Journal of High Technology Management Research xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of High Technology Management Research

Motivation synergy, knowledge absorptive capacity and NPD project performance in multinational automobiles in Thailand

Sujinda Popaitoon [a,*], Patchara Popaitoon [b]

[a] Mahasarakham Business School, Mahasarakham University, Khamriang Sub-District, Kantarawichai District, Maha Sarakham 44150, Thailand
[b] Chulalongkorn Business School, Chulalongkorn University, 4th Floor, 50th Anniversary Building, Phayathai Road, Pathumwan, Bangkok 10330, Thailand

ARTICLE INFO

Available online xxxx

Keywords:
Motivation synergy
Knowledge absorptive capacity
Project performance
Technology management
New product development
Thai automotive industry

ABSTRACT

Employee motivation is crucial in technology intensive firms, particularly when individuals must utilize existing knowledge and apply past experience to enhance new product development (NPD). This research investigates the roles of project team's motivation (intrinsic and extrinsic) on knowledge absorptive capacity (realize and potential) and NPD project performance (short and long run) relations. We use data obtained from returned questionnaire survey from NPD project leaders in multinational automobiles viewed as technology intensive firms in Thailand to analyze the relationships. Hierarchical regression analysis results suggest that intrinsic motivation can accelerate the influence of project team's potential knowledge absorptive capacity on the long-run NPD project success and that extrinsic motivation demonstrates its role in service of intrinsic motivation moderating the influence of intrinsic motivation with NPD project outcomes. In doing so, we contribute to technology management literature suggesting the condition under which performance impact of knowledge absorptive capacity can be enhanced. Implications for these results are discussed.

1. Introduction

Multinational companies (MNCs), particularly in technology intensive firms have been shifting their operational formats to project-oriented organization adopting temporary team to deal with increasing complex environment through projects (e.g., Maidique & Hayes, 1984; Sydow, Lindkvist, & DeFillippi, 2004). Particularly, in the automotive industry, Clark, Chew, and Fujimoto (1987) found that new product development (NPD hereinafter) projects in the automotive industry consist, to a large extent, of investment in research and development (R&D) and represent a substantial commitment of company resources to ensure advances in technology through the introduction of timely new products to the marketplace. As such, growth and sustainability in MNCs automotive industry depend largely on the successful management of the resources dedicated to completing both short- and long-run projects (e.g. Brady & Davies, 2004). Short-run NPD project completion refers to the performance of the project on the targeted timeframe and within a predetermined budget, whereas long-run NPD project performance is associated with the organizational potential created through the knowledge transfer from current projects to future projects (Shenhar, Levy, & Dvir, 1997).

Sivasubramaniam, Liebowitz, and Lackman (2012), in their report of meta-analysis on NPD team performance, revealed that team ability is one of the key influencing factors on project effectiveness and efficiency. This echoes the arguments of Grant

* Corresponding author at: Mahasarakham University, Khamriang Sub-District, Kantarawichai District, Maha Sarakham 44150, Thailand.
E-mail addresses: sujinda.p@acc.msu.ac.th (S. Popaitoon), patchara.p@cbs.chula.ac.th (P. Popaitoon).

http://dx.doi.org/10.1016/j.hitech.2016.10.004
1047-8310/

(1996) and Collins and Smith (2006) that technology intensive firms in rapidly changing industries derive their primary competitive advantage through the ability of their employees to create and manage knowledge for creating innovation. Moreover, Brady and Davies (2004) and Nahapiet and Ghoshal (1998) explained that the ability of project team is valuable resource because high capability team could engender the 'project-to-project' learning by capturing project knowledge, transferring lessons learned and experience in the current project to a subsequent one. The ability in this regard is analogous to project team's knowledge absorptive capacity (ACAP hereinafter), which Cohen and Levinthal (1990) categorized as the determinant of effective knowledge recipient. Zahra and George (2002) delineated the ACAP concept into realized ACAP, employees' ability to utilize existing knowledge for project success and potential ACAP, employees' ability to transfer and apply their key learnings and experience to create new or innovative projects. Previous research shows support for the utility of two different determinants of knowledge receiver to facilitate project outcomes: project team's realized ACAP has positive influence on short-run NPD project performance whist project team's potential ACAP on long-run NPD project performance (Popaitoon & Siengthai, 2014).

However, Kim (1997) pointed that project team's knowledge ACAP could be intensified on its link with NPD project outcomes should the motivational devices are being used appropriately to exert the project team to utilize, transfer and share knowledge (see also Amabile & Kramer, 2011; Anand & Gomez-Mejia, 2014; Cerasoli, Nicklin, & Ford, 2014; Rose & Manley, 2011; Schmid & Adams, 2008; Zhao & Chadwick, 2014). For example, Schmid and Adams (2008) reported that motivational devices such as extrinsic reward and intrinsically challenged tasks will benefit project team at different stages of project. Osterloh and Frey (2000) pointed to the important role of intrinsic motivation on knowledge transfer across team members, particularly the transfer of tacit knowledge as a primary source of innovation that is crucial for NPD projects (e.g., Dewett, 2007). In contrast, other research projects suggested that extrinsic rewards can improve project team's speed of work and their likelihood to support other team members so as the overarching project goals were achieved (e.g. Szulanski, 2000; Zander & Kogut, 1995). Amabile (1993) proposed that intrinsic and extrinsic motivation can combine synergistically whereby extrinsic motivation can complement intrinsic motivation to yield higher level of performance and that employees' ability should be taken into account when applying these two types of motivation. As such, the effects of motivational devices will not be undermined. Scholars such as Zhao and Chadwick (2014) and Minbaeva (2007) explored this combined effect of ability and motivation in their study of related NPD projects but these studies did not demonstrate clearly the interaction of ability with different types of motivation.

Accordingly, our research contributes to the literature of technology management in MNC automobiles by 1) exploring the synergistic role of intrinsic and extrinsic motivation to enhance NPD project success in both short- and long-run; and 2) investigating the extent to which the project short- and long-run performance variance of the project team's realized ACAP and potential ACAP could be influenced by intrinsic and extrinsic motivation. We do this by analyzing survey data collected from 198 projects in MNC automobiles in Thailand. These MNCs do most of their work as projects assumed to be related to the transfer of knowledge from MNC headquarters to the local subsidiary to develop new products (Wheelwright & Clark, 1992). In this regard, NPD project is defined as a completed new product development project may simply be one that incorporates minor changes to establish designs or one that uses new technologies to create new markets (Clark et al., 1987). In doing so, this research provides insights into the synergistic roles of project team's ACAP and intrinsic and extrinsic motivation in enhancing projects success. Project managers can use these findings to arrange their valuable resources, project team's ACAP and two different types of motivation, to achieve both short- and long-run nature of NPD projects to support organizational growth and sustainability in the long term. In the following sections, we first review the relevant literature and develop a set of hypotheses. After outlining the research methodology, we describe and discuss the empirical findings of our hypotheses tests. Finally, the paper concludes by providing implications of these findings on both theory and practice.

