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USING INDIVIDUAL VALUES OF INFORMATION TECHNOLOGY PROFESSIONALS TO IMPROVE SOFTWARE DEVELOPMENT MANAGEMENT PRACTICES IN THAILAND

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ABSTRACT

Management of software development is a vital factor which can lead to the success of software projects. The most important component involved in the project is the composition of the team members. Several cross cultural and psychological research studies indicate that human values influence human behaviour. Therefore, the individual values of Thai Information Technology (IT) professionals who include the project manager, the systems/business analyst and the programmer also impact the software development management practices. This research reveals that Thai IT workers' self-direction influences all practice areas of software development. In addition, and apart from this individualist value, others such as the benevolence, universalism, conformity and achievement of these professionals are also significant values.

Keywords: individual values, software project management, software development management practices, motivation, Schwartz's model

INTRODUCTION

Due to high competition in Thailand, software has emerged with an important role in managing the business of organisations. As a result, the Thai software industry continues to grow. According to the results of a 2013 market survey about software and software services conducted by the Thailand Development Research Institute (TDRI, 2013), the Thai software market consists of three segments: packaged software, software services and embedded software; in 2013, the total production value of these software markets was THB7,956 million, THB31,134 million and THB4,886.7 million, respectively. Furthermore, this report showed the projection of the value of the software market; it indicated that in 2014, the consumption value of the software services would be THB34,870 million (growth rate = 12.0%). The value of packaged software was estimated to be THB9,156 million (growth rate = 15.0%), and the value of embedded software was expected to be THB5,864 million (growth rate = 20.0%).

The development of any software is achieved through human activities such as problem solving, cognitive information processing and social interaction (Capertz & Ahmed, 2010). In fact, human and social factors have a major impact on the success of software development and its system. Therefore, in any successful software development, teamwork is a significant factor as it is the primary mechanism for software creation. A software development team is typically formed for each new project, depending on staff availability and the requirements of the project (Faraj & Sproull, 2000). Staffing teams containing the right people are more likely to improve the effectiveness and efficiency of software development (Gorla & Lam, 2004; Klein, Jiang, & Tesch, 2002).

To motivate Thai IT professionals to perform with efficacy, individual values are highly influential. Bilsky and Schwartz (1994) indicate that values guide human beings to select or judge behaviours or events. Knowing what values can positively influence the behaviour of Thai IT professionals should support the management of software development in the Thai software industry. Therefore, common values to all Thai IT professionals for the achievement of the common goals of a software project need to be discerned. However, when different tasks must be undertaken, different values might be more appropriate for these tasks. Hence, studying the effects of the values that currently exist in a Thai software development team will help uncover the best ways software development can be managed. Furthermore, a study of individual values will assist to deepen an understanding of what values might enrich the performance of software development management (SDM) practice. Such research should also give a better understanding of how to achieve synergy from value diversity. Therefore, overlooking the complexity of individual values may create problems during software development.

Although Jirachiefpattana (2012; 2013) studied the influence of individual values of Thai IT professionals on SDM practices, these studies did not uncover which precise individual values of the members of the software development team affect the areas of SDM practices, in terms of their roles. Therefore, the objective of this research is to recover key Thai IT professionals' individual values, particularly those of the project manager, the systems analyst and the programmer, all of whom assert distinct influence in the area of SDM practice. This study aims to uncover this missing knowledge by employing the same data set used in the Jirachiefpattana research; consequently, the findings of this research will provide indicators of what values motivate the performance of the Thai IT professionals.

THEORETICAL BACKGROUND

Roles of IT Professionals in the Software Development Team

Software development requires various skills that depend on the software's characteristics. In general, the common positions on a software team are project manager, system/business analyst and programmer. These positions are responsible for different and vital activities. Schwalbe (2010) stated that the job listing for project managers varies by organisation and industry. In addition to these differences, most project managers perform similar tasks. These tasks include solving problems, determining scope and activities, scheduling, budgeting, staffing of team members, team coordinating and leading and helping the team to interface with clients, as well as monitoring and controlling (PMI, 2008).

Capertz and Ahmed (2010) identified a variety of job requirements for system/business analysts such as interacting extensively with customers, analysing client's existing systems, interpreting customer requirements, identifying and evaluating potential solutions, and providing innovative solutions. They also listed the tasks required for programmers, for example, analysing business requirements and preparing for detailed programming specifications, arranging application testing, selecting appropriate software programming, and preparing procedures and the documentation needed for installation and maintenance.

Measurements of Individual Values

According to the objective of this research, individual values need to be identified. The most popular scales for measuring such values are those of Rokeach (1973), Inglehart (1977), Schwartz (1992), and O'Reilly, Chatman and Caldwell (1991). Rokeach (1973) maintains that each value is ordered in priority of importance relative to other values. Thus, the value systems of individuals would differ due to variations in personal and cultural experiences. Rokeach identifies two types of values, instrumental and terminal. Each category contains 18 values. Terminal values refer to end-states of existence, whereas instrumental values are defined as modes of behaviour used to arrive at end-states. Terminal values concentrate on two groups: personal (e.g., salvation and inner harmony) and social (e.g., world peace and true friendship among people). Instrumental values are subdivided into moral versus competence values. Moral values are interpersonal such that, when they are violated, the individual has feelings of guilt. Competence values have a personal focus rather than an interpersonal focus. People have feelings of shame about personal adequacy in an event in which these values are violated.

