2008

Towards Information Systems Project Success: The Influence of Incentives on Project Managers' Drive and Participation

Corina Raduescu
University of Queensland, c.raduescu@business.uq.edu.au

Jon Heales, Ph.D.
University of Queensland, j.heales@business.uq.edu.au

Keith Frampton, Ph.D.
The Marlo Group, keith_frampton@bigpond.com

Towards Information Systems Project Success: The Influence of Incentives on Project Managers' Drive and Participation

Corina Raduescu, MInfmSystems
Business School
The University of Queensland
Brisbane, Queensland 4072
Australia
Phone: +61 7 3365 6289; Fax: +61 7 3365 6788
Email: c.raduescu@business.uq.edu.au

Jon Heales, PhD
Business School
The University of Queensland
Brisbane, Queensland 4072
Australia
Phone: +61 7 3365 6433; Fax: +61 7 3365 6788
Email: j.heales@business.uq.edu.au

Keith Frampton, PhD
The Marlo Group
Southbank, Victoria 3006
Australia
Phone: +61 3 9937 2750; Fax: +61 3 9937 2799
Email: Keith_Frampton@bigpond.com

ABSTRACT

Project managers' behavior has been found to positively influence project outcomes we explore the issue through the development of a two-stage model incorporating agency theory that examines the relationship between PM behavior and IS project success. We measure project success by delivery on time, within budget, and adhering to specification. A web-based survey was used to collect data and test the model using SEM. The two-stage model was supported, however, further analysis suggests that a combination of three factors *commitment*, *willingness*, and *motivation* would significantly improve the model fit by forming a higher-order factor we call *drive*. We found that PM's participation level is the most important factor influencing project success and is directly influenced by incentives and drive.

Keywords

Incentives, Project Management, Information Systems, Agency Theory, Success, Performance, Motivation, Commitment, Willingness, Drive.

INTRODUCTION

Critical to the future success of business activities and initiatives are information systems (IS) designed to meet the challenges of today's and tomorrow's business environment (Ba et al., 2001). As a result organizations continue to make large investments in and devote substantial resources to IS that are intended to deliver significant performance gains (Yetton et al., 2000). The major organizational benefits from successful IS projects will be reflected in: 1) reduction of costs associated with IS projects, 2) improvement of organizations' return on investment (ROI), 3) timely implementation of planned functionality, and 4) delivery of functionality designed to meet the needs.

IS project problems such as failures and overruns continue to exist and have changed little over the past three decades (IT Cortex, 2003; KPMG, 2003). To address these issues we draw our attention to project managers. Jiang et al. (2001) found the project manager role was critical for IS project success. Eisenhardt (1989) suggests linking performance to incentives as a way to improve project managers' performance.

We therefore explore the relationship between IS project managers and IS project outcomes by examining how the use of incentives in the project manager arena can improve the IS project success. We incorporate the work of Martisons and Chong (1999), and Yetton et al. (2000) and seek to answer the following research questions:

(1) What aspects of project managers' behavior are influenced by the use of incentives?

(2) What influence does that behavior have on the criteria for successful IS project outcomes?

We address our research questions by employing agency theory (AT) to examine incentives' influence on project managers' (PM) behavior. We develop a research model that relates the use of incentives to PM behavior and the impact of their behavior on IS project outcomes.

The remainder of this paper is organized as follows. First, we present the background of the study. Second, we develop the research model and propositions. Third, we present the research methodology employed. Fourth, we present the data analysis..Fifth, we discuss the research findings. Sixth, we present the contributions and limitations of this study, and highlight further research.

BACKGROUND TO THE STUDY

To address our research questions and develop an agency-based research model, we; 1) identify the factors leading to and criteria for IS project success; 2) understand the role of project managers in IS projects; and 3) understand the role of AT in improving current practices in IS projects.

Criteria for IS Project Success

Technical factors and the role of user's involvement in IS projects have been established among the most important factors influencing the IS development (Barki and Hartwick, 1994b). Further, problems in IS projects are linked to social, conceptual, or organizational factors such as, motivation, commitment, involvement, communication, and good project management (Guthrie and Hollensbe, 2004; Kim and Peterson, 2000; Shoniregun, 2004; Walsh and Schneider, 2002).

From existing literature, we found that time, cost, and adherence to specifications are the most cited performance criteria relevant to IS project success (KMPG 2003). Consistent with Banker and Kemerer's (1992) model for IS performance , we consider a "successful" IS project, a project delivered on time, within budget, and adhering to specifications.