2. Literature review

2.1. NPD project performance in multinational automobiles in Thailand

Thailand has been promoting foreign investment in developing Thai automotive industry since 1960 and as of 2015 Thailand automotive industry was the largest in Southeast Asia. The majority of MNCs investors have adopted localization strategy (Petison & Johri, 2008) whereby local employees were involved in the product development process so that the product being offered to the market will meet local context and preferences (Ghoshal & Nohria, 1989). For example, Japanese automobiles in Thailand recognized the needs of locals for multi-purpose vehicles in agricultural business in up-country Thailand hence the organization had commissioned a series of pickup truck projects to ensure the one-ton pickup truck models offered to the market corresponding with the local needs. In addition, some work processes initiated at the headquarters will be adjusted to correspond with the technology, skills and knowledge, and other conditions at the host country. These product/process development and adjustment are commissioned through NPD projects. The new product development projects undertaken are breakthrough and platform types of projects which are accounted for 60% of the overall projects commissioned in MNC automobiles. The other 40% was the derivative or incremental change projects. Wheelwright and Clark (1992: 73) explain that the breakthrough projects of product development involve significant changes to existing products and processes incorporating revolutionary new technologies or materials. Successful breakthrough projects establish core products and processes that differ fundamentally from previous models or generations. Similarly, platform type projects entail some products and/or processes changes but the project does not result in an introduction to the new technologies that breakthrough products do. As such, the nature of NPD projects in the study context involves implementing knowledge transfer from the headquarters to their local subsidiaries to develop new products.

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

Clark et al. (1987) explained that multinational automobiles are constantly commissioning new product R&D projects to ensure advances in technology through the introduction of timely new products to the marketplace. Also, Clark et al. (1987) found that, in the industry, this sort of projects captures substantial commitment of organizational resources and that the performance impact of the product development projects is of paramount to the growth and sustainability of the firm. As such, the nature of continuous product development in MNC automobiles is consistent with that of technology intensive firms (Maidique & Hayes, 1984). Shenhar et al. (1997: 9) proposed that project performance could be assessed separately on its short- and long-run success. Short-run NPD project performance refers to project completion, which includes project efficiency (meeting budgets and schedules) and the immediate commercial success of the project. These are consistent with the well-established measure of project success on cost-time-quality triangle (Pinto & Slevin, 1988; Sivasubramaniam et al., 2012). Long-run NPD project performance, in contrast, refers to the potential created by the project for future projects (Shenhar et al., 1997) or how to manage the transfer of knowledge earned and experienced gained from one project to the next relevant projects, thus shortening the timeline of the new project (Brady & Davies, 2004; Lindkvist, Soderlund, & Tell, 1998). This project-to-project transition is analogous to the nature of sequential product development projects where the knowledge and experience in the current project could enhance the future development of the product, be it an incremental or radical innovation (Wheelwright & Clark, 1992). Accordingly, this research explores both short- and long-run NPD project performance of the motivation synergy and the synergy of motivation and knowledge absorptive capacity. The following sections provide the literature review and our hypotheses in this study.

2.2. Motivation synergy and NPD project performance

Deci (1975) has categorized human motivation toward work into two types of extrinsic motivation and intrinsic motivation. Extrinsic motivation results from organizational inducement in the form of financial rewards and incentives (external) to reinforce employee behaviors towards the goal of the firm. In contrast, intrinsic motivation refers to the motivational state in which an individual is attracted to their work or committed to the work itself, not due to any external outcomes. Put differently, project team is extrinsically motivated when their motives to engage in and exert effort to complete the assigned tasks are the financial rewards such as incentives and pay for performance. Previous research in project-based environment reported that financial incentives can trigger the speed of learning and to complete the project in limited time (e.g., Anand & Gomez-Mejia, 2014; Gupta & Govindarajan, 2000; Meng & Gallagher, 2012; Zander & Kogut, 1995). Moreover, Kessler and Chakrabarti (1996) emphasized that not only can team-based rewards encourage cross-functional cooperation but it can also reduce the potential for team conflict resulting in an accomplishment of the shared goal of the project team success.

On the other hand, intrinsically motivated team would seek enjoyment, self-expression, or challenge in the project work. Amabile (1993) and Zhou (1998) emphasized the importance of project team's intrinsic motivation for particularly the context of NPD projects whereby innovation and creative products and time-to-market are key challenges to project success. Intrinsically motivated individuals tend to be cognitively more flexible, prefer complexity and novelty, and enjoy the higher levels of challenge and the attainment of mastery experience; therefore, it is likely that they will be more persistent and seek for alternatives to solve problems arising in the projects. Dewett (2007) found intrinsic motivation particularly in an R&D environment, is significant to creating creativity climate to enhance the achievement of project in the desired level (short-run performance). Additionally, Osterloh and Frey (2000) found that intrinsic motivation can enable the project-to-project transfer of tacit knowledge or knowledge earned and experience gained from solving issues in the previous projects, which is a primary source of innovation and critical to the success of NPD projects and other related innovation contexts (long-run performance).

While both intrinsic and extrinsic motivation, as discussed earlier, could separately influence project performance in both short and long run, Amabile's motivation synergy theory (1993: 189) suggested that "intrinsic and extrinsic motivation can combine synergistically to yield high levels of performance and personal satisfaction". With regards to this, she explained that intrinsic motivation is critical for task engagement in the process, whereas the extrinsic motivation is important to the end product or outcome, and that extrinsic motivation could be in service of intrinsic motivation. That is, project team's intrinsic motivation is necessary to help the team overcome the challenges they might come across while in the process of NPD projects. The project team will, when projects are complete, as a result, attain the reward pertaining to the achievement of the project on time-cost-quality dimension at the desired level (Rose & Manley, 2011). This suggests that intrinsic motivation is the basic type of motivation to drive project team to exert effort to meet the project assessment criterion while extrinsic rewards could strengthen or weaken this relationship (Makri, Lane, & Gomez-Mejia, 2006). This is because although intrinsically motivated project team could be energized by the challenges and complexities they experience in the assigned NPD projects, they could as well be exhausted over a period of time and hence the expected rewards (if interesting) when NPD projects complete could encourage them to push hard for the achievement of NPD project success. Moreover, it is expected that motivational rewards will induce in the project team a high level of knowledge sharing and transferring know-how from projects to projects to create new potentials for a greater good of the firm. Accordingly, intrinsic and extrinsic motivation can by synergized such that the intrinsic motivation will serve as a basic type of motivation in the project-based environment to enhance the level of NPD project success in both short and long run while the extrinsic motivation as the boundary condition of intrinsic motivation influence on NPD project outcomes (Amabile, 1993; Cerasoli et al., 2014; Hung, Durcikova, Lai, & Lin, 2011; Lin, 2007; Osterloh & Frey, 2000). In line with this reasoning, we advance the following hypotheses:

Hypothesis 1a. There is a synergistic influence of intrinsic and extrinsic motivation in the short-run NPD project performance.