Another values measurement is materialism/postmaterialism (MPM) proposed by Inglehart (1977). MPM posits that materialist values are those that are related to economic and political stability, while postmaterialist values include values concerned with society and peace. Inglehart and his colleagues conducted several surveys in 9 European countries in 1973. The questionnaire contained 12 questions. Six items emphasised materialist needs; the remainder aimed to identify postmaterialist needs. A bipolar result was indicated. The negative pole contained five materialist items, while the opposite pole included five of six postmaterialist items.

Three years later, Inglehart and Baker (2000) studied the development of values, modernisation and the persistence of traditional values. They designed "The World Values Surveys" as a comprehensive measurement covering all major areas of human concern, from religion to politics, economics and social life. The results uncovered two dimensions that reflect the different worldviews of people from prosperous societies and those of low-income societies. The two dimensions include (1) Traditional/Secular-rational and (2) Survival/Self-expression values. Inglehart and Baker linked a shift from traditional to secular-rational authority to modernisation, and a shift from survival to well-being, which is termed postmodernisation, a replacement of material goals.

In 1991, O'Reilly et al. proposed an instrument for measuring a person-organisation fit called Organisational Cultural Profile (OCP). This instrument contained 54 value statements that can be used to assess organisation values and individual preferences. This research provides a base definition of the pattern of values that explain organisational culture. This pattern is consistent with the pattern of the attributes of individual preferences. With loadings of greater than .40 on a single factor, 26 of the 54 value statements were incorporated into eight dimensions: innovation, attention to detail, outcome orientation, aggressiveness, supportiveness, reward emphasis, team orientation and decisiveness.

Additionally, Schwartz (1992) developed the Schwartz Value Survey (SVS), which is widely used by social and cross-cultural researchers. Schwartz defined values as conceptions of the desirable that guide an individual's way to select actions, evaluate people and events and explain their actions. In this view, values are trans-situational criteria or goals that are ordered by importance as guiding principles in life. The survey questionnaire contained 56 specific values. The results from the research allowed Schwartz to conclude that there were 10 basic values (see Figure 1). Next, he organised these basic values into two dimensions with four motivation domains (openness to change, conservation, self-enhancement and self-transcendence).

Table 1
Meaning of the 10 basic individual values

Basic individual values	Meaning
Power	Social status and prestige, control or dominance over people and resources (social power, authority, wealth, preserving my public image)
Achievement	Personal success through demonstrating competence according to social standards (successful, capable, ambitious, influential)
Hedonism	Pleasure and sensuous gratification for oneself (pleasure, enjoying life, self-indulgence)
Stimulation	Excitement, novelty and challenge in life (daring, a varied life, an exciting life)
Self-direction	Independent thought and action-choosing, creating, exploring (creativity, freedom, independence, curiosity, choosing own goals)
Universalism	Understanding, appreciation, tolerance and protection for the welfare of all people and for nature (broadmindedness, wisdom, social justice, equality, a world at peace, a world of beauty, unity with nature, protecting the environment)
Benevolence	Preservation and enhancement of the welfare of people with whom one is in frequent personal contact (helpful, honest, forgiving, loyal, responsible)
Tradition	Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provides the self (humble, accepting my portion in life, devout, respecting tradition, moderate)
Conformity	Restraint of actions, inclinations impulses likely to upset or harm others and violate social expectations or norms (politeness, obedience, self-discipline, honor for parents and elders)
Security	Safety, harmony and stability of society, of relationships and of self (family security, national security, social order, cleanliness, reciprocation of favours)

Source: Schwartz (1992)

Figure 1 demonstrates that the first dimension is openness to change versus conservation. Openness concerns self-restriction, preservation of traditional practices and protection of stability (security, conformity and tradition). In contrast, conservation emphasises independent thought and action and favours change (self-direction and stimulation). The second dimension is self-enhancement versus self-transcendence. While self-transcendence concentrates on the acceptance of others as equals and concern for their welfare (universalism and benevolence), self-enhancement emphasises the pursuit of one's own success and dominance over others (power and achievement). Hedonism is related to openness both to change and to self-enhancement. However, Schwartz (2003) modified the SVS and recommended a short measurement of values called The

Portrait Values Questionnaire (PVQ). While it includes only 21 items, the PVQ has the capacity to measure the 10 basic values.