Project Manager Role in IS Projects

Sound project management is essential to ensure greater probability of IS project success (Shoniregun, 2004). Jiang et al. (2001) highlight the important role of PM in IS projects and suggest that PM's performance has a direct relationship with the project outcomes. Shoniregun (2004) suggests PMs should rely more on their personal skills involvement rather than on automated project management tools. Therefore, we suggest that ways to improve the PM's contribution to project outcomes is through their personal skills and behavior.

Agency Theory

In recent years AT has emerged as a main theory guiding research on the pay-performance relationship (Eisenhardt, 1989). AT explains how to best organize a relationship in which one party (the principal) directs the work of another party (the agent).

AT argues that problems arise in an agency relationship when: 1) the desires or goals of the principal and agent are in conflict and 2) it is difficult or expensive for the principal to verify what the agent is actually doing. AT addresses these problems via contracts that provide incentives to agents with the purpose of motivating them to exert effort in directions that are aligned with the interests of the principals (McKenzie and Lee, 1998).

Agency Theory in IS Projects

In IS projects, Banker and Kemerer (1992) advocate that agency relationship consists of: 1) the owner of the project (the principal) who is concerned with the successful delivery of the IS project, and 2) the PM (the agent) who is responsible for the management of IS project. Mahaney and Lederer (2003) suggest that by introducing incentive contracts, PMs will give more attention and effort to controlling and monitoring the IS projects, hence they can contribute to a lower failure rate of IS projects. Provided that incentives are aligned positively with successful project outcomes it is likely the provision of incentives will result in a greater likelihood of project success (Sharma and Yetton, 2003).

RESEARCH MODEL AND PROPOSITIONS

We examined the behavioral literature and choose four factors of PM's behavior for inclusion in our research model (see Figure 1): *commitment*, *willingness to act*, *motivation* toward, and *participation* in IS project tasks.

We believe that AT explains how incentives are most likely to influence the PM's behavior, which in turn is likely to impact the IS project outcomes. Although, AT and use of incentives were addressed in the arena of employees in general, we extrapolate their use to PMs because we view PMs as a type of employee.

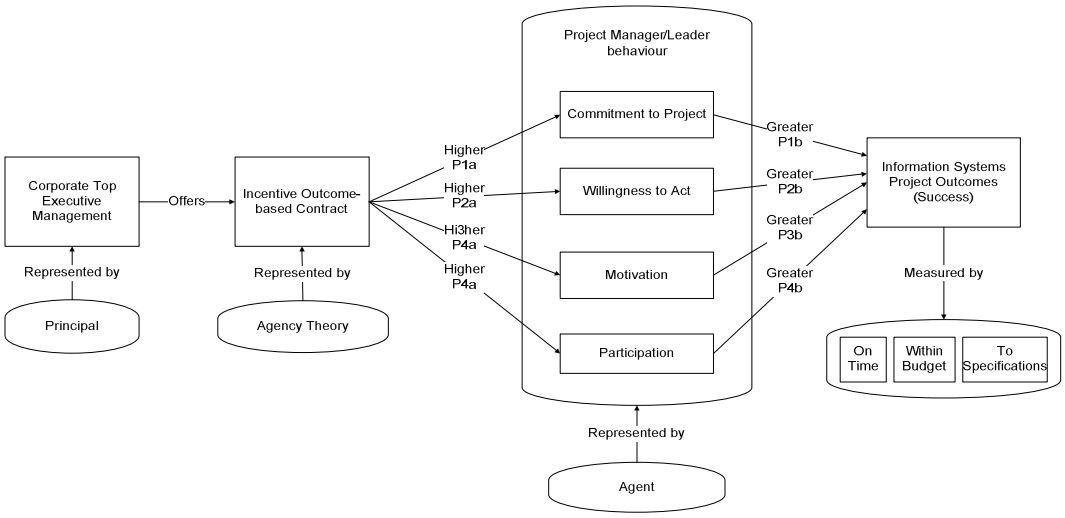

Figure 1. Agency-Based Research Model

Commitment and Willingness to Act

Butler and Fitzgerald (2001) propose that management *commitment* and *willingness to act* on project activities are among the key factors that impact on project success. Because these two factors are likely to influence work related performance, we include *commitment* and *willingness to act* as factors that might have a positive effect on project outcomes.

Commitment

Commitment can be defined as the sense of loyalty to an organization or a project (Jurison, 1999). Committed employees are willing to devote more of their time and energy to the project; hence a greater desire to contribute to the project success. Organizations seek to create committed employees by implementing incentive contracts (Moorman et al., 1998). Employees who benefit financially, will be more committed to the organization or project they work on (Klein et al., 2001). Therefore, we propose that:

> **Proposition 1a**: Higher levels of incentives will lead to higher level of PM's commitment toward an IS project.