Hypothesis 1b. There is a synergistic influence of intrinsic and extrinsic motivation in the long-run NPD project performance.

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

2.3. Motivation synergy, knowledge ACAP and NPD project performance

Scholars argued that the success of NPD project often depends on the ability of project team to ensure time-cost-quality specification while project team motivation serves as an essential element to drive the team to work under pressures (e.g., time-limited, high competition and unpredictable changes) for a successful NPD project (e.g., Collins & Smith, 2006; Grant, 1996). With regards to the ability, Cohen and Levinthal (1990) and Zahra and George (2002) proposed that knowledge absorptive capacity (ACAP) is a dynamic capability pertaining to knowledge utilization (or realized ACAP) and knowledge creation (or potential ACAP) that constitute the ability of the project team to achieve project innovativeness and strategic flexibility. Specifically, Zahra and George (2002) explained that the role of realized ACAP comprised a function of the transformation and exploitation capabilities reflecting on project team's knowledge utilization that is significantly affected project completion in the short run. In addition, potential ACAP of the project team is influenced by past experience or resulted from the cumulative knowledge from prior projects providing project team on their knowledge creation that is significant to the long-term project performance particularly in the context of high-velocity environment. This contention has been supported by several research projects (e.g. Brady & Davies, 2004; Popaitoon & Siengthai, 2014). For example, Popaitoon and Siengthai's (2014) study of NPD projects in MNCs in Thailand reported that project team's realized ACAP has been found to affect project performance in the short run in terms of project completion and commercial success, and project team's potential ACAP has been found to affect project performance in the long run in terms of the potential created by the project for subsequence projects.

However, Kim (1997) and Minbaeva (2007) pointed that project team's knowledge ACAP could be intensified on its link with project outcomes should the motivational devices are being used appropriately to exert the project team to utilize, transfer and share knowledge. Consistently, Zhao and Chadwick (2014) pointed that both project team's capability and motivation are the key to drive innovation for NPD projects. Likewise, Amabile (1993) proposed that the motivational devices being used will not be undermined if the employee's ability to perform meets the tasks requirement. While the above contentions seem to suggest both ability and motivation are important to support the achievement of the projects, Vroom (1964) believed that ability is the pre-condition for the motivational devices to be effective. He stated that "…more is to be gained from increasing the motivation of those who are high in ability than from increasing the motivation of those who are low in ability… More is gained from increasing the ability of those who are highly motivated than from increasing the ability of those who are relatively unmotivated" (1964: 203). Accordingly, it is argued that project team's knowledge ACAP is the basic foundation for a successful project implementation while motivational forces could reinforce project performance enhancement of knowledge utilization (realized ACAP) and knowledge creation (potential ACAP). Minbaeva (2007) explored this combined effect of ability and motivation in her study of knowledge transfer projects in MNCs but the study did not demonstrate clearly the interaction of ability with different types of motivation. This research contributes to the above calls for research to explore the moderating roles of intrinsic and extrinsic motivation on knowledge ACAP (realized/potential) and NPD project performance (short/long run).

Based on empirical case study of a knowledge transfer program in MNC, Kalling (2003) found that project team's ACAP is affected by incentives. In the case, the company stimulates local management primarily through the award routine. This management control factor can thus be seen as a way to create an incentive to learn, when there is no natural desire to do so. The stronger the incentives, the more likely it is that individuals will work harder on trying to learn and pick up new knowledge. Likewise, Makri et al. (2006) suggest that technology intensive firms have used a combination of short- and long-term incentives to reward key people for contributing both desired outcome and behavioral performance. Consistently, Gupta and Govindarajan (2000) point out the role of incentive in stimulating motivation on project learning and sharing. In addition, Cohen and Levinthal (1990) found that incentive is very important for preventing the situation of Not-Invented-Here (NIH) syndromes. NIH syndromes refer to situations where potential recipients of knowledge lack the incentive to learn as a key obstacle to learning in the future. Thus, the following hypotheses are suggested:

Hypothesis 2a. Project team's extrinsic motivation moderates the relationship between a project team's realized ACAP and the short-run NPD project performance.

Hypothesis 2b. Project team's extrinsic motivation moderates the relationship between a project team's potential ACAP and the long-run NPD project performance.

Moreover, project teams in the context of R&D are often said to be driven by intrinsic motivation (Amabile & Gryskiewicz, 1987) where the project challenge, complexity and novelty are considered the favorable nature of assignments (Amabile, 1993). Research found that intrinsically motivated team can bolster the team's willingness to share knowledge (Minbaeva, 2007; Teigland & Wasko, 2009), to provide cognitive effort to focus on the task/assignment itself (Zhou, 1998), and to solve problems (Dewett, 2007). In other words, these behaviors impacted by project team's intrinsic motivation can strengthen the process of knowledge utilization or realized ACAP to achieve the target, i.e. short-run project performance. Moreover, project team's intrinsic motivation can also enhance a project team's potential ACAP by using their prior-related knowledge and encouraging knowledge exploration (Zhou, 1998) to shorten the product development cycle time (Dewett, 2007). Besides, project team's motivation to adapt knowledge and experience to create future product development projects and other related R&D efforts (Amabile, 1993; Tierney, Farmer, & Graen, 1999) further support the moderating role of intrinsic motivation to strengthen the relationship between project team's potential ACAP and project performance in the long run. In the line of this reasoning, the hypotheses are developed:

Hypothesis 3a. Project team's intrinsic motivation moderates the relationship between a project team's realized ACAP and the short-run NPD project performance.

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

Hypothesis 3b. Project team's intrinsic motivation moderates the relationship between a project team's potential ACAP and the long-run NPD project performance.

3. Methods

This research explores the influence of motivation synergy (intrinsic and extrinsic) and the synergy of motivation and knowledge absorptive capacity (realized and potential) on NPD project performance (short and long run). Our survey was based on existing scales in the literature. Before the survey was administered, the survey was first prepared in English and then translated into Thai that double-blind back-translation process was used to check for meaning accuracy (Sinaiko & Brislin, 1973). Then, a pretest with 33 project team leaders was conducted to validate the measures in terms of their clarity and appropriateness to the context of MNC automobiles in Thailand. The reliabilities of all of the measures exceeded 0.70, which is the rule of thumb for Cronbach's alpha (Nunnally, 1978).