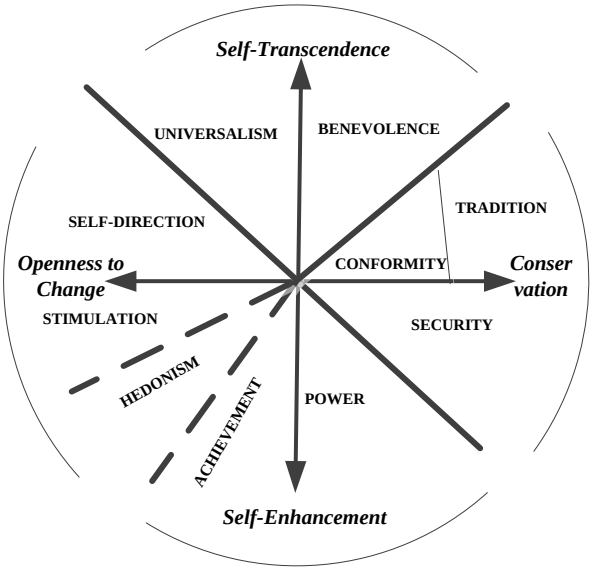

Figure 1. Model of relations among ten basic values (*Source:* Schwartz, 1992)

Thai Values

In 1990, Komin studied Thai values based on Rokeach's theoretical findings. Komin developed 20 terminal values and 23 instrumental values. The two lists were derived from various sources. The Thai Value Scale contained several emerging values that proved to be obvious values for Thai people. There were 3 terminal values and 6 instrument items that did not appear in Rokeach's value lists, such as gratitude, care and consideration and responsiveness to situations and opportunities. The results from Komin's research indicated that there were nine value clusters for describing Thai characteristics. These Thai value clusters were developed based on relative correlations among values and scholars' subjective judgment. The nine values, with short explanations, are presented in Table 2. Komin also summarised the overall picture of Thai values as follows:

> The Thai social system is first and foremost a society where individualism and interpersonal relationships are of utmost importance.
>
> (Komin, 1990, p. 691)

Table 2
Nine Thai values

Thai value clusters	Meaning
Ego orientation	Thai people have a deep sense of independence, pride and dignity.
Grateful relationship orientation	Two persons are psychologically bonded by *bunkhun*, which means that one renders the help and favour while the other remembers the kindness.
Smooth interpersonal relationship orientation	This value cluster focuses on the surface harmonious, kind, pleasant and conflict free interpersonal interactions.
Flexibility and adjustment orientation	Thai people have flexibility to respond to situations and opportunities such as decision shifting, vote switching and the switching of principles.
Religious-psychic orientation	Religious, spiritual and supernatural beliefs have some influence on Thai people's lives.
Education and competence orientation	Education is a means for Thai people to climb the high social ladder. It is a prestigious symbol.
Interdependence orientation	This cluster value reflects community collaboration through the value of brotherhood spirit through helping each other and interdependence.
Fun-pleasure orientation	Thai people are easy-going, fun-loving, life enjoying.
Achievement-task orientation	Achievement motivation requires internal drive towards achievement, through hard work.

Source: Komin (1990)

Relationship between Individual Values Theories

Given this research on human values, a key question is to be addressed: Is there any relationship among these creditable theories? In fact, previous studies reveals that many scholars have investigated this question. For example, Schwartz (1992; 2003) attempted to find a universal structure value dimension that could be used for cross-culture comparison. His theory, *10 Basic Human Values*, was developed based on Rokeach's research. Wilson (2005) examined the relationship between the postmaterialist values introduced by Inglehart (1977) and the 10 value dimensions elaborated by Schwartz (1992). Wilson indicated that postmaterialism could be predicted by self-direction, universalism and security. However, security value was negatively correlated with this construct. Wilson also concluded that postmaterialism was positively associated with self-transcendence and negatively correlated with conservation and self-enhancement.

In addition, Bilsky and Jehn (2002) attempted to map the 54-OCP items, introduced by O'Reilly et al. (1991), in Schwartz's two-dimensional structure of values. Bilsky and Jehn found that aggression, outcome orientation and rewards

correlated to self-enhancement, while team orientation and supportiveness related to self-transcendence. With regard to the second dimension, innovation was associated with openness to change and stability. Furthermore, detail and decisiveness orientation correlated with conservation. As stated in the previous section, most value items in the Thai value system were brought over from Rokeach. However, although three terminal values and six instrument values were different from the Rokeach's value survey, all of them were considered in Schwartz's value system. In short, according to the above findings, the structure values system covers all human values introduced by the popular theories.

SDM Practices

Although many research studies related to software development practices have been undertaken, a major portion studied only some particular practices, such as software maintenance, schedule estimation, techniques and tools (Banker, Davis, & Slaughter, 1998; Cusumano, Maccormack, Kemerer, & Crandall, 2003; Verner, Evanco, & Cerpa, 2007; White & Fortune, 2002). Only a few of the studies cover more particular aspects of SDM practice (Dutta, Lee, & Wassenhove, 1999; Leung, 2001–2002). This section presents these studies.

Dutta et al. (1999) conducted a survey on SDM practices in European communities. The practices in their survey instrument were divided into five areas: organisational and management practices, standards and procedures, metrics, control of development process and, finally, tools and technology. Their survey questions were influenced by previous research, such as the Capability Maturity Model (CMM), Europe's Bootstrap Model and Software Process Improvement and Capability Determination (SPICE). The results from Dutta et al.'s survey revealed that the adoption levels were higher in some areas, such as organisation and management practice and control of the development process. In contrast, the management practices related to metrics and tools as well as technology were less adopted by the European countries.