Commitment to an IS project is an important factor in its successful completion (Mahaney and Lederer, 1999). Further, committed employees have a greater desire: 1) to perform better on their job, and 2) to do what is right for their organization or project (Klein et al., 2001). Therefore, we propose that:

> **Proposition 1b**: Higher levels of PM's commitment toward an IS project will lead to more successful IS project outcomes.

Willingness to Act

Employees that are identified with organizational goals or projects show a greater willingness to act and contribute meaningfully to the organization or project, thus performing better on the job (Moorman et al., 1998). Organizations develop and maintain employees' attachment to a project and goals by rewarding them via incentive contracts (Moorman et al., 1998). We therefore propose that:

> **Proposition 2a**: Higher levels of incentives will lead to a higher level of PM's willingness to act toward the activities related to an IS project.

Given the critical role in managing IS projects, PMs are expected to act positively on activities that affect the success or failure of an IS project. We therefore propose that:

> **Proposition 2b**: Higher levels of PM's willingness to act on activities that affect the success or failure of an IS project will lead to more successful IS project outcomes.

Motivation

Rasch and Tosi (1992) found *motivation* was an important factor in predicting software project staff performance. Motivated employees are expected to perform better in their jobs, hence we include *motivation* as a factor that will have a positive effect on project outcomes.

Organizations focus on creating favorable conditions that foster and maintain employees' motivation by offering incentive contracts (Frey and Osterloh, 2002). In turn, motivated employees put in a greater effort to produce more valuable results, such as increased work performance (Thomas, 2000). We therefore propose that:

> **Proposition 3a**: Higher levels of incentives will lead to higher level of PM's motivation toward an IS project.

AT suggests that offering incentives to PMs will induce greater effort and performance on their side, and their interests will become congruent to those of the owners of the IS project (Frey and Osterloh, 2002). Specifically, we suggest that when incentives are awarded with the goal of delivering the system on time, within budget, and satisfying user's demands, the PMs are expected to display higher motivation toward IS project tasks. We therefore propose that:

> **Proposition 3b**: Higher level of PM's motivation will lead to more successful IS project outcomes.

Participation

Cotton (1993) found having employees *participate* in work-related activities may result in improved productivity and job performance. Hartwick and Barki (1994) view *participati*on as the behavior, assignments, and activities that users or their representatives perform during the IS projects. Given the importance of *participation* in influencing an employee's behavior and work performance, we include *participation* in our study.

Cotton (1993) found that organizations attempt to increase employees' participation by introducing reward systems. Specifically rewards increase the level of participation and lead to improved task effectiveness and performance (Cotton, 1993). Given the critical role of PMs in managing IS projects, it is expected that by providing incentives to PMs, the PMs will increase their participation in monitoring and controlling the IS projects. We therefore propose that:

> **Proposition 4a:** Higher levels of incentives will lead to higher level of project manager's participation throughout the IS project activities.

An individual will be motivated to perform an action if the probability of success of action (their expectation associated with the task) is expected to be high (Griffin, 1999). Invoking AT by setting up an incentive contract, the owner expects the delivery of a successful IS project. Thus when PMs perceive a high probability for a successful IS project, they will display a higher participation throughout the project activities; hence they are more likely to manage and lead an IS project to successful outcomes. We therefore propose that:

> **Proposition 4b:** Higher levels of project manager's participation throughout IS project activities will lead to more successful IS project outcomes.

RESEARCH METHODOLOGY

Because we are concerned with PM's behavior, several alternative methods for testing the research model were considered, e.g., survey, in-depth interviews, project data analysis, etc. We chose a survey instrument because it allows for a rich assessment of the constructs and examines the statistical testing of direct relationships in a research model (Grover et al., 2002). We employed a web-based survey using items from previously validated instruments in the IS and organizational behavior fields.

Construct and Survey Instrument Development

Constructs from the literature were utilized where possible. We conducted a pilot test of the instrument for clarity, consistency, and validity with selected users from the IS field, as well as academics and experts in the IS research areas (Dinev and Hu, 2007). We identified minor issues that resulted in small changes to the final instrument.