3.1. Sample and data collection procedures

Our target organizations were 372 MNC automobiles in Thailand based on the list of Thailand Automotive Institute (2012). They compose of two main groups: 23 MNC automotive assemblers and 349 MNC automotive parts-and-accessories makers. Nearly every Japanese automobile has manufacturing facilities in Thailand, as do many major U.S. and German companies. In this study, a nature of project uses project-based operations to transfer knowhow from their headquarters and to undertake R&D for new products. We obtained a list of the 372 MNCs; however, the unit of analysis of this research is discrete projects. Project outcomes are new products that have been in the market for at least a year (Clark et al., 1987). Therefore, project leaders, who are considered to be the best source of information about the project, include plant managers, engineering managers, product managers, and R&D managers. However, it would be an unmanageable task to identify the number of completed projects in each of the 372 MNCs. As experts recommended, the number of projects that companies had implemented during the past five years averaged 10. Accordingly, we sent a packet, addressed to the plant manager, to 150 MNCs. The packets included ten copies of the survey and a personalized cover letter outlining the nature of the study and its confidential nature. Target respondents who had worked on different NPD projects were identified by the plant managers to fill in the questionnaires.

Our survey resulted in 207 returned questionnaires, all carefully cross checked for accuracy with respect to the target companies and sample respondents. We discarded nine anonymous questionnaires that had more than 50% of their information incomplete (Hair, Bush, & Ortinau, 2006), resulting in a total of 198 usable questionnaires for analysis. Using this sample of 198 projects from 39 MNCs, the number of projects per MNC averaged five. The response rate for this survey was 13.2% (150 MNCs were each sent a packet of 10 questionnaires resulting in 198 usable questionnaires). For sample characteristics, 60% of the projects in our sample were projects that aimed at radical change or had a high complexity in developing a new product. The remaining 40% focused on incremental change. About 50% of the questionnaires indicated that the project duration was around one year, about 43% lasted between one and three years, and 7% of the sample respondents said that their project lasted for more than three years. Most projects were undertaken in Japanese-owned MNCs (71%), with 14% in German MNCs, 12% in US MNCs and 3% in UK MNCs.

3.2. Measures

We used multi-item measurement scales derived from existing studies. Each item was rated on a Likert-type scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). The item scales were validated using principal component factor analysis (PCFA) for a unidimensional construct. The Kaiser-Meyer-Olkin values of all of the measures exceeded the recommend value of 0.60 (Kaiser, 1974) and Barlett's Test of Sphericity was statistical significant at the 1% level (Barlett, 1954), which indicates that the data obtained for each construct are appropriate. Following this, Cronbach's alpha was used to assess the internal consistency of the measures. The rule of thumb for Cronbach's alpha is that the value should exceed 0.70 (Nunnally, 1978). As presented in Table 1, the Cronbach's alpha for all of the study variables was found to be above the acceptable level of 0.70.

3.2.1. Dependent variables

We adopted Shenhar et al.'s (1997) measurement of project management. They separated project performance into short-run project performance and long-run project performance. *Short-run NPD project performance* includes project efficiency (assessed with four items), the effect on users (assessed with four items), and direct business success (assessed with two items). *Long-run NPD project performance* was assessed by three items that were related to future potential projects. We replaced the word “customer” with “user” in the question items so that what was asked was more relevant to the context of study.

3.2.2. Independent variables

In this research, motivation of project team is divided into extrinsic and intrinsic. *Extrinsic motivation* is concerned with monetary rewards and incentives relied on pay for performance for project team based on Thompson and Heron's (2006)'s measurement (using three items). *Intrinsic motivation* (using five items) focuses on self-enjoyment for project activities related to generating new ideas for product development based on Tierney et al. (1999). We changed the wording of questions from “I” to “project members” to suit the context of study. Next, we used Jansen, Bosch, and Volberda's (2005) measurement of realized

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

Table 1
Means, standard deviations, reliability and correlation matrix for all study variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Mean	0.72	0.96	0.51	0.49	0.81	0.23	0.60	3.75	4.83	5.12	4.74	5.22	4.75
Standard deviation	0.45	0.20	0.50	0.50	0.39	0.42	0.49	1.70	1.34	0.92	1.10	0.88	1.23
1. Home country	na												
2. Operational period	−0.015	na											
3. Project duration	−0.039	0.002	na										
4. Project experience	−0.006	0.049	0.051	na									
5. Mode of entry	−.186**	0.033	0.096	−0.07	na								
6. Project complexity	−0.026	−.252**	−0.029	−0.09	0.08	na							
7. Automotive tiers	.397**	−0.012	−.156*	−0.091	.160*	−0.01	na						
8. Extrinsic motivation	−0.005	−.308**	−0.058	−0.033	−0.031	.177*	−.152*	*0.83*					
9. Intrinsic motivation	0.005	−0.026	0.053	−0.005	−0.021	0.072	0.044	.388**	*0.96*				
10. Realize ACAP	−.174*	−0.024	0.083	0.017	.155*	0.133	0.052	.216**	.655**	*0.91*			
11. Potential ACAP***	−.208**	−0.084	0.109	−0.014	0.062	.197**	−0.081	.339**	.563**	.782**	*0.88*		
12. Short run NPD project performance	−.150*	−.150*	0.066	0.011	.153*	0.106	0.021	0.137	.440**	.580**	.509**	*0.91*	
13. Long run NPD project performance	−.143*	−.176*	0.012	−0.105	0.084	0.03	−0.025	.220**	.388**	.474**	.518**	.653**	*0.84*

Note: the value of the construct reliability (Cronbach's alpha) appear on cross-diagonal in italics; N = 198.
* Correlation is significant at the 5% level (2-tailed);
** Correlation is significant at the 1% level (2-tailed);
*** Correlation between potential ACAP and realized ACAP is very high. Then, we test the value of Akaike Information Criterion (AIC) with AMOS version 7th by comparing the AIC value between the construct of ACAP as a whole and the separation construct of realized ACAP and potential ACAP with complementary roles. The AIC value indicated that the value of the separation construct (539.386) was lower than those of the solely ACAP construct (544.723). The AIC testing is meaningful when two different models are estimated that lower values indicate a better fit (Akaike, 1978). Consistently, Zahra and George asserted the construct of ACAP with two separate dimensions of realized ACAP and potential ACAP but complementary roles.

and potential ACAP. The eleven-item measure of *realized ACAP* assessed the processes of transformation (using six items) and exploitation (using five items). The seven-item measure of *potential ACAP* examined the processes of acquisition (using five items) and assimilation (using two items). We changed the wording of questions from "unit" to "project" and from "employees" to "project members" to suit the context of study.