In 2001–2002, Leung adopted the SDM practices of Dutta et al. (1999) as a starting point for studying the situation of SDM practices in China and Hong Kong. He selected only those practices with an average adoption rate of over 50% and determined 20 practices for his study, as presented in Table 3. He found only eight SDM practices that were shared among the top ten practices.

Verner and Cerpa (2005) explored the project management practices to provide a basic set of factors that influenced the success of projects. They developed a questionnaire to collect data from Australian software developers and included five aspects of project management: project manager, requirement analysis, cost/schedule estimation, risk assessment and post-mortems. The questions in this

research consisted of 37 statements, while only nine questions correlated to the success of the project.

Rationale for Employing Schwartz's Model and Dutta's Study

With respect to the objective of this research, the PVQ was selected as our measurement tool because it met several criteria. First, the PVQ is a globally developed and validated measure of individual values (Lindeman & Verkasalo, 2005). Second, the PVQ is a measure of individuals' core values and not political behaviour values (Schwartz, 1992). Thus, it is an important measure that taps into the enduring core values of individuals, as well as their present work behaviour, given the dynamic business environment in Thailand. Third, this measurement covers all of the above individual value theories, including Thai values. Finally, the use of Schwartz's model allows us to compare our results with those of other countries (Schwartz & Bardi, 2001).

With respect to the SDM practices, the practices from the study of Dutta et al. were chosen as particularly appropriate. Firstly, their study covered more than 60 management practices that had been influenced by major standards related to software development. Secondly, Dutta's survey questionnaire was conducted in a wide range of European countries, indicating that the practices are valid for measuring SDM practices. These criteria were then used for the selection of some SDM practices from Leung (2001–2002), which was the only study that selected practices with an above 50% average adoption rate. As a result, this study determined 20 positive management practices as the research's dependent variables. The research conceptual model is presented in Figure 2.

From this conceptual model, the following specific research questions were developed according to the study's objective:

RQ1: Do the individual values of a Thai project manager exert influence in the area of SDM practices? If yes, what are they?

RQ2: Do the individual values of a Thai systems/business analyst exert influence in the area of SDM practices? If yes, what are they?

RQ3: Do the individual values of a Thai programmer exert influence in the area of SDM practices? If yes, what are they?

Table 3
Common SDM practices

Management areas	Management practices
Organisational Structure and Management	1. Have a software project manager for each project
	2. Have a software quality assurance plan
	3. Establish a change control function for each project
	4. Ensure user/customer input at all stages of the project
	5. Ensure critical non-software resources available according to plan
	6. Usage of prototyping methods in checking the requirements of the software
Standards and Procedures	7. Formal assessment of risk, benefits and viability of projects prior to contractual commitment
	8. Application of common coding standards to each project
	9. Formal procedures for estimation of effort, schedule and cost
	10. Test planning prior to programming
	11. Periodic reviews of the status of each project by management
	12. Formal procedures for passing over deliverables from one group to another
	13. Independent testing conducted by users or a Software Quality Assurance team
Metrics	14. Record and feedback of estimated versus actual efforts into estimation process
	15. Log post-implementation problems and track the effectiveness of solution
	16. Existence of records from which all current versions and variants of systems can be quickly and accurately reconstructed
Control of the Software Development Process	17. Production of estimates, schedules and changes only by the project managers who directly control the project resources
	18. Have procedures for controlling changes to requirements, design and documentation and code and specifications
	19. Obtain signoff from all parties before changing project plans
	20. Ensure testing/verification of every function

Source: Leung (2001–2002)

RESEARCH METHOD

The aim of this research is to investigate what individual values of Thai IT professionals have an effect on the areas of SDM practices regarding the role of the team members. To find answers to these questions, a questionnaire was developed to collect the relevant data. The questionnaire consisted of three parts. The first part contained general questions related to the respondent and his/her organisation. The second part consisted of 21 questions regarding PVQ. The third contained 20 questions regarding software management practices. Five Likert

scales were employed to represent the level of the respondent's opinion, which was questioned in the second and third sections. To accommodate Thai speakers, Thai language questions were needed, along with some adjustments. The questions were reviewed, and their wording was edited by a Thai IT academic professor, a PhD graduate from Australia. Finally, the questionnaire was pretested with 30 Thai IT professionals who were not included in the sample.

