey from this belief was "Majoring in MIS in college would give me a competitive advantage when seeking out a job." The first normative belief from Table 2 is "family" and the resulting question on the Phase II survey is "My family thinks that I should major in MIS." All of the measurement items follow a similar pattern and are included in the Appendix.

The salient beliefs garnered from Phase I formed the basis of the indirect measurement questions to assess participants' behavioral, normative, and control beliefs towards majoring in MIS. Consistent with Ajzen (2002), two questions are asked for each behavioral belief: the degree of the respondent's belief about majoring in MIS and the importance attached to that belief. Similarly, each normative belief generates two questions: the degree to which the participant feels others expect him/her to major in MIS and the participant's motivation to comply with the normative referent's expectations. Last, each control belief is also assessed through two questions. The composite of the strength and power of each belief provides a measure of the belief's impact in facilitating or impeding a participant's intention to major in MIS.

4.2.2 Data Collection. We conducted a pilot study in spring 2015 with 150 student participants from the private university in the southwest U.S. Analysis of the 147 usable responses revealed that "motivation to comply" questions about normative beliefs had been omitted. After correcting the survey to add these questions, we began the full study by emailing a link to the electronic survey to professors at the same two universities that participated in the elicitation study as well as a public university in the southeast U.S. Professors disseminated the link to their students offering a class credit incentive to complete the survey. Most students had taken or were taking a required introductory IT course. Three hundred thirty five students responded to the survey; cases with at least 50% missing values were removed leaving 319 usable cases. Table 3 shows sample characteristics.

To assess construct validity, we performed a factor analysis of the indicators. Since the primary theoretical constructs are expected to correlate highly, we included their items in a principal axis factor analysis with an oblique rotation. The items loaded highest on their theoretical constructs except for item SN3 ("The people in my life whose opinion I value would approve of me majoring in MIS in college"), which did not load above 0.3 on any factor and was therefore dropped. The factor analysis of the indicators is not included due to space constraints. Belief factors in TPB are also expected to highly correlate (Ajzen, 2002). Therefore, we conducted a principal axis factor analysis with an oblique rotation in order to determine the underlying factor structure of behavioral, normative, and control beliefs shown in Table 4.

All normative belief items loaded on one factor as expected. Two control beliefs loaded on a second factor. The two items (CB2 and CB4) measured students' perceptions of their interest and self-efficacy in technology. However, behavioral beliefs loaded in an unexpected way. A third factor was composed of five items: two related to behavioral belief items and three related to control belief items. An examination of these five items revealed they were related through their focus on MIS job-related characteristics; for example, BB1 assessed student perceptions of job market competitiveness whilst CB3 assessed students' perceptions of the ease of finding a job in MIS. The overlap between behavioral and control beliefs is not new nor

	Category	Frequency	Percent of Sample
Gender	Female	160	50%
	Male	158	50%
	Unknown	1	0%
College Level	Freshman	66	21%
	Sophomore	53	17%
	Junior	106	33%
	Senior	83	26%
	Fifth Year	10	3%
	Unknown	1	0%
University	U.S. Private	283	89%
	U.S. Public	20	6%
	Zambian	13	4%
	Unknown	3	1%
Age in Years	18 – 19	91	29%
	20 – 21	147	46%
	22 – 23	53	17%
	>23	27	8%
	Unknown	1	0%
Race/ Ethnicity	African American/Black	52	16%
	Hispanic/Latino	28	9%
	Caucasian or White	209	66%
	American Indian or Alaska Native	1	0%
	Asian	22	7%
	Unknown	7	2%
Major	Other	39	12%
	Unspecified	29	9%
	CS, Other IT-related major	6	2%
	MIS	54	17%
	Business Non-MIS or Unsure	191	60%

Table 3. Demographic Information, Full Study (N=319)