The *Incentive* construct borrowed items from constructs used in the Lambert and Larcker (1993) compensation measurement instrument. We measured incentives using participants' involvement with incentive contracts, from no incentives to a high level of incentives. The remaining variables were captured by multiple items. The *Participation* construct was derived and measured using the Barki and Hartwick (1994a) instrument. The *Commitment* construct was measured by adapting research items from the instrument developed by Mowday et al. (1979). The *Motivation* and *Willingness to act* constructs were measured by adapting items from previously validated measurement instruments used in other fields (Hellman et al., 2006). The *Information Systems Success* construct was measured using items developed from Banker and Kemerer (1992). The survey items were captured using a 7-point Likert scale and are presented in Table 4.

Sample Profile and Descriptive Statistics

We targeted a cross-section of IS practitioners belonging to a national IS professionals society. We selected one of the society's state branches to limit the target population size to around 500 IS professionals. The exploratory stage of the study targeted mainly IS project managers. The demographic profile of our respondents is presented in Table 1.

Type	Category	Distribution (%)
Position	Project Manager	41.7
	Other	23.3
	Project Leader	15.5
	IT Manager Programmer	11.7
	Systems Manager	7.8
Industry	Government Agencies	21.4
	IS/IT Consulting	19.4
	Transportation, Communication, and Utilities	14.6
	Education	9.7
	Finance, banking, and Insurance	8.7
	Mining	8.7
	Wholesale and Retail	7.8
	Other	3.9
	Manufacturing and Processing	1.9
Experience with IS Projects	<6 years	35.9
	6-10 years	32.0
	11-15 years	14.6
	16-20 years	8.7
	>21 years	8.7
IS Projects Managed	<6 projects	55.3
	6-10 projects	15.5
	11-15 projects	9.7
	16-20 projects	1.7
	21-25 projects	1.9
	> 26 projects	5.8
Incentive Types	None	39.8
	Financial	39.8
	Non-financial	11.7
	Both	8.7
Involvement in Incentive-Based Projects	None	44.7
	1-5 projects	41.8
	6-10 projects	8.7
	11-25projects	3.9
	>25 projects	9.7

Table 1. Demographic Profile of the Survey Respondents

A total of 117 responses were collected for a response rate of approximately 20%, comparable with other similar surveys (Sohal and Ng, 1998). Fourteen surveys were disqualified for lack of completeness, leaving 103 usable for data analysis. As we had more than 100 responses, SEM is a reliable and appropriate technique to test our model (Sörbom and Jöreskog, 1982).

The demographic data were reviewed for the response bias of the population. Descriptive statistics indicate that the sample does not suffer from a non-response bias (Hair et al., 1998).

Table 2 details respondents' involvement in and perceptions of successful IS project outcomes. Note that all incentive-based projects were considered successful, while 80 percent of them were considered delivered on time, within budget, and adhering to specifications. We believe this is a first indicator that incentive-based projects are more efficiently and effectively managed and completed.

Type*	Number of Projects			
	None (%)	1-5 projects (%)	6-10 projects (%)	>10 projects (%)
Incentive-based IS projects finished within budget	8.8	78.9	8.8	3.5
Incentive-based IS projects finished on time	3.5	78.9	15.8	1.8
Incentive-based IS projects delivered to specifications	1.7	82.4	10.6	5.3
Incentive-based IS projects considered successful	0	84.2	10.5	5.3
* Based on 57 incentive-based projects				

Table 2: Respondents' Involvement in Incentive-Based Projects

Results and Analyses

We used LISREL, a Structural Equation Modelling (SEM) technique (Sörbom and Jöreskog, 1982) in two stages to: 1) assess the reliability and validity of the measurement model using Confirmatory Factor Analysis (CFA), and 2) assess the structural relationships of our model using Path Analysis. Our initial results indicated the need for a further stage in our analysis, that is, to re-specify and develop a second order CFA model (Fornell and Larcker, 1981).

Table 3 presents the descriptive statistics and actual range of the items used in this study. We checked the sample for existence of outliers and multicollinearity. No extreme cases were identified and a certain degree of multicollinearity is required in factor analysis, hence data did not display any anomalies (Hair et al., 1998).