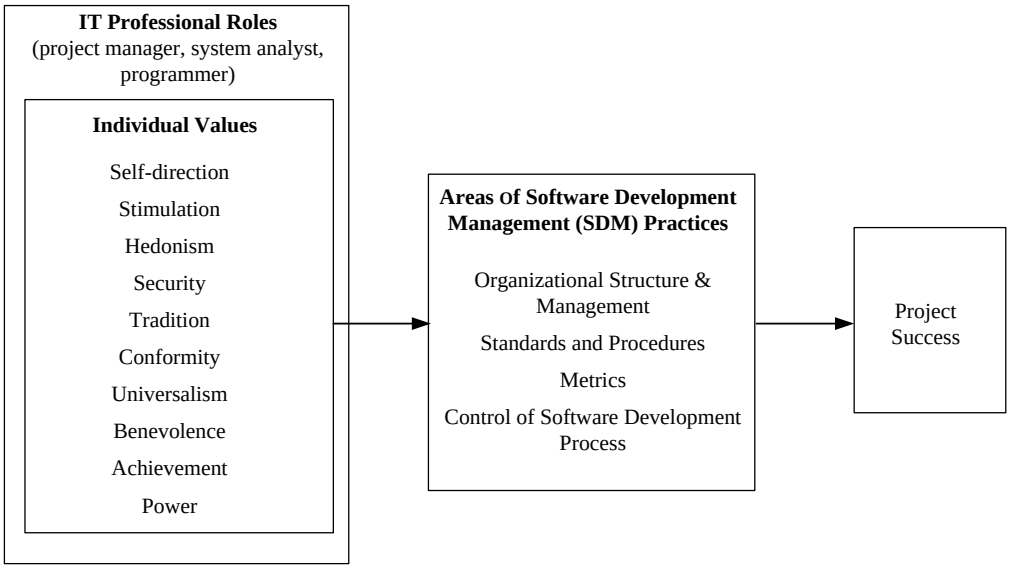

Figure 2. The research conceptual model

The target respondents of the research were project managers, system/business analysts and programmers who work for Thai IT outsourcing companies. Unfortunately, many people are working in this industry. Therefore, the sample size was 384, calculated with 95% confidence, from an unknown population. To collect the data, we managed the questionnaires using a drop-off, pick-up method (Steele, Bourke, Luloff, Liao, Theodori, & Krannich, 2001). We chose the sampled IT outsourcing companies from the list of software and IT firms provided by the National Software Industry Information Mining (NSIIM). Companies located in Bangkok and the metropolitan area were selected because they contained the largest proportion (82.84%). Next, 400 questionnaires were sent out, and the returned questionnaires amounted to 384, which equals 96%. A high response rate was achieved because a colleague of the research team is working as a business analyst in an IT consulting firm and has a good relationship with the people in this industry.

To answer the research questions, responses were selected and classified according to the position of the respondents. Three common positions were covered in the analysis, so that 44 responses were excluded. Following this, a stepwise regression analysis was employed to identify which individual values influence which areas of SDM practices. Each of the basic individual values was used as the mean of the responses in its dimension, as presented in Table 1. Similarly, each SDM practice area was used as the average score calculated from its responses, as illustrated in Table 2.

According to the criteria for utilising a stepwise regression analysis, multicollinearity tests were performed. The variance inflation factor (VIF) and the condition index (CI) are the statistics generally used to test collinearity. VIF is an index of the effect of other predictor variables on a regression coefficient. If the regression model contains a high VIF, it means that there is a high degree of collinearity or multicollinearity (Hair, Anderson, Tatham, & Black, 1998). Generally, the accepted VIF is not greater than 10.0. In this study, the VIFs range from .626 to 1.598 (Tables 6–8), which are lower than the threshold value. Additionally, CI values larger than 30 indicate a problem of collinearity (Hair et al., 1998). In this study, all CIs are less than the threshold value (Tables 6–8). Together, these two collinearity diagnostics indicate there is no problem associated with multicollinearity in the research data.

FINDINGS

General Demographic Data

In summary, the majority of the responses received from each group, as presented in Table 4, were from females who had a Thai bachelor's degree majoring in Information Technology and Computer Science. The majority of Thai programmers had worked in their current companies for a period of from 1–5 years (51.9%), while Thai project managers and the Thai system/business analysts had been employed from between 11–15 years (35.1%) and more than 15 years (28.6%), respectively. In addition to experiences related to software projects, most of the Thai project managers have been involved in software projects longer than other groups (more than 15 years, 41.3%). Moreover, while most of the Thai systems/business analysts had gained experience from between 11–15 years (45.5%), the Thai programmers had performed jobs in this area for 1–5 years (53.5%). The project managers had gained their experience in government projects (41.3%), whereas the system analysts/business analysts and programmers were more familiar with applications developed for the fashion, clothes and cosmetics industry (54.1% and 49.6%).