Construct	Indicator	Description	Factor					
			1	2	3	4	5	6
Behavioral Beliefs: Job Characteristics	BB1	Majoring in MIS in college would give me a competitive advantage when seeking out a job	0.55					
	BB7	If I major in MIS in college, I will earn a high salary	0.64					
	CB1	I expect that majoring in MIS will require more effort compared to other majors	0.52					
	CB3	It will be easy to find a job if I major in MIS	0.61					
	CB5	If I majored in MIS, my teachers, friends and family would support me	0.50					
Behavioral Beliefs: Intrinsic Motivations	BB5	If I major in MIS in college, I will find it interesting		0.82				
	BB10	If I major in MIS in college, I will find it a rewarding and satisfying experience		0.73				
Behavioral Beliefs: Technical Skills	BB4	If I major in MIS in college I will acquire additional technical skills			0.66			
	BB8	If I major in MIS in college, I will have to keep pace with rapidly changing technology			0.47			
Behavioral Beliefs: Cost Factors	BB2	If I major in MIS in college, I will find the classes difficult				0.42		
	BB6	If I major in MIS in college, I will have to take many additional classes				0.44		
	BB9	If I major in MIS in college, I will have limited interaction with people during college or during my professional life				0.51		
Control Beliefs	CB2	I am interested in technology					0.49	
	CB4	I am good at technology					0.58	
Normative Beliefs	NB1	My family thinks that I should major in MIS						0.61
	NB2	My friends think that I should major in MIS						0.56
	NB3	My academic advisors think that I should major in MIS						0.90
	NB4	My high school teachers that I should major in MIS						0.51
	NB5	IT professionals think that I should major in MIS						0.38

Table 4. **Rotated Factor Pattern Matrix: Behavioral Beliefs, Control Beliefs, and Normative Beliefs**

unprecedented and is empirically highly probable (Fishbein and Ajzen, 2011). Kraft et al. (2005) note that some measures of behavioral control beliefs may indeed reflect the experiential aspect of attitude, which may have been a factor with the aforementioned three control belief items. A fourth factor was composed of two items related to students' intrinsic motivations to major in MIS. The items, BB5 and BB10, measured participants' perceptions of how satisfying and interesting majoring in MIS would be. Items BB4 and BB8 loaded highest on a fifth factor capturing beliefs about technical skills. The former item assessed participants' beliefs that majoring in MIS would help them acquire technical skills while the latter measured the belief that MIS graduates would have to maintain pace with new technological developments. Items BB2, BB6, and BB9 loaded together on a sixth factor and tapped aspects of cost incurred by majoring in MIS. Specifically, the items measure the difficulty, time commitment, and social cost perceived when majoring in MIS.

The preceding four factors form a primary layer of constructs for a second-order behavioral beliefs (BB) construct. Figure 2 depicts the hierarchical component model for the

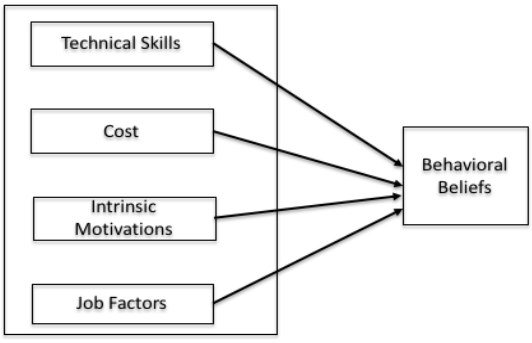

Figure 2. Hierarchical Component Model for Behavioral Beliefs

newly-developed BB construct. Only item BB3 ("If I major in MIS in college, I will have to write a lot of programming code") did not load above 0.3 on any factor and was deleted.

5. RESULTS

To analyze relationships among the constructs in the research model, we chose the component-based Partial Least Squares (PLS) method for three reasons. First, the final model was reasonably complex, employing a mixture of formative and reflective constructs, and a second-order construct. Second, we were unable to guarantee normality of the collected data *a priori*. Third, the belief constructs obtained from the factor analysis are not well tested; hence this research is somewhat exploratory in nature (Urbach and Ahlemann, 2010; Hair et al., 2013).

The sections below report the results of the PLS-based analyses. The analyses include all data collected from the three universities described earlier. While the small number of responses from the U.S. public university and the Zambian university did not allow us to do comparative analyses to determine if models based on data from each separate university were consistent, when analyzing the research model using the U.S.-based private data alone (89% of the sample), we found the results to be consistent with the results reported below.

5.1 Measurement Model

For each participant, indicator scores for the belief constructs were calculated as a product of belief strength and the importance attached to that belief as described earlier. These indicator formulations highlight an important strength of TPB research: a salient belief only motivates an individual to perform a stated behavior if that individual attaches importance to that belief.