Construct	Survey Item	Mean	Standard Deviation	Skewness	Kurtosis	Cronbach's α
Commitment	COMM1	4.30	1.35	-0.10	0.42	0.61
	COMM2	4.55	1.27	-0.24	0.62	
	COMM3	4.82	1.43	-0.39	0.41	
Incentive	INCENT	2.43	1.90	1.04	-0.10	1
Motivation	MOT1	4.77	1.31	-0.66	1.34	0.84
	MOT2	4.67	1.38	-0.63	0.64	
	MOT3	4.88	1.57	-0.69	0.26	
	MOT4	4.63	1.48	-0.10	0.42	
Participation	PART1	4.14	1.39	-0.38	0.87	0.90
	PART2	4.09	1.25	-0.60	1.06	
	PART3	4.77	1.50	-0.62	0.21	
	PART4	4.55	1.34	-0.45	0.89	
	PART5	4.57	1.31	-0.65	1.09	
IS Success	SUC1	3.99	1.28	-0.61	0.61	0.91
	SUC2	3.74	1.28	0.10	0.52	
	SUC3	4.27	1.11	-0.73	1.75	
Willingness to Act	WILL1	4.67	1.16	-0.13	1.45	0.85
	WILL2	4.56	1.07	-0.17	1.99	
	WILL3	4.65	1.27	-0.64	1.40	
	WILL4	4.87	1.43	-0.57	0.64	
	WILL5	4.69	1.28	-0.64	1.33	

Table 3: Descriptive Statistics for Survey Items

Due to the SEM sensitivity to sample size and departures from normality chi-square per degrees of freedom (χ^2/d.f.) is a more appropriate measure of a model fit. Chin (1998) recommends a ratio of χ^2/d.f. below 3:1. SEM provides three additional measures of model fit (GFI, AGFI, and Standardized RMR). The thresholds for a good overall model fit in IS research are above 0.90 for GFI, above 0.80 for AGFI, and below 0.05 for Standardized RMR (Chin, 1998).

Measurement Model Validation

We conducted a CFA of the original model comprising of 5 factors and 21 items (see Table 3). The original measurement model results showed a poor goodness of fit based on the above-mentioned threshold values for IS field (GFI = 0.635 and AGFI = 0.535).

Consistent with SEM techniques, we re-specified and re-estimated the model after we inspected carefully the modification indices and the residuals (Anderson and Gerbing, 1988). As a result, six items were discarded from further analysis, resulting in a revised model with 5 factors and 15 items (see Table 3).

The statistical results are detailed in the following sections, including all the required validity checks. The revised model and its items are presented in Table 4 showing the 5-factor solution. We start by addressing the validity checks in Table 4 and then briefly discuss the model goodness of fit.

The *content validity* of the new model needed to be established. The fact that all *t*-tests were statistically significant showed that all indicator variables provided good measures to their respective construct. With a GFI of 0.90 or above, all constructs are deemed *unidimensional*, hence they are reliable and valid (Sörbom and Jöreskog, 1982).

Further, all scales have a NFI of 0.90 or above, hence they have strong *convergent validity* and the model fits the underlying data well.

To test the *discriminant validity*, CFA was performed on a selected pair of scales, allowing for correlation between the two constructs. Checks on every pair of the five scales were performed, some of these tests showed chi-square differences statistically significant at $p \leq 0.01$. This result displays unsatisfactory separation of the 3 major constructs. We observed high correlations (see Table 4) between three of the factors in the model; that is, between Motivation, Willingness, and Commitment.

	Motivation	Willingness to Act	Commitment
Motivation	1.000		
Willingness to Act	0.969	1.000	
Commitment	0.919	0.912	1.000

Table 5: First Order Factors Correlations

The existence of high correlations between the factors suggests they measure the same higher-level structure or thing. Hence we introduced a higher-order factor (also known as second-order) model (Fornell and Larcker, 1981). We suggest that a second order factor consisting of Motivation, Willingness, and Commitment may exist. Due to space limitation below we only discuss the second order factor model.

Construct	Item Label	Survey Item Measured on 7-point Likert Scale	Factor Loading	*t*-value	Composite Reliability
IS Success	Suc1	Was/would the total cost of the project be more or less than the initial estimate?	0.94	11.73	0.88
	Suc2	Was/would the actual duration of the project be more or less than the initial estimate?	0.82	9.926	
	Suc3	Overall, was/would the final version of the project be completed with more or less than initial user specifications?	0.750	8.573	
Motivation	Mot1	I felt/would feel more enthusiastic to work on the project.	0.91	11.605	0.83
	Mot2	I spent/would spend more time thinking about the project while not at work.	0.78	9.16	
Willingness to Act	Will1	Did/would you lead the team more or less successfully towards project's objectives?	0.84	10.203	0.84
	Will2	Did/would you contribute more or less to effective communication with all team-members during system development/implementation?	0.72	8.223	
	Will3	Did/would you monitor more or less closely team-members' performance during system development/implementation?	0.7	7.948	
	Will4	Were/would you be willing to put in effort beyond that normally expected during system development/implementation?	0.8	9.64	
Commitment	Comm1	I felt/would feel more comfort and freedom working on the project.	0.71	7.913	0.76
	Comm2	The project had/would have more personal meaning for me.	0.87	10.208	
Participation	Part1	Your responsibility for estimating development costs of the IS project was/would be?	0.8	7.587	0.86
	Part2	Your responsibility for the success of the IS project was/would be?	0.77	12.65	
	Part3	Your responsibility for the development of project was/would be?	0.69	9.082	
Incentive	Incentive	Are or have you been involved in an incentive-scheme during the implementation of an IS project?			1