Table 4
Demographic data classified by position in software development team

Variables		IT Professional Roles						Total N = 340	
		Project Manager N = 63		System/Business Analyst N = 148		Programmer N = 129			
		Count	%	Count	%	Count	%	Count	%
Sex	male	21	33.3	72	48.6	67	51.9	160	47.1
	female	42	66.7	76	51.4	62	48.1	180	52.9
Age	< 30 years	10	15.9	36	24.3	84	65.1	130	38.2
	31–35 years	6	9.5	41	27.7	42	32.6	89	26.2
	36–40 years	25	39.7	46	31.1	0	0	71	20.9
	41–45 years	13	20.6	25	16.9	3	2.3	41	12.1
	> 45 years	9	14.3	0	0	0	0	9	2.6
Education level	Below bachelor degree	0	0	1	.7	1	.8	2	.6
	Bachelor degree	36	57.1	112	78.3	111	86.0	259	77.3
	Master degree	27	42.9	30	21.0	17	13.2	74	22.1
Education area	Information Technology	23	36.5	48	32.4	41	31.8	112	32.9
	Computer Sciences	22	34.9	52	35.1	52	40.3	126	37.1
	Computer Engineering	3	4.8	3	17.6	11	8.5	17	5.0
	Software Engineering	0	0	0	0	5	3.9	5	1.5
	Other	15	23.8	45	30.4	20	15.5	80	23.5
Graduation location	Thailand	60	95.2	140	94.6	126	97.7	326	95.9
	Other countries	3	4.8	8	5.4	3	2.3	14	4.1
Year-of-work in organisation	< 1 year	15	23.8	12	8.1	43	33.3	70	20.6
	1–5 years	17	27.0	37	25.0	67	51.9	121	35.6
	6–10 years	7	11.1	31	20.9	15	11.6	53	15.6
	11–15 years	6	9.5	52	35.1	3	2.3	61	17.9
	> 15 years	18	28.6	16	10.8	1	.8	35	10.3

(Continued on next page)

Table 4 *(continued)*

Variables		IT Professional Roles						Total N = 340	
		Project Manager N = 63		System/Business Analyst N = 148		Programmer N = 129			
		Count	%	Count	%	Count	%	Count	%
Number of years related to SW project	< 1 year	6	9.5	4	2.8	22	17.15	32	9.5
	1–5 years	3	4.8	23	15.9	69	3.517	95	28.2
	6–10 years	10	15.9	26	17.9	22	.1	58	17.2
	11–15 years	18	28.6	66	45.5	13	10.1	97	28.8
	> 15 years	26	41.3	26	17.9	3	2.3	55	16.3
Business–type	Banking & Finance	19	30.2	54	36.5	44	34.1	117	34.4
	Tourist & Hotel	12	19.0	32	21.6	25	19.4	69	20.3
	Food	7	11.1	35	23.6	22	17.1	64	18.8
	Fashion, Clothes & Cosmetics	19	30.2	80	54.1	64	49.6	163	47.9
	Telecommunication	8	12.7	22	14.9	6	4.7	36	10.6
	Government	26	41.3	63	42.6	23	17.8	112	32.9
	Transportation	4	6.3	20	13.6	18	14.0	42	12.4
	Manufacturing	19	30.2	65	43.9	26	20.2	110	32.4
	Others	9	14.3	12	8.1	11	8.5	32	9.4

Descriptive Data Related to Individual Values and SDM Practice Areas

The data presented in Table 5 show the average score and the rank of the individual values and the areas of SDM practice of Thai IT professionals. The results reveal that the Thai project manager, the systems/business analyst and the programmer ranked, in a similar pattern, the top three basic values (benevolence, universalism and hedonism, respectively). All three scored as average at more than 4.0. On the contrary, they rated power as the least important value.

Furthermore, the Thai IT professionals strongly agreed with all areas of the practices (scores of more than 4.0 from 5.0). Every group ranked practices using almost the same pattern. Remarkably, the Thai project managers marked metric as the practice of highest importance, while control of the software development process was rated by the system/business analysts and the programmers as the most important practice.

The Influence of Individual Values on the Areas of SDM Practices
Project Manager

The results from the stepwise analysis, illustrated in Table 6, shows that the first area of the SDM practice, organisational structure and management, is

significantly influenced by self-direction (b = .532, p = .001). Although the regression model is significant, it can only explain this practice area at 18% (R^2 = .180, F = 13.391, p = .001). Similarly, self-direction can also predict standards as well as procedure and control of the software development process (b = .711, p = .000 and b = .699, p = .000). In addition, the prediction abilities of both regression models are 25.1% and 21.5% (R^2 = .251, F = 20.482, p = .000 and R^2 = .215, F = 16.676, p = .000). In the case of the metric area, self-direction and benevolence are the affecting factors (b = .491, p = .001 and b = .380, p = .001), and the model is also significant with a 29.2% explanation ability (R^2 = .292, F = 12.356, p = .000). Therefore, we can conclude that self-direction and benevolence are the individual values of Thai project managers that influence the area of SDM practice.

Table 5
The average score and rank of individual values and SDM practices

Constructs	Project Manager (63)			System/Business Analyst (148)			Programmer (129)		
	Mean	SD.	Rank	Mean	SD.	Rank	Mean	SD.	Rank
Individual Values									
Self-direction	4.0079	.51189	5	4.0439	.51484	5	4.0039	.50966	5
Stimulation	3.6746	.79392	9	3.7230	.71258	9	3.7093	.72267	9
Hedonism	4.0397	.53356	3	4.1655	.60437	3	4.1705	.55374	3
Security	3.9206	.49356	8	3.9662	.59665	6	3.9186	.57211	7
Tradition	3.9365	.66291	7	3.7770	.63160	8	3.7597	.65282	8
Conformity	4.0317	.51488	4	3.9662	.60795	6	3.9612	.60793	6
Universalism	4.4444	.41044	2	4.4955	.45920	2	4.4599	.49685	2
Benevolence	4.4921	.46222	1	4.5372	.47053	1	4.4961	.51348	1
Achievement	3.9921	.52741	6	4.1115	.58269	4	4.0349	.56660	4
Power	3.6508	.63268	10	3.6047	.70047	10	3.5155	.67875	10
SDM Practices									
Organisational structure and management	4.0984	.64245	4	4.1189	.64178	4	4.1070	.65481	4
Standards and procedures	4.1329	.72640	3	4.2154	.61822	3	4.1473	.60906	3
Metrics	4.3333	.63641	1	4.4009	.61594	2	4.3256	.59580	2
Control of software development process	4.2857	.77233	2	4.4071	.65419	1	4.3333	.66316	1