Each item of the belief components captures a different aspect of the underlying TPB construct. The normative items capture student perceptions of friends, family, advisors, teachers, and IT professionals' opinions about majoring in MIS. These measures will not necessarily correlate since a student's parent may hold a different opinion concerning MIS than an academic advisor would. Indeed, belief constructs are not expected to have high internal consistency (Harrison, Mykytyn, and Riemenschneider, 1997; Ajzen, 2002;). Salient beliefs concerning MIS collectively explain students' behavioral, normative, and control beliefs in the MIS context. According to MacKenzie, Podsakoff, and Jarvis (2005), if a construct's indicators are its defining characteristics, then a formative indicator measurement model should be specified. Past TRA research has formatively modeled belief constructs (Zhang, 2007; Downey, McGaughey, and Roach, 2011; Hennessy, Bleakley, and Fishbein, 2012; Kumar and Kumar, 2013). As such, belief constructs can be appropriately modeled formatively, indicating that changes in the indicators lead to changes in the construct (Petter, Straub, and Rai, 2007). On the other hand, items constituting the major TPB constructs (ATT, SN, PBC, and INT) are interchangeable in that removing a single item should not alter the conceptual meaning of the construct; hence, these constructs are modeled reflectively.

We assessed formative constructs on the basis of their collinearity (Hair et al., 2013). The variance inflation factor (VIF) statistic for all formative indicators ranged from 1.01 to 2.24, below the maximum threshold of 3.3 beyond which collinearity becomes a problem when estimating the path model (Diamantopoulos and Siguaw, 2006). In calculating outer weights of the indicators, NNB3, NNB4, and NCB3 did not have significant weights, indicating they did not contribute significantly to their respective formative constructs in relative terms. Consequently, we assessed the absolute contributions of the formative indicators to the constructs by looking at their loadings. NNB3 (loading = -0.08, p = 0.74) and NNB4 (loading = 0.07, p = 0.25) did not significantly load on their construct. The non-significant contributions of NNB3 and NNB4 showed that they did not contribute towards the formation of the normative beliefs construct; thus, we deleted them.

Reflective constructs are analyzed on the criteria of internal consistency, convergent validity, and discriminant validity (Roldán and Sánchez-Franco, 2012). Tables 5 and 6 summarize results of these analyses. The model's reflective constructs exceed the Hair et al. (2013) benchmarks for demonstrating high internal consistency. Indicator reliability and average variance extracted (AVE) are used to assess the convergent validity of each reflective construct. Except for item PBC1, reflective item loadings ranged from 0.70 to 0.97, meeting the requirement for indicator reliability. We considered PBC1 for removal from the model; however, its deletion did not raise the composite reliability or AVE above the threshold values. Consequently, we retained PBC1 in the model (Hair et al., 2013). AVE values for reflective constructs ranged from 0.56 to 0.92 demonstrating adequate convergent validity. In determining discriminant validity, the squared correlation between two constructs must be less than either of their individual AVEs (Fornell and Larker, 1981). As Table 6 shows, this condition is met for all the model's reflective constructs. Cross loadings can also be used to evaluate the model's discriminant validity. Analysis of the cross loadings for the indicators in the model showed acceptable levels of discriminant validity.

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Attitude	0.92	0.94	0.72
Intention	0.95	0.97	0.92
Perceived Behavioral Control	0.77	0.83	0.56
Subjective Norms	0.72	0.82	0.60

Table 5. Composite Reliability, Cronbach's Alpha, and Average Variance Extracted for Reflective Model Constructs

5.2 Tests for the Second-Order Behavioral Beliefs Construct

Our factor analysis revealed that behavioral beliefs fall into four categories: technical skills, job factors, intrinsic motivations, and cost. Thus, behavioral beliefs is a second-order construct composed of four first-order constructs (Figure 2). Each first-order construct captures a different aspect of the behavioral belief construct. Therefore, this hierarchical component model

Construct	1	2	3	4	5	6	7	8	9	10	11	12
1. Attitude	**0.85**											
2. Behavioral Beliefs	0.74	F										
3. Control Beliefs	0.47	0.52	F									
4. Cost Beliefs	0.33	0.45	0.26	F								
5. Enrolled in MIS	-0.49	-0.42	-0.22	-0.17	Single Item							
6. Intention	0.64	0.61	0.37	0.25	-0.74	**0.96**						
7. Intrinsic Motivation Beliefs	0.71	0.96	0.50	0.29	-0.40	0.60	F					
8. Job Factors Beliefs	0.47	0.64	0.33	0.26	-0.28	0.31	0.45	F				
9. Normative Beliefs	0.38	0.43	0.30	0.15	-0.27	0.40	0.42	0.31	F			
10. PBC	0.42	0.39	0.45	0.23	-0.30	0.31	0.32	0.38	0.12	**0.75**		
11. Subjective Norms	0.56	0.52	0.34	0.26	-0.41	0.62	0.49	0.35	0.39	0.29	**0.77**	
12. Technical Skills Beliefs	0.28	0.39	0.24	0.16	-0.18	0.11	0.37	0.41	0.19	0.28	0.14	F