3.2.3. Control variables

In order to assess the impact of motivation synergy (extrinsic and intrinsic) and knowledge ACAP (realized and potential) on NPD project performance (short and long run), we control for the effects of NPD project performance. Based on the literature, several factors could potentially shape project performance comprising MNC home country (Myloni, Harzing, & Mirza, 2007), mode of entry (Foss & Pedersen, 2002), operational period (Foss & Pedersen, 2002), project duration (Bakker, Boroş, Kenis, & Oerlemans, 2013), project complexity/change (Zander & Kogut, 1995), automotive tiers (Gupta & Govindarajan, 2000), and project related experience (Cohen & Levinthal, 1990). They were dummy coded.

4. Results

This research explores the influence of motivation synergy (intrinsic and extrinsic) and the synergy of motivation and knowledge absorptive capacity (realized and potential) on NPD project performance (short and long run). Table 1 displays the means, standard deviations, scale reliability estimates, and correlations for all of the variables.

4.1. The interaction effects of extrinsic and intrinsic motivation on NPD project performance in the short and long run

We tested our hypotheses (H1a and H1b) using hierarchical regression analysis (see Table 2). We identified project performance as the criteria (see Model 2 for short-run NPD project performance, and Model 4 for long-run NPD project performance). Following Aiken and West (1991), before creating the interaction terms of extrinsic and intrinsic motivation, the independent variables were mean-centered to mitigate the potential problem of multicollinearity. The hierarchical regression analyses revealed that the interaction effect of intrinsic and extrinsic motivation of project team on NPD project performance in the short run (see Model 2, $\beta = 0.124$ at the 10% level, supporting H1a). Also, Model 4 demonstrates the interaction effect of those in the long run NPD project performance ($\beta = 0.199$ at the 1% level, supporting H1b).

4.2. Extrinsic and intrinsic motivation as a moderator of the relationship between ACAP (realized and potential) and NPD project performance (short- and long-run)

The hierarchical regression analyses (see Table 3) revealed that project team's extrinsic motivation does not moderate the relationship between ACAP (realized and potential) and NPD project performance (short and long run) that are not significantly different from zero (see Model 3 and Model 7). Thus, H2a and H2b were rejected. On the other hand, the hierarchical regression

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

Table 2
Results of hierarchical regression analysis.

	Short-run NPD project performance		Long-run NPD project performance	
	Model 1	Model 2	Model 3	Model 4
Main effects				
Intrinsic motivation	0.471***	0.521***	0.382***	0.464***
Extrinsic motivation	−0.093	−0.115	0.026	−0.008
Extrinsic motivation*intrinsic motivation		0.124†		0.199***
Control variables				
Home country	−0.133†	−0.129†	−0.131†	−0.116
Operational period	−0.165*	−0.174*	−0.174*	−0.189**
Project duration	0.022	0.021	−0.018	−0.020
Project related experience	0.031	0.027	−0.096	−0.102
Modes of entry	0.133*	0.116†	0.076	0.050
Project complexity	0.037	0.042	−0.065	−0.056
Automotive Tiers	0.025	0.015	−0.013	-0.028
R square	0.266	0.279	0.218	0.251
Adjusted R2	0.231	0.240	0.181	0.211

Note: Standardized regression coefficients are reported, N = 198.
† Significant at the 10% level.
* Significant at the 5% level.
**Significant at the 1% level.

analyses revealed that project team's intrinsic motivation moderate the relationship between project team's potential ACAP and long-run NPD project performance (see Model 8). The interaction coefficient is significant (β = 0.185 at the 1% level, supporting H3b). However, the interaction coefficient for the relationship between project team's realized ACAP and the short-run NPD project performance is not significantly different from zero (Model 4). Thus, H3a was rejected.

To better explain the interactions found in the hierarchical regression analysis, we plotted the interaction effect (Fig. 1) using one standard deviation above and below the mean to capture high and low levels of project team's intrinsic motivation (Aiken & West, 1991). Fig. 1 illustrates this finding for the relative long-run NPD project performance when considering project team's intrinsic motivation as the moderating variable. This indicates that the effect of a project team's potential ACAP on long-run NPD project performance is dependent on project team's intrinsic motivation. Project team's intrinsic motivation strengthens the relationship between project team's potential ACAP and long-run NPD project performance when project team's intrinsic motivation is at a high level. Thus H3b is supported.

Table 3
Results of hierarchical regression analysis.

	Short-run NPD project performance				Long-run NPD project performance			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Control variables								
Home country	−0.159*	−0.052	−0.050	−0.056	−0.140 †	−0.042	−0.044	−0.064
Operational period	−0.140 †	−0.162*	−0.163*	−0.166**	−0.183*	−0.173**	−0.174*	−0.180**
Project duration	0.063	0.003	0.003	0.004	0.007	−0.055	−0.056	−0.051
Project related experience	0.034	0.013	0.014	0.017	−0.096	−0.096	−0.094	−0.086
Modes of entry	0.106	0.081	0.077	0.077	0.058	0.068	0.058	0.052
Project complexity	0.064	−0.002	0.000	0.002	−0.033	−0.123†	−0.124†	−0.103
Automotive tiers	0.080	−0.014	−0.016	−0.015	0.011	−0.017	−0.014	−0.022
Main effects								
Realized ACAP		0.464**	0.463***	0.459**				
Potential ACAP						0.436**	0.436**	0.407**
Intrinsic motivation		0.164 †	0.169*	0.177*		0.163*	0.175*	0.231*
Extrinsic motivation		−0.076	−0.080	−0.077		−0.029	−0.041	−0.034
Interaction effects								
Realized ACAP × extrinsic motivation			0.019					
Realized ACAP × intrinsic motivation				0.041				
Potential ACAP × extrinsic motivation							0.058	
Potential ACAP × intrinsic motivation								0.185**
R square	0.074	0.375	0.375	0.376	0.066	0.332	0.335	0.362
Adjusted R2	0.040	0.341	0.338	0.339	0.031	0.296	0.295	0.324
ΔR square	0.074	0.301	0.006	0.002	0.066	0.266	0.003	0.050
ΔF	2.172	29.97	0.093	0.453	1.915	24.769	0.849	8.760
Sig ΔF	0.038	0.000	0.761	0.502	0.069	0.000	0.358	0.003

Note: Standardized regression coefficients are reported, N = 198.
† Significant at the 10% level; * Significant at the 5% level; **Significant at the 1% level.