Table 6
Influence of the project manager's basic values on SDM practices

Dependent variables	Independent variables	*b*	SE *b*	*t*	Sig.	Tolerance	VIF	CI
Organisational structure and management	Constant	1.964	.588	3.341	.001			
	Self-direction	.532	.146	3.659	.001	1.000	1.000	15.848
	R = .424, R^2 = .180, R^2_{adj} = .167, SEE = .58651, F = 13.391, Sig. = .001							
Standards and procedures	Constant	1.281	.635	2.018	.048			
	Self-direction	.711	.157	4.526	.000	1.000	1.000	15.848
	R = .501, R^2 = .251, R^2_{adj} = .239, SEE = .63364, F = 20.482, Sig. = .000							
Metrics	Constant	.658	.771	.853	.397			
	Self-direction	.491	.140	3.498	.001	.926	1.080	17.166
	Benevolence	.380	.155	2.444	.017	.926	1.080	24.464
	R = .540, R^2 = .292, R^2_{adj} = .268, SEE = .54445, F = 12.356, Sig. = .000							
Control of software development process	Constant	1.484	.692	2.146	.036			
	Self-direction	.699	.171	4.084	.000	1.000	1.000	15.848
	R = .463, R^2 = .215, R^2_{adj} = .202, SEE = .69001, F = 16.676, Sig. = .000							

Systems/Business Analyst

The regression analysis, as illustrated in Table 7, indicates that the Thai systems/business analysts are significantly affected by self-direction, conformity, achievement and universalism, which are individual values. The organisational structure and management is influenced by conformity and self-direction (b = .394, p = .000 and b = .405, p = .000). These values also affect the standards and procedures (b = .384, p = .000 and b = .278, p = .001). Although achievement is significant, it has a slightly lower impact on this practice area (b = .167, p = .038). Similarly, metric practice can be explained by self-direction and conformity, including universalism (b = .311, p = .002, b = .197, p = .030 and b = .244, p = .037, respectively). With regard to the control of the software development process, self-direction and universalism are involved in the prediction of this area (b = .385, p = .000 and b = .349, p = .003). Furthermore, all of the regression models are significant and influential on individual values, which can collectively explain the area of SDM practices of more than 20% (R^2 = .355, F = 39.924, p = .000; R^2 = 354, F = 26.276, p = .000; R^2 = .261, F = 16.921, p = .000; R^2 = .213, F = 19.589, p = .000, respectively).

Table 7
Influence of basic values of system/business analysts on SDM practices

Dependent variables	Independent variables	*b*	SE	*t*	Sig.	Tolerance	VIF	CI
Organisational structure and management	Constant	.920	.367	2.505	.013			
	Conformity	.394	.079	4.983	.000	.792	1.262	15.657
	Self-direction	.405	.093	4.332	.000	.792	1.262	19.000
	R = .596, R^2 = .355, R^2_{adj} = .346, SEE = .51892, F = 39.924, Sig. = .000							
Standards and procedures	Constant	.869	.388	2.242	.026			
	Self-direction	.384	.092	4.169	.000	.761	1.314	17.677
	Conformity	.278	.081	3.456	.001	.716	1.396	18.506
	Achievement	.167	.080	2.094	.038	.792	1.263	22.861
	R = .595, R^2 = .354, R^2_{adj} = .340, SEE = .50213, F = 26.276, Sig. = .000							
Metrics	Constant	1.265	.472	2.678	.008			
	Self-direction	.311	.099	3.144	.002	.752	1.330	17.986
	Conformity	.197	.090	2.193	.030	.653	1.531	21.262
	Universalism	.244	.116	2.102	.037	.685	1.460	29.119
	R = .511, R^2 = .261, R^2_{adj} = .245, SEE = .53511, F = 16.921, Sig. = .000							
Control of software development process	Constant	1.282	.516	2.485	.014			
	Self-direction	.385	.103	3.747	.000	.831	1.203	18.420
	Universalism	.349	.115	3.031	.003	.831	1.203	24.103
	R = .461, R^2 = .213, R^2_{adj} = .202, SEE = .58444, F = 19.589, Sig. = .000							