Table 6. Correlation Matrix for Model Constructs. (Numbers in bold are Fornell and Larker Criterion Figures (square root of AVE); F = Formative Constructs; PLS does not calculate Fornell Larker Criterion figures for formative constructs)

is modeled as a formative-formative type, indicating that the relationship between the first- and second-order constructs is formative, and each construct is measured by formative indicators (MacKenzie, Podsakoff, and Jarvis, 2005). We used a repeated indicators approach in that the second-order construct used all the indicators of the first-order constructs in its measurement (Lohmoller, 1988).

There were significant relationships between three first-order constructs (job factors, cost, and intrinsic motivations) and the second-order construct (see Figure 3). However, the relationship between the technical skills construct and the second-order construct was non-significant. According to Mackenzie, Podsakoff, and Podsakoff (2011), lower-order constructs with non-significant relationships are candidates for elimination only if they exhibit multicollinearity problems. The VIF for the Technical Skills to Behavioral Beliefs path was 1.27, well below the benchmark of 3.3 (Diamantopoulos and Siguaw, 2006). This suggests there were no multicollinearity problems with the technical skills construct; thus, the construct was retained in the model. Finally, we tested whether the second-order construct mediates the relationships between each first-order construct and ATT; our test indicates that BB indeed fully mediates the relationships – the influences of technical skills considerations, job factors, cost factors, and intrinsic motivations on attitude towards studying MIS are fully explained by the second-order BB construct.

5.3 Structural Model

The structural model is assessed on the basis of strength of the relationships between the constructs. The initial model included controls for age, gender, ethnicity, college level, and socioeconomic status; these are omitted from subsequent models as none of the control variables had a significant relationship with behavioral intention. Figure 3 depicts our structural model. Similar to the measures for assessing formative indicators, VIF values for each predictor construct should not exceed the benchmark of 5 (Hair et al., 2013). Our model's VIF values range from 1.00 to 1.63 indicating no

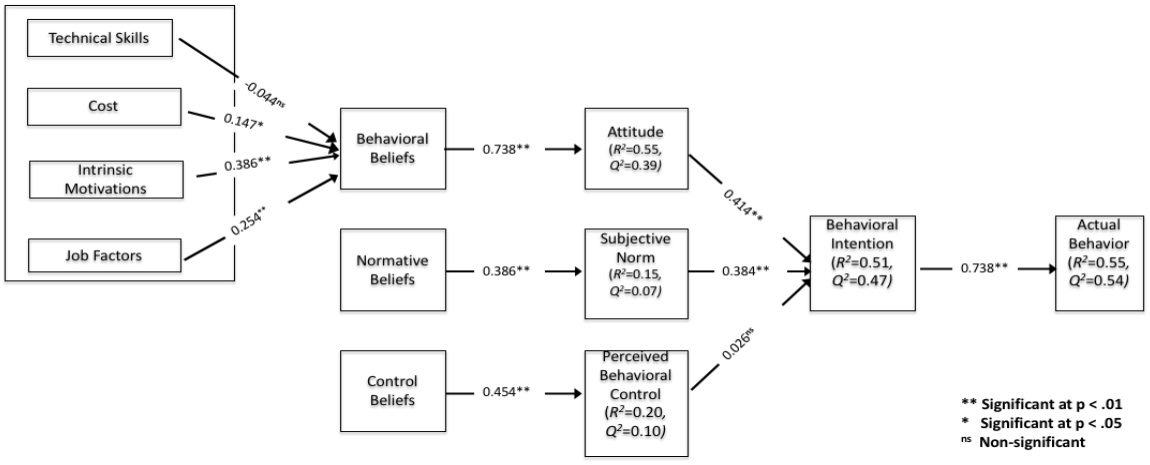

Figure 3. PLS Results for Student Enrollment in MIS Major

significant collinearity among the predictor constructs. Four intervening variables are in the research model: attitude (ATT), subjective norm (SN), perceived behavioral control (PBC), and intention to major in MIS (INT). Hayes (2009) argues that bootstrapping, as opposed to the Sobel test or causal steps approach, must be used to investigate mediating variables. We selected a sample of 5,000 with a confidence interval of 95% as bootstrapping parameters. T values exceeding 1.96 for a given path indicate a significant relationship between the two constructs linked by the path. Running the PLS algorithm reveals that all paths were significant except the paths between technical skills and behavioral beliefs and between PBC and intention. Table 7 summarizes the results of hypothesized relationships.