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

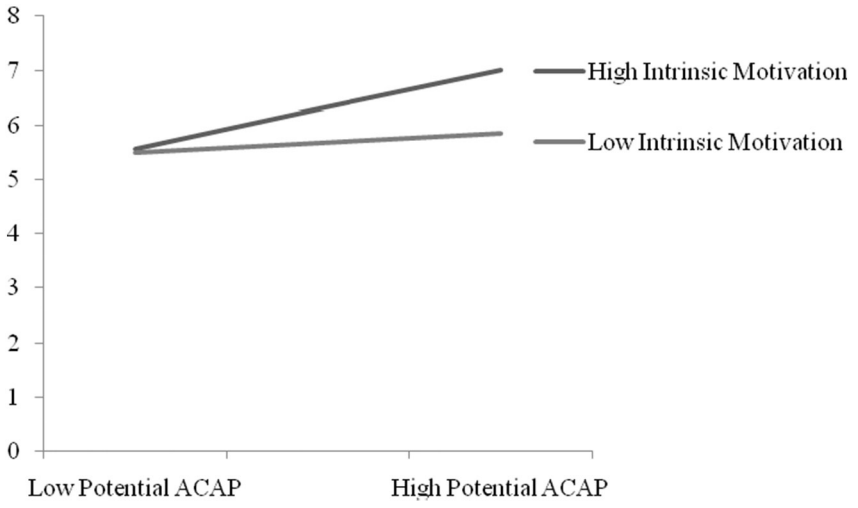

Fig. 1. Interaction effect of intrinsic motivation and potential ACAP on long-run NPD project performance.

5. Discussion and conclusion

5.1. Discussion

This research explores the influence of motivation synergy and the synergy of motivation and knowledge absorptive capacity on project performance, short and long term. Our results shed light on the different roles of intrinsic and extrinsic motivation on project performance and how intrinsic motivation can enhance knowledge ACAP and project performance relationships. Given some limitations, our research provides insights into technology management in MNC automobiles viewed as technology intensive firms. Project managers can match project resources, i.e. human resources and motivational rewards, more effectively with different types of projects so as to achieve the efficiency and effectiveness of NPD project outcomes. We contribute to the substantial body of knowledge on NPD project management in two important ways. First, it provides insight into the synergistic role of intrinsic and extrinsic work motivation on NPD project performance in the MNCs automotive environment. While previous research paid attention to variance in NPD project performance, short term in particular, of either intrinsic or extrinsic motivation, our work filled in the knowledge gap in technology management literature investigating the synergistic role of intrinsic and extrinsic motivation on NPD project success, both short and long term. More specifically, our findings reveal that intrinsic motivation could directly influence NPD project short-and long-term performance and that the impact of intrinsic motivation on these project outcomes could be improved on the condition that employees perceived extrinsic rewards to be high and the diminished impact will be observed when employees perceived extrinsic rewards to be low. Our findings echoed Amabile's (1993) premises on motivation synergy that intrinsic motivation is key to drive people effort to work in such a high velocity and time pressure environment as NPD project and that extrinsic rewards shall be used synergistically with intrinsic motivation for the most effective outcomes. It is possible that project people assess the value of extrinsic rewards in relations to projects challenge or difficulty and workload. As such, perceived low value of the rewards could undermine the intrinsic motives to exert extra effort for the project desired outcomes. Besides, Minbaeva (2007) reported in her studies that the systems of employment practices could also influence the level of employee extrinsic motivation hence the effectiveness of knowledge transfer in MNC environment. Previous research in similar context confirmed that performance incentives alone seem inadequate in this sort of environment (Lin, 2007; Makri et al., 2006; O'Dell & Grayson, 1998; Schmid & Adams, 2008; Szulanski, 1996).

Second, we respond to calls for research into project capabilities and project performance enhancement, particularly in the MNCs project-based organization environment whereby an additional element of project team's motivation on knowledge utility for project success was examined (Brady & Davies, 2004: 1606–7; Kim, 1997; Minbaeva, 2007; Popaitoon & Siengthai, 2014; Schmid & Adams, 2008; Zhao & Chadwick, 2014). We contribute to these calls by testing empirically the moderating role of intrinsic motivation on knowledge absorptive capacity and NPD project outcomes. In doing so, our work extend previous research providing empirical evidence on the synergistic impact of project people's knowledge ACAP and motivation to enhance project short-and long-term performance. Specifically, we found variance explained in long-run NPD project success of potential ACAP can be varying upon the level of intrinsic motivation. That is, potential ACAP and long-term NPD project performance relationship will be increasing when project people have high intrinsic motivation and this relationship will be restrained when project people have low intrinsic motivation. Our findings shed light on the critical role of intrinsic motivation on long term NPD project performance improvement whereby the project challenge and enjoyment being experienced during the project can engage the project team to think more creatively applying their prior relate knowledge and experience for new project creation (Amabile, 1993; Dewett, 2007).

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

Third, our findings suggest the different roles of intrinsic and extrinsic motivation play on NPD project success. We found the dual roles of intrinsic motivation on NPD project success. First, intrinsic motivation can by itself directly influence the project success in both short and long run (see Table 2) and second, it can be the condition under which potential ACAP can be accelerated on its influence on the long run project. Extrinsic motivation, in contrast, plays low light on NPD project outcomes enhancement. It neither has direct influence on project achievement in both short and long run nor has it a moderating effect on the influence of realized/potential ACAP on short/long run NPD performance. Rather, extrinsic motivation demonstrates its role in service of intrinsic motivation moderating the impact on intrinsic motivation and NPD project outcomes.

5.2. Managerial implications

Our findings raise important managerial implications for project manager and project practitioners in technology intensive firms. First, project managers should, given the limited resources, match the right people and motivational rewards with the nature of NPD projects. Successful long-run NPD project requires people with intrinsic motivation and potential ACAP or ability on knowledge creation, whereas successful short-run NPD project achievement needs project team with realized ACAP or usable skills for that particular project. In addition, project managers should reserve meaningful extrinsic rewards for long-run project type, because extrinsic rewards would trigger intrinsically motivated project team to exert even more effort towards the creation of future projects for business success. Cautions are provided when applied extrinsic rewards to expedite the influence of intrinsic motivation: project managers can make the rewards more meaningful by allocating a higher value of rewards contingent to a higher level of project difficulty. Accordingly, the satisfied level of extrinsic rewards will enhance intrinsic motivation influence on NPD project completion (short-term performance) and on future NPD projects (long-term performance). Second, project managers should involve project team in the design phase of the project and rewards allocation, in particular when working on long-run project. Project team will be aware of the nature of NPD project, its challenge and difficulty and expected or satisfactory level of rewards. As such, the attained rewards will be more meaningful to the team because they involved and agreed upon from the design phase of the NPD project. With regards to this, project managers should work closely with functional managers to prevent work overloaded on project team, otherwise, the expected rewards will not be able to engage project team to exert efforts on the project achievement. Third and last, our findings suggest the important role of intrinsic motivation in project-to-future projects success. Hence, project managers can promote project team's ability to refer prior relate knowledge and experience to future projects by enhancing their positive mood and enjoyment while undertaking project assignments. This positive experience will help reinforce knowledge creation resulting in a distinguished long-run NPD project success in technology-intensive firms.