Programmer

There are only four out of ten individual values of the Thai programmers that significantly affect the SDM practice areas, as shown in Table 8. Conformity and self-direction influence organisational structure and management (b = .373, p = .000 and b = .331, p = .003), and the regression model can predict this SDM area by approximately 26.7% (R^2 = .267, F = 22.890, p = .000). Self-direction and universalism affect not only standards and procedures (b = .473, p = .000 and b = .294, p = .004) but also metrics (b = .397, p = .000 and b = .375, p = .000). These individual values of Thai programmers can explain how these practice areas are at approximately 29.1% (R^2 = .291, F = 25.915, p = .000) and 30.0% (R^2 = .300, F = 27.018, p = .000). Moreover, the control of the software development process is also significantly predicted by self-direction and benevolence (b = .493, p = .000 and b = .380, p = .000), and the ability of explanation is at 27.5% (R^2 = .275, F = 23.929, p = .000). In conclusion, the individual values of the Thai programmers that significantly affect the areas of SDM practice include self-direction, conformity, universalism and benevolence.

Table 8
Influence of basic values of programmer on SDM practices

Dependent variables	Independent variables	*b*	SE *b*	*t*	Sig.	Tolerance	VIF	CI
Organisational structure and management	Constant	1.302	.430	3.032	.003			
	Conformity	.373	.092	4.058	.000	.799	1.251	15.594
	Self-direction	.331	.110	3.022	.003	.799	1.251	19.411
	R = .516, R^2 = .267, R^2_{adj} = .255, SEE = .56524, F = 22.890, Sig. = .000							
Standards procedures	Constant	.945	.463	2.043	.043			
	Self-direction	.473	.098	4.813	.000	.832	1.201	18.395
	Universalism	.294	.101	2.915	.004	.832	1.201	22.151
	R = .540, R^2 = .291, R^2_{adj} = .280, SEE = .51673, F = 25.915, Sig. = .000							
Metrics	Constant	1.063	.450	2.364	.020			
	Self-direction	.397	.095	4.154	.000	.832	1.201	18.395
	Universalism	.375	.098	3.833	.000	.832	1.201	22.151
	R = .548, R^2 = .300, R^2_{adj} = .289, SEE = .50237, F = 27.018, Sig. = .000							
Control of software development processes	Constant	.649	.542	1.197	.234			
	Self-direction	.493	.101	4.893	.000	.959	1.042	16.057
	Benevolence	.380	.100	3.84	.000	.959	1.042	23.038
	R = .525, R^2 = .275, R^2_{adj} = .264, SEE = .56901, F = 23.929, Sig. = .000							

CONCLUSIONS

This study sought to identify the professional individual IT values of Thai project managers, systems/business analysts and programmers that affect areas of SDM practice. It is hoped that this study can contribute to a better understanding of SDM areas in Thailand through these IT professionals. The findings of this study may provide helpful insight into the management of Thai IT organisations as well as provide incentive to potential investors, especially foreign investors, in this industry to conduct their business. The results from the research study are summarised as follow.

1. Most Thai project managers, systems/business analysts and programmers assessed themselves as benevolent, universal in outlook and hedonistic.
2. To achieve quality software, the adoption of good management practices is important. These Thai IT professionals firmly agree that they should be comfortable with such management application if IT companies have an intention to establish quality products and practices.
3. It was found that the area of SDM practices of Thai project managers could be predicted by their values, which are self-direction and benevolence.

4. There are four individual values of Thai systems/business analysts that affect their management practices: conformity, self-direction, achievement and universalism. Interestingly, some of these individual values are potentially incompatible, e.g., self-direction VS conformity and universalism VS achievement.
5. Furthermore, SDM practice areas of Thai programmers depend on self-direction, conformity, universalism and benevolence. Similar to systems/business analysts, there is a conflict among the values involved in the prediction of management practices.
6. Even though there are incompatible values among those of systems/business analysts and programmers, the overall effect on practices is positive. These values support and facilitate the smooth performance of SDM practices. For example, the conformity value of the Thai systems/business analysts and the programmers will allow them to accept and perform according to the rules, standards and procedures. This effect may be due to the nature of the Thai culture.
7. It was also discovered that self-direction is a common value among these Thai IT professionals and affects all areas of SDM practice. Therefore, self-direction is an important value for Thai IT workers. This value will motivate these workers to create new ideas, explore the risks, benefits and viability of projects and encourage them to examine data and statistics to effectively improve their work as well as to accept change. Hence, self-directed teams may be appropriate.

This information describing the values of Thai IT professionals can provide IT managers with a deeper knowledge of their workers' motivation and could be employed by managers to increase the successful functioning of software projects, according to their roles (for example, whether managers wish to maximise creativity). This knowledge may also reveal what forms of management practice better suit certain values, helping to increase the competitiveness of the business. Human resource policies, training and organisational development programs can be adjusted to reach the best fitting composition of personnel for the achievement of software development tasks.

Finally, this research has several limitations. First, as this study is exploratory research, the findings were derived in the form of statistics. A lack of qualitative data has resulted in an inadequacy of rich information to explain situations. Second, the samples of this research were IT professionals working in IT outsourcing companies in Thailand. Consequently, any use of these results should be undertaken cautiously, even by other Thai IT organisations, because the organisational settings are different. Hence, in the future, researchers