The relationship between behavioral beliefs and attitude towards majoring in MIS is empirically validated ($\beta = 0.74$, $p = 0.000$), lending support towards H1. Specifically, positive behavioral beliefs are associated with favorable attitudes towards majoring in MIS. Similarly, normative beliefs positively correlate with subjective norms concerning majoring in MIS, suggesting that strong normative beliefs are associated with high perceived social pressure ($\beta = 0.39$, $p = 0.000$); H2 is supported by our results. H3 is also supported; control beliefs positively correlate with perceived behavioral control ($\beta = 0.45$, $p = 0.000$).

Attitude and subjective norms towards MIS are positively related to behavioral intention ($\beta = 0.41$, $p = 0.000$) and ($\beta = 0.38$, $p = 0.000$) respectively, lending support towards both H4 and H5. However, the relationship between PBC and intention is non-significant ($\beta = 0.03$, $p = 0.50$); hence, H6 is not supported. Finally, H7 is supported; behavioral intention is positively associated with actual behavior – participants that expressed intention to major in MIS were more likely to do so than participants that did not intend to major in MIS ($\beta = 0.74$, $p = 0.000$).

To assess the predictive value of the model, the coefficient of determination, R^2, is employed. The model explains 51% of the variance in the intention to major in MIS and 55% of the variance in actual behavior. The size of the effect of ATT on INT is 0.22 and that of SN on INT is 0.21 (Table 7), representing medium effects for the predictor variables on INT (Cohen, 1988).

In addition, we evaluated the predictive relevance of the model using the Q^2 statistic (Stone, 1974). Q^2 values greater than 0 indicate predictive relevance for the construct (Hair et al., 2013). Q^2 values ranged from 0.06 (SN) to 0.47 (actual enrollment behavior), indicating that the model has predictive relevance for its endogenous constructs. Specifically, the model correctly predicts indicator values in reflective and single-item constructs.

6. DISCUSSION AND POST-HOC ANALYSIS

This study sought to understand the strongest influencers of students' decisions to major (or avoid majoring) in MIS and the beliefs that shape these influencers. The TPB-based approach found strongest support for the influences of students' attitude towards majoring in MIS, and the expectations of other people important to the student, in this order. Results reported in Figure 3 give us additional insights into the beliefs that most strongly shape these influencers.

Intrinsic motivators, such as interest and the potential for a rewarding and satisfying experience, proved to be the strongest influencer of a students' attitude about majoring in MIS, followed closely by job-related aspects of MIS, such as competitive advantage, salary, support structure, and ease of finding a job that MIS careers offer. Analysis also revealed that the perception of the MIS major as posing high costs to students can lessen their positive attitude towards majoring in MIS. Examples of this include difficulty of classes in the major,

	Hypothesis	Result	Path Coefficient (p-value)	Effect Size (f^2)
H1	The more positive the *beliefs that majoring in MIS produces certain outcomes*, weighted by evaluations of the outcomes, the more positive the *attitude* towards majoring in MIS.	Supported	0.74 (0.00)	1.20
H2	The more positive the *beliefs that specific normative referents feel a student should major in MIS*, weighted by the student's motivation to comply with the norms, the more positive the *subjective norm* towards majoring in MIS.	Supported	0.39 (0.00)	0.20
H3	The more positive the *beliefs about resources required to major in MIS*, weighted by perceptions of the power of these resources, the more positive the *perceived behavioral control* towards majoring in MIS.	Supported	0.45 (0.00)	0.26
H4	The more positive the *attitude* about majoring in MIS, the greater the *intention* to major in MIS.	Supported	0.41 (0.00)	0.22
H5	The more positive the level of *subjective norm* towards the MIS major, the greater the *intention* to major in MIS.	Supported	0.38 (0.00)	0.21
H6	The more positive the *perception of control* over the ability to major in MIS, the greater the *intention* to major in MIS.	Not supported	0.03 (0.50)	0.00
H7	The more positive the *intention* to major in MIS, the greater the likelihood of *majoring* in MIS.	Supported	0.74 (0.00)	1.20

Table 7. Research Hypotheses Results

number of additional classes required for the major, and the perceptions of limited social interaction in college and beyond with a career in MIS.