5.3. Limitations and future research

This study has several limitations that should be addressed in future research. First, the study uses cross-sectional data. As such, cause-and-effect relationships cannot be definitively inferred from the results because causality can only be tested with data collected at different points in time. Thus, future research would benefit from the use of longitudinal data to test motivation synergy of project team in different stage of a product development project to observe how the relationships between these variables develop over time (Schmid & Adams, 2008). Second, the survey data used in this research were self-reported and the data collected for each project were based only on the perspective of the individual who completed the questionnaire, which may lead to common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Although our tests suggest no serious concern for multicollinearity given that the variance inflation factor obtained was far below the cut-off point (Hair et al., 2006), future studies should attempt to obtain data from multiple sources (e.g., project leader and members). Third, data collected from project team's motivation related to project performance in the context of MNC automobiles in Thailand should also consider some effects as discussed in previous section. In this regard, future research should consider these factors, including cultural distance (Gomez-Mejia & Palich, 1997; Myloni et al., 2007), long-term incentives (Hoskisson, Hitt, & Hill, 1993; Makri et al., 2006), communication (Badir & O'Connor, 2015), person-job fit and innovative work behavior (Afsar, Badir, & Khan, 2015) and the time frame of NPD project duration (Bakker et al., 2013). Finally, the generalizability of the findings may be limited because a factor may motivate project performance in one cultural context that might be not effect or even opposite effect in some other contexts (e.g., Popaitoon & Rayton, 2012). Also, there are other factors of extrinsic motivation (e.g., performance-related rewards) and those of intrinsic motivation (e.g., team-based job design, self-efficacy) that are not included in this study. Accordingly, future research should consider these factors.

5.4. Conclusion

This research investigates the roles of project team's motivation (intrinsic and extrinsic) on knowledge absorptive capacity (realize and potential) and NPD project performance (short and long run) relations in MNC automobiles viewed as technology intensive firms. We contribute to technology management literature suggesting the condition under which performance impact of knowledge absorptive capacity can be enhanced. Our results highlight the role of intrinsic motivation to intensify the influence of project team's potential knowledge absorptive capacity on the long-run NPD project success. Extrinsic motivation seems to play low light on both knowledge utilization and knowledge creation providing only the condition under which project team's intrinsic motivation can be triggered to intensify the effort to NPD project success in technology intensive firms.

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

Acknowledgments

This research was partially supported by the research fund of Mahasarakham University of Thailand.