Table 4: Survey Items Used in Final Analysis and Construct Composite Reliability

Second-Order Factor Model

All residuals indicated that the Success 3 item shows very large residuals, potential common variance, and the lowest loading on its factor. Therefore the Success 3 item was discarded from further analysis, suggesting that it shares common variance with Success 1 and 2. The Success 3 item, measuring "the degree of initial specifications completeness," was considered not an appropriate measure of project success. .

Goodness of Fit Measures	RMR	GFI	AGFI	NFI	NNFI	CFI	RMSEA	χ^2/d.f.
IS Threshold values	<0.05	>0.9	>0.8	>0.9	>0.9	>0.9	(<0.05-0.08)	<3:1
Second-Order Measurement(CFA) Model	0.062	0.892	0.788	0.892	0.887	0.928	0.118	2.42
Structural (SEM) Model	0.071	0.885	0.802	0.888	0.901	0.929	0.112	2.28

Table 6: Second Order CFA and SEM Goodness of Fit Indices

We conducted a second-order CFA resulting in a new 3-factor structure (see Figure 2 and Table 6 for factor loadings). As noted, three of the first-order factors are actually sub-dimensions of a broader and more encompassing construct.

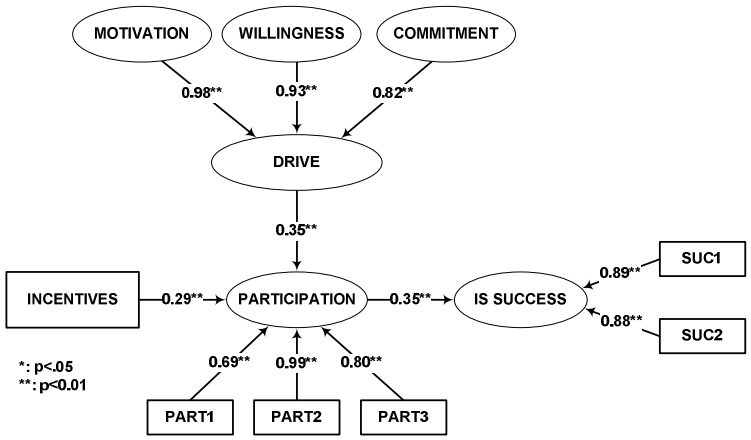

Figure 2: Second Order Factor Structural (SEM) Model (including loadings)

We turned out attention to the literature and found that Ajzen and Fishbein (1980) examined how to understand and predict behavior. According to the theory of reasoned action (TRA), the immediate determinant of a person's behavior is the person's intention to perform that behavior. The person's behavioral intentions are in turn said to be determined by the person's attitude and intentions concerning the behavior (Ajzen and Fishbein, 1980). Intentions are viewed as antecedent of active behavior, more specifically participation. Further, we found that Aladwani et al. (2000) viewed reward schemes as an intervention mechanism of some antecedent variables, i.e., intentions.

The three constructs that comprise the new factor seem to represent behavioral intentions, while participation is the actual active behavior. We can therefore suggest that if PMs display high levels of behavioral intentions, they will display higher participation in IS project tasks. We labeled the new factor "Drive."

We viewed "Drive" as an appropriate higher level construct with the overall meaning of "a motivating instinctual need, intention or desire, or effort determination leading to an affective state (Oxford Dictionary)." We developed the new construct "Drive" using a summated scales approach (average of item values in the scale) for the three original constructs, i.e., motivation, willingness, and commitment (Hair et al., 1998).

We tested the new model and all validity checks were within satisfactory limits. The new structural model produced a better overall goodness of fit; with all indices close to the recommended IS guidelines, as indicated in Figure 2 and Table 6.

In the new re-specified model all parameters were found significant except the path from Incentive to the new composite construct Drive and from Drive to Success. **P4a** was supported, as well as the expected impact of Drive to Participation. The overall conclusion is that the new underlying construct Drive is neither influenced directly by incentives, nor influencing directly IS success. However, Drive influences directly Participation. In other words, higher motivation, willingness to act, and commitment together as behavioral intentions lead to higher participation, which together with influence from Incentives leads to a higher rate of IS success.