Perceived social pressures were also found to significantly predict a student's intention to major in MIS. Of particular interest is the influence of IT professionals, which has the most significant impact on a students' intention to major in MIS, followed by influences of friends and family. Interestingly, student participants did not perceive social pressures to major in MIS from high school teachers nor from high school or college academic advisors as demonstrated by the lack of significant weights and loadings of these indicators.

The perception of the ease or difficulty of majoring in MIS lacked significance in predicting intention to major in MIS. This finding contradicts findings of Heinze and Hu (2009), as well as the original proposition by Ajzen (1991), that PBC influences behavioral intention. Therefore, we conducted further analyses on the PBC construct to determine if its effect could be observed in other ways. The TPB proposes that PBC may directly influence actual behavior in addition to the proposed indirect effect through intention. We tested that relationship in a post-hoc analysis and found the relationship was statistically significant ($\beta = 0.08$, $p = 0.03$) at $p = 0.05$. However, the size of the effect ($f^2 = 0.01$) fell below the required threshold for it to be characterized as even a small effect (Cohen, 1988).

Further consideration of PBC is that the present study incorporated items measuring both internal and external control aspects of PBC. Ajzen (2002) acknowledged growing questions over the structure of the PBC component of TPB, noting findings of differing impacts of these two aspects of PBC. Citing a meta-analysis of the PBC construct by Cheung and Chan (2000), Ajzen reported studies finding internal (self-efficacy) PBC items significantly explaining behavioral intentions, while external (controllability) PBC items were more significant in explaining actual behavior (Ajzen, 2002). Our operationalization combining both components of PBC suggested higher levels of PBC are associated with a higher likelihood of actual enrollment in MIS giving further credence to the possibility of PBC being multi-dimensional with differing impacts on the decision to enroll in MIS. Thus, it is clear that more work remains in conceptualizing the PBC construct in the context of majoring in MIS.

Finally, we conducted two-tailed independent t-test analyses to examine variations in attitudes towards MIS and perceived control over the decision to major in MIS according to whether the students are MIS majors or not. Results of these analyses are unsurprising; compared to non-majors, MIS majors had significantly more positive attitudes, more positive perceptions of subjective norms, and greater perceived control over the decision to major in MIS. Further, MIS majors more positively perceived the job market for MIS professionals than non-majors. These findings underscore the characteristics that differentiate students that elect to major in MIS from those that do not.

In sum, our analyses confirm the utility of TPB constructs in predicting behavioral intention to major in MIS. The results suggest implications to practice for influencing these important factors and implications to research about the structure and nature of influence of the TPB constructs when it comes to predicting decisions to major in MIS.

7. IMPLICATIONS

Our study has implications for both MIS theory and practice. We will address both the theoretical and the practitioner views in an interwoven fashion as they interrelate to each other.

First, based on a full implementation of the TPB methodology (Ajzen, 1991), we have demonstrated that the TPB provides a useful framework for understanding and predicting why students major in MIS. In particular, our study confirms that attitudes towards majoring in MIS and normative beliefs about whether to major in MIS are significant predictors of the intention to major in MIS. The application of this theory to studying MIS enrollment is relevant from a global perspective as the need to grow the international workforce and fill the MIS worker pipeline continues to be an area of economic concern. Given the strong demand and projections for MIS and ICT-related workers (Manyika, 2017; Bureau of Labor Statistics, 2018), our research can inform MIS practitioners of currently-held beliefs about majoring in MIS, which can inform their efforts to increase the pipeline of MIS workers.

Second, our study extends the behavioral beliefs dimension of the TPB by uncovering four sub-constructs of behavioral beliefs that emerge when determining intentions to major in MIS. These sub-dimensions allow researchers to analyze and understand the MIS career decision phenomena with more granularity and depth than prior TPB-based career choice studies. Of these sub-constructs, intrinsic motivations had the strongest influence on behavioral beliefs followed by job factors, cost, and technical skills. It is insightful to know that these students were most influenced by the interest, satisfaction, and reward of the major followed by the ability to secure a job after graduation and earn a good salary. From a practitioner standpoint, to further enhance the interest, satisfaction, and reward of the major, video testimonials emphasizing successful MIS majors could be developed and uploaded on university websites. MIS departments and professional recruiters could work together to create these videos highlighting job satisfaction and rewards of recent hires. Both MIS professionals and faculty should emphasize job availability and good salaries in promotional marketing pieces catered to students in junior high and high school, as well as college freshmen.