References

Afsar, B., Badir, Y., & Khan, M. M. (2015). Person–job fit, person–organization fit and innovative work behavior: The mediating role of innovation trust. *The Journal of High Technology Management Research*, *26*(2), 105–116.
Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions in multiple regression.* Newbury Park, CA: Sage.
Akaike, H. (1978). A Bayesian analysis of the minimum AIC procedure. *Annals of the Institute of Statistical Mathematics*, *30*, 9–14.
Amabile, T. M. (1993). Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Human Resource Management Review*, *3*(3), 185–201.
Amabile, T. M., & Gryskiewicz, S. S. (1987). *Creativity in the R&D laboratory.* Center for Creative Leadership.
Amabile, T., & Kramer, S. (2011). *The progress principle: Using small wins to ignite joy, engagement, and creativity at work.* Harvard Business Press.
Anand, V., & Gomez-Mejia, L. R. (2014). The impact of cash incentives on TMT information seeking behavior in entrepreneurial firms. *The Journal of High Technology Management Research*, *25*(1), 68–82.
Badir, Y. F., & O'Connor, G. C. (2015). The formation of tie strength in a strategic alliance's first new product development project: The influence of project and partners' characteristics. *Journal of Product Innovation Management*, *32*(1), 154–169.
Bakker, R. M., Boroş, S., Kenis, P., & Oerlemans, L. A. G. (2013). It's only temporary: Time frame and the dynamics of creative project teams. *British Journal of Management*, *24*, 383–397.
Barlett, M. (1954). A note for multiplying factors for various chi square approximations. *Journal of the Royal Statistical Society*, *16*, 296–298.
Brady, T., & Davies, A. (2004). Building project capabilities: From exploratory to exploitative learning. *Organization Studies*, *25*, 1601–1621.
Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological Bulletin*, *140*(4), 980.
Clark, K. B., Chew, W. B., & Fujimoto, T. (1987). Product development in the world auto industry. *Brookings Papers on Economic Activity*, *3*, 729–771.
Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, *35*, 128–152.
Collins, C. J., & Smith, K. G. (2006). Knowledge exchange and combination: The role of human resource practices in the performance of high-technology firms. *Academy of Management Journal*, *49*(3), 544–560.
Deci, E. L. (1975). *Intrinsic motivation.* New York, US: Plenum Press.
Dewett, T. (2007). Linking intrinsic motivation, risk taking, and employee creativity in an R&D environment. *R&D Management*, *37*(3), 197–208.
Foss, N. J., & Pedersen, T. (2002). Transferring knowledge in MNCs: The role of sources of subsidiary knowledge and organizational context. *Journal of International Management*, *8*, 49–67.
Ghoshal, S., & Nohria, N. (1989). Internal differentiation within multinational corporations. *Strategic Management Journal*, *10*(4), 323–337.
Gomez-Mejia, L. R., & Palich, L. E. (1997). Cultural diversity and the performance of multinational firms. *Journal of International Business Studies*, *28*(2), 309–335.
Grant, R. M. (1996). Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science*, *7*(4), 375–387.
Gupta, A. K., & Govindarajan, V. (2000). Knowledge flows within multinational corporations. *Strategic Management Journal*, *21*, 473–496.
Hair, J. F. J., Bush, R. P., & Ortinau, D. J. (2006). *Marketing research: Within a changing information environment* (Third ed.). New Delhi: McGraw-Hill.
Hoskisson, R. E., Hitt, M. A., & Hill, C. W. (1993). Managerial incentives and investment in R&D in large multiproduct firms. *Organization Science*, *4*(2), 325–341.
Hung, S. -Y., Durcikova, A., Lai, H. -M., & Lin, W. -M. (2011). The influence of intrinsic and extrinsic motivation on individuals' knowledge sharing behavior. *International Journal of Human-Computer Studies*, *69*(6), 415–427.
Jansen, J. J. P., Bosch, F. A. J. V. D., & Volberda, H. W. (2005). Managing potential and realized absorptive capacity: How do organizational antecedents matter? *Academy of Management Journal*, *48*, 999–1015.
Kaiser, H. (1974). An index of factorial simplicity. *Psychometrica*, *35*, 401–415.
Kalling, T. (2003). Organization-internal transfer of knowledge and the role of motivation: a qualitative case study. *Knowledge and Process Management*, *10*(2), 115–126.
Kessler, E. H., & Chakrabarti, A. K. (1996). Innovation speed: A conceptual model of context, antecedents, and outcomes. *The Academy of Management Review*, *21*(4), 1143–1191.
Kim, L. (1997). The dynamics of Samsung's technological learning in semiconductors. *California Management Review*, *39*(3), 86–100.
Lin, H. -F. (2007). Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions. *Journal of Information Science*, *33*(2), 135–149.
Lindkvist, L., Soderlund, J., & Tell, F. (1998). Managing product development projects: On the significance of fountains and deadlines. *Organization Studies*, *19*(6), 931–951.
Maidique, M. A., & Hayes, R. H. (1984). The art of high-technology management. *Sloan Management Review*, *25*(2), 17–31.
Makri, M., Lane, P. J., & Gomez-Mejia, L. R. (2006). CEO incentives, innovation, and performance in technology-intensive firms: A reconciliation of outcome and behavior-based incentive schemes. *Strategic Management Journal*, *27*(11), 1057–1080.
Meng, X., & Gallagher, B. (2012). The impact of incentive mechanisms on project performance. *International Journal of Project Management*, *30*, 352–362.
Minbaeva, D. B. (2007). Knowledge transfer in multinational corporations. *Management International Review*, *47*(4), 567–593.
Myloni, B., Harzing, A. -W., & Mirza, H. (2007). The effect of corporate-level organizational factors on the transfer of human resource management practices: European and US MNCs and their Greek subsidiaries. *International Journal of Human Resource Management*, *18*, 2057–2074.
Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of management review*, *23*(2), 242–266.
Nunnally, J. C. (1978). *Psychometric theory* (Second ed.). New York: McGrew-Hill.
O'Dell, C., & Grayson, C. J. (1998). If only we knew what we know. *California Management Review*, *40*(3), 154–174.
Osterloh, M., & Frey, B. S. (2000). Motivation, knowledge transfer, and organizational forms. *Organization Science*, *11*(5), 538–550.
Petison, P., & Johri, L. M. (2008). Localization drivers in an emerging market: Case studies from Thailand. *Management Decision*, *46*(9), 1399–1412.
Pinto, J. K., & Slevin, D. P. (1988). Project success: Definitions and measurement techniques. *Project Management Journal*, *19*(1), 67–72.
Podsakoff, P. M., MacKenzie, S. B., Lee, J. -Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*, 879–903.
Popaitoon, P., & Rayton, B. (2012). Employment relationship in context: Commitment-based HR practices in the UK and Thailand. *Journal of General Management*, *37*(Spring), 21–37.
Popaitoon, S., & Siengthai, S. (2014). The moderating effect of human resource management practices on the relationship between knowledge absorptive capacity and project performance in project-oriented companies. *International Journal of Project Management*, *32*(6), 908–920.
Rose, T., & Manley, K. (2011). Motivation toward financial incentive goals on construction projects. *Journal of Business Research*, *64*(7), 765–773.
Schmid, B., & Adams, J. (2008). Motivation in project management: The project manager's perspective. *Project Management Journal*, *39*(2), 60–71.
Shenhar, A. J., Levy, O., & Dvir, D. (1997). Mapping the dimensions of project success. *Project Management Journal*, *28*, 5–13.
Sinaiko, H. W., & Brislin, R. W. (1973). Evaluating language translations: Experiments on three assessment methods. *Journal of Applied Psychology*, *57*, 328–334.
Sivasubramaniam, N., Liebowitz, S. J., & Lackman, C. L. (2012). Determinants of new product development team performance: A meta-analytic review. *Journal of Product Innovation Management*, *29*(5), 803–820.
Sydow, J., Lindkvist, L., & DeFillippi, R. (2004). Project-based organizations, embeddedness and repositories of knowledge: Editorial. *Organization Studies*, *25*, 1475–1489.

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004

Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practices within the firm. *Strategic Management Journal*, *17*, 27–43.
Szulanski, G. (2000). The process of knowledge transfer: A diachronic analysis of stickiness. *Organizational Behavior and Human Decision Processes*, *82*(1), 9–27.
Teigland, R., & Wasko, M. (2009). Knowledge transfer in MNCs: Examining how intrinsic motivations and knowledge sourcing impact individual centrality and performance. *Journal of International Management*, *15*(1), 15–31.
Thailand Automotive Institute (2012). Master plan for automotive industry 2012–2016. Retrieved from http://www.thaiauto.or.th
Thompson, M., & Heron, P. (2006). Relational quality and innovative performance in R&D based science and technology firms. *Human Resource Management Journal*, *16*, 28–47.
Tierney, P., Farmer, S. M., & Graen, G. B. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology*, *52*(3), 591–620.
Vroom, V. (1964). *Work and motivation.* New York: Wiley.
Wheelwright, S. C., & Clark, K. B. (1992). Creating project plans to focus product development. *Harvard Business Review*, *70*, 70–82.
Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, *27*, 185–203.
Zander, U., & Kogut, B. (1995). Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test. *Organization Science*, *6*, 76–92.
Zhao, Z. J., & Chadwick, C. (2014). What we will do versus what we can do: The relative effects of unit-level NPD motivation and capability. *Strategic Management Journal*, *35*(12), 1867–1880.
Zhou, J. (1998). Feedback valence, feedback style, task autonomy, and achievement orientation: Interactive effects on creative performance. *Journal of Applied Psychology*, *83*(2), 261–276.

Dr. Sujinda Popaitoon (sujinda.p@acc.msu.ac.th) is a lecturer at Mahasarakham Business School, Mahasarakham University, Thailand. She received her Ph.D. in International Business and HRM from School of Management at Asian Institute of Technology. Her research interests include international HRM, technology management, knowledge transfer, and cross-border alliances.

Dr. Patchara Popaitoon (patchara.p@cbs.chula.ac.th) is a lecturer at Chulalongkorn Business School, Chulalongkorn University, Thailand. She worked as an HR professional in multinational companies before pursuing academics career. Her research areas include HR-performance linkages, work engagement, psychological contract and work motivation.

Please cite this article as: Popaitoon, S., & Popaitoon, P., Motivation synergy, knowledge absorptive capacity and NPD project performance in..., *Journal of High Technology Management Research* (2016), http://dx.doi.org/10.1016/j.hitech.2016.10.004