We found that Success 3, the adherence to specifications, shares a high variance with the other two items of Success. We conclude that "meeting specifications" is somewhat problematic in IS development. We can further suggest that "on time" and "within budget" criteria for successful IS project outcomes impact on the "degree to which specifications" are met. We believe that because specifications are often changed during the development and implementation of an IS, measuring such a construct at one point in time does not reflect the changing nature over the entire period of time. If a project is finished on time or within budget it might be at the cost of functionality. Consequently we deemed the item inappropriate for inclusion in the final model.

DISCUSSION

Our model for testing the appropriateness and applicability of AT to the IS field found that participation was clearly influenced by incentives, as opposed to motivation, willingness to act, and commitment. Therefore we conclude that AT is applicable in the context of IS project management.

By undertaking a second order factor analysis, we suggest that our new construct "Drive" influences participation and can be considered or perceived as an antecedent of participation. Specifically, "Drive" is a more complex construct and embodies "behavioral intentions" as opposed to participation which is the "active" behavior. "Drive" further implies an element of "thoroughness" that seeks to continue the active behavior until a result is obtained. The implications are that IS managers must be determined to initially develop their intentions to participate, leading subsequently to their active participation until the result is obtained (successful IS project outcomes).

The lack of support for **P1a** may be explained by the type of incentives applied, financial verses non-financial incentives. Meyer and Allen found commitment was higher among employees who have been promoted, a non-financial incentive (Meyer and Allen, 1997). Because financial incentives were the most common incentive type in our study, this may explain the result in our analysis.

We did not find direct support for **P2a**; hence suggesting that PMs are not keen to dedicate more of their resources toward an incentive-based IS project. It follows that PMs do not perceive that incentives would impact on their project-related activities that can lead to successful IS projects.

Surprisingly, we did not find that motivation is directly influenced by incentives. Since our respondents were predominantly involved in financial incentive schemes, they are therefore not fulfilling the profile of "income maximisers." Prior literature found that IS professionals are mainly "achievers," thus motivated by non-financial incentives rather than financial ones (Trittmann et al., 2000). This might explain the lack of support for **P3a**. To solve this dilemma, in the light of our and prior research, other explanations should be sought in future research projects.

We found that **P4b**, higher participation leads to higher IS success, is strongly supported as indicated in Figure 2. We believe this is an important finding, because it partially supports the applicability of the AT in the IS field. AT is therefore supported for the participation construct. Willingness to act, commitment, and motivation failed to support the applicability of AT without influencing individually IS success in the context of this research. Our results lead to the conclusion that higher commitment, higher willingness to act in favor of an IS project did not directly lead to improved IS project success. However, together as behavioral intentions, they could lead to higher participation, which in turn lead to higher IS project outcomes. Further research is needed to support or validate the full applicability of AT in IS.

LIMITATIONS OF THE STUDY

There are certain limitations of the study that may also inform a number of potential avenues for future research. In our research external validity is limited by the relatively small sample size used in this study. Care should be taken with generalizing to the entire IS managers population as our sample is not fully representative of the PM population. he instrument should also be further tested and validated because we discarded certain items from analysis.

We would also like to acknowledge that this research did not aim to provide either an optimal incentive package that could ensure a successful IS project, nor determine what type of incentives should be used to motivate PMs to better perform and lead to successful IS project outcomes. Because our research was more exploratory in nature, we view the limitations as appropriate avenues for further research.

CONCLUSIONS

In this study we investigated the relevance and applicability of AT to the IS field. Specifically, we explored: 1) the relationship between the use of incentives and IS project managers' behavior; and 2) the relationship between PM's behavior and IS project success.

First, our theoretical contribution is the development of a model to apply AT to the IS field. The contribution emanates from our findings that PMs' participation in IS projects is positively influenced by an incentive-based project contract. High levels of participation in IS project-related activities were associated with high levels of IS project success. We also found that "Drive" played an antecedent role by increasing the level of participation in IS project activities, without being directly influenced by incentives. Second, by using SEM techniques in our analysis, we supported the view of introducing higher order constructs that cannot be directly measured and achieve an improvement in the overall fit of the research model.