Third, in this study, the PBC construct was not significant in predicting intention to major in MIS, thus raising the question of applicability of PBC for this behavior of interest. However we further found PBC significant in predicting actual behavior, albeit with a small effect size. Thus, another contribution of this research is to raise the need for further research regarding the PBC construct and its direct or indirect influence on majoring in MIS.

Fourth, our use of TPB-based elicitation uncovered behavioral, normative, and control beliefs about majoring in MIS not typically uncovered in previous studies. These factors include the opportunity to stay abreast of rapid-changing technology; the availability of a support system of teachers, family, and friends when majoring in MIS; and the strong influence of IT professionals on decisions to major in MIS. While these factors had varying levels of contributions to our research model, the emergence of these factors give support for the periodic use of TPB-based elicitation methods to uncover new MIS career decision factors that may emerge over time (Taylor, 2015). In addition, these factors are prescriptive to

faculty and practitioners alike. Faculty can offer a support system to the MIS majors through professional groups, such as student AITP chapters and faculty/student mentoring programs. Additionally, faculty can expose MIS majors to conferences such as the Grace Hopper Conference by offering scholarships and sponsorship for student participation.

As the impact of IT professionals in influencing students to major in MIS was a significant contributor to our research model, industry practitioners are encouraged to increase mentorship programs that encourage and support students in their early years of education. MIS department faculty can work with professional advisory board members to arrange mentorship programs and offer events for interaction between the students and MIS professionals. Firm sponsored events such as pre-game tailgating offer opportunities for student and professional interaction in an informal and fun environment and can help mitigate perceptions of limited social interaction in the MIS field. In addition, recent research supports the necessity of IT professionals' influence specifically in encouraging more women and minorities to pursue IT careers (Wang, 2017).

The lack of influence of high school teachers and advisors found in our study supports the findings of other studies that have noted the lack of adequate coverage of MIS careers at the secondary education level (Walstrom et al., 2008; Downey, McGaughey, and Roach, 2009; Chipidza, Green, and Riemenschneider, 2016b). Clayton, Beekhuyzen, and Nielsen (2012) advocate interventions designed to influence middle-school girls to major in ICT fields, noting that there are few existing influences in the middle and high school environments supporting a culture of majoring in ICT fields. Our findings suggest that interventions at the secondary and higher education levels can be effective by emphasizing intrinsic motivators and MIS job characteristics as ways to positively influence attitudes towards majoring in MIS. Interventions should also address the key cost-related concerns that may cause students to form negative attitudes towards majoring in MIS, including the feeling that MIS classes are too difficult, that majoring in MIS would limit their social interaction, and that majoring in MIS would require too many additional classes. Efforts such as ensuring consistent supply of tutors and offering access to tutorials can ensure potential MIS majors that ample resources are available for success.

8. LIMITATIONS AND FUTURE RESEARCH

As with any empirical study, there are limitations to the study. First, student participants provided self-reported judgments regarding behavioral intention; however, unlike other studies, actual behaviors were observed and reported. Since student subjects were the population of interest, the critique often associated with using students as subjects is not warranted for this study. Additionally, we conducted a Harman's one factor test as a counter to the limitation of common method bias, and we found no bias.

Second, we have utilized the elicitation approach suggested by Ajzen when researching behavioral intentions using the TRA/TPB. However, this approach does constrain us by TPB-based assumptions. Thus, some beliefs not related to TPB constructs could be excluded, such as fears, trust, past experiences, etc.

Future research should consider comparisons across different countries, including residents in low and middle-income countries such as some African countries and India, as well as more economically-developed and developing countries such as Ireland, the Netherlands, and Poland. This extension to other countries with a variety of cultural backgrounds could allow for additional insight into cultural differences of student selection or not of MIS as a major. Additional data from a variety of countries would also allow for comparison across ethnicity and gender in future research.

Finally, an area not as frequently explored in MIS research is the attraction to MIS due to its applicability to other industries that may be of more "interest" to students such as sports, health care, accounting, sociology etc. Future research in this area, including the exploration of gender-based attractions to these related disciplines, is suggested.

9. CONCLUSION

The current study has demonstrated that the TPB provides a useful framework for understanding and predicting why students major in MIS. The availability of a support system for students majoring in MIS, the opportunity to stay well-informed of rapid-changing technology, and the influence of MIS professionals are factors not identified in prior research that should be considered as we work to increase the pool of MIS majors globally. Second, we decomposed behavioral beliefs into four sub-constructs: job characteristics, intrinsic motivations, technical skills, and cost factors, allowing us to analyze the data with more granularity and depth than in extant studies. Third, based on the insignificant findings of PBC influencing intention, we raise the question of applicability of the PBC construct for predicting intention to major in MIS. Additional research is needed to validate or refute this finding.

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Appendix 1: Descriptive Statistics for TPB Measurement Items

Model Variable	Item	Definition	Mean	Standard Deviation
Attitude	ATT1	For me, majoring in MIS in college would be good/bad	1.24	1.58
	ATT2	For me, majoring in MIS in college would be enjoyable/unenjoyable	0.31	1.93
	ATT3	For me, majoring in MIS in college would be pleasant/unpleasant	0.36	1.81
	ATT4	For me, majoring in MIS in college would be wise/unwise	1.22	1.63
	ATT5	For me, majoring in MIS in college would be valuable/worthless	1.71	1.33
	ATT6	For me, majoring in MIS in college would be interesting/boring	0.71	1.92
Behavioral Beliefs	BB1	Majoring in MIS in college would give me a competitive advantage when seeking out a job	1.59	1.30
	BB2	If I major in MIS in college, I will find the classes difficult	0.80	1.48
	BB3	If I major in MIS in college, I will have to write a lot of programming code	0.29	1.57
	BB4	If I major in MIS in college I will acquire additional technical skills	1.92	1.27
	BB5	If I major in MIS in college, I will find it interesting	0.45	1.84
	BB6	If I major in MIS in college, I will have to take many additional classes	0.71	1.56
	BB7	If I major in MIS in college, I will earn a high salary	1.43	1.29
	BB8	If I major in MIS in college, I will have to keep pace with rapidly changing technology	2.09	1.10
	BB9	If I major in MIS in college, I will have limited interaction with people during college or during my professional life	0.53	1.64
	BB10	If I major in MIS in college, I will find it a rewarding and satisfying experience	0.47	1.65
Control Beliefs	CB1	I expect that majoring in MIS will require more effort compared to other majors	0.77	1.49
	CB2	I am interested in technology	0.62	1.92
	CB3	It will be easy to find a job if I major in MIS	1.14	1.52
	CB4	I am good at technology	0.73	1.62
	CB5	If I majored in MIS, my teachers, friends and family would support me	1.80	1.44
Behavioral Intention	INT1	I intend to major in MIS	0.88	2.20
	INT2	I will major in MIS	-1.01	2.24
	INT3	I plan to major in MIS	-1.03	2.27
Normative Beliefs	NB1	My family thinks that I should major in MIS	0.07	1.73
	NB2	My friends think that I should major in MIS	-0.14	-0.14
	NB3	My academic advisors think that I should major in MIS	0.08	1.41
	NB4	My high school teachers that I should major in MIS	-0.08	1.32
	NB5	IT professionals think that I should major in MIS	1.12	1.63
Perceived Behavioral Control	PBC1	Majoring in MIS is completely up to me	2.30	1.29
	PBC2	For me to major in MIS would be easy	-0.33	1.68
	PBC3	For me to major in MIS would be possible	1.23	1.72
	PBC4	If I wanted to I could be an MIS major	1.97	1.54
	PBC5	I have the intellectual ability to be an MIS major	1.82	1.55
Subjective Norm	SN1	Most people who are important to me think I should major in MIS in college	-0.11	1.66
	SN2	Most people who are important to me will themselves major in MIS	-0.96	1.60
	SN3	The people in my life whose opinion I value would approve of me majoring in MIS in college	1.01	1.78
	SN4	The people in my life whose opinion I value will major in MIS	-0.92	1.53

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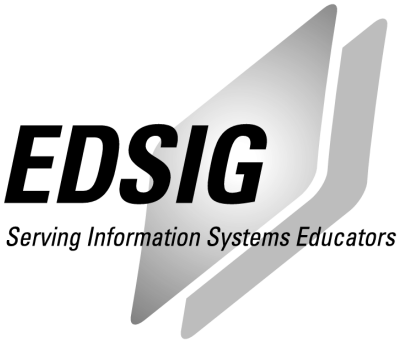

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