From a practical perspective, we suggest that organizations should consider increasing PMs' participation by increasing their "Drive," i.e., their motivation, commitment, and willingness to act. AT principles could be applied to better manage projects in line with management expectations. Psychometric testing could help identify individuals that exhibit strong drive tendencies and they could be nurtured into a PM training program. Consequently, organizations should be in a better position to manage their IS projects, by increasing the rate of successful IS project outcomes, thus avoiding additional costs associated with IS project failures and/or overruns.

REFERENCES

The full list of references is available by request.

Ajzen, I. and M. Fishbein (1980) Understanding Attitudes and Predicting Social Behavior. Englewood Cliffs, NJ.

Ba, S., J. Stallaert, and A. B. Whinston (2001) Research Commentary: Introducing a Third Dimension in Information Systems Design - The Case for Incentive Alignment, *Information Systems Research,* 12 3, 225-239.

Banker, R. D. and C. F. Kemerer (1992) Performance Evaluation Metrics for Information Systems Development: A Principal-Agent Model, *Information Systems Research,* 3, 4, 379-400.

Barki, H. and J. Hartwick (1994a) Explaining the Role of User Participation in Information System Use, *Management Science,* 40, 4, 440-465.

Chin, W. W. (1998) Issues and Opinion on Structural Equation Modeling, *MIS Quarterly,* 22, 1, vii-xvi.

Eisenhardt, K. M. (1989) Agency Theory: An Assessment and Review, *Academy of Management Review,* 14, 1, 57-74.

Fornell, C. and D. F. Larcker (1981) Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, *Journal of Marketing Research,* 18, 1, 39-50.

Guthrie, J. P. and E. C. Hollensbe (2004) Group Incentives and Performance: A Study of Spontaneous Goal Setting, Goal Choice and Commitment, *Journal of Management,* 30, 2, 263-284.

Hair, J. F. J., R. Anderson, R. L. Tatham, and W. G. Black (1998) Multivariate Data Analysis, 5th edition. Upper Saddle River, N.J.: Prentice Hal, Inc.

Hartwick, J. and H. Barki (1994) Explaining the Role of User Participation in Information System Use, *Management Science,* 40, 4, 440-466.

Jiang, J. J., G. Klein, and H.G. Chen (2001) The Relative Influence of IS Project Implementation Policies and Project Leadership on Eventual Outcomes, *Project Management Journal,* 32, 3, 49-63.

KPMG (2003) KPMGs International 2002-2003 Programme Management Survey, http://www.kpmg.com.sg/publications/survey/prog_mgmt2003.pdf, Last accessed: 10/07/2008.

Lambert, R. A. and D. F. Larcker (1993) The Structure of Organizational Incentives, *Administrative Science Quarterly,* 38, 3, 438-462.

Mahaney, R. C. and A. L. Lederer (2003) Information Systems Project Management: An Agency Theory Interpretation, *Journal of Systems and Software,* 68, 1, 1-9.

Meyer, J. P. and N. J. Allen (1997) Commitment in the Workplace: Theory, Research, and Application. Thousand Oaks, CA: Sage Publications.

Rasch, R. H. and H. L. Tosi (1992) Predicting Developers' Performance, *MIS Quarterly,* 16, 3, 395-413.

Sharma, R. and P. Yetton (2003) The Contingent Effects of Management Support and Task Interdependence on Successful Information Systems Implementation, *MIS Quarterly,* 27, 4, 533-555.

Shoniregun, C. A. (2004) An Investigation of Information Systems Project Failure and Its Implication on Organization, *International Journal Services Technology and Management,* 5, 1, 25-41.

Sohal, A. S. and L. Ng (1998) The Role and Impact of Information Technology in Australian Business, *Journal of Information Technology,* 13, 4, 201-217.

Sörbom, D. and K. G. Jöreskog (1982) The Use of Structural Equation Models in Evaluation Research, in, vol. 2 C. Fornell (Eds.) *A Second Generation of Multivariate Analysis Measurement and Evaluation*, New York, N.J.: Praeger, 381–418.

Trittmann, R., D. Stelzer, A. Hierholzer, and W. Mellis (2000) Managing Motivation in Software Development - ACase Study at SAP AG, in K. W. Thomas (Eds.) *Intrinsic Motivation at Work: Building Energy & Commitment*, San Francisco, CA: Berrett-Koehler, 251-273.

Walsh, K. R. and H. Schneider (2002) The Role of Motivation and Risk Behaviour in Software Development Success, in, *Information Research*, 7, http://informationr.net/ir/7-3/paper129.html, Last accessed: 13/07/2208.

Yetton, P., A. Martin, R. Sharma, and K. Johnston (2000) A Model of Information Systems Development Project Performance, *Information Systems Journal,* 10, 4, 263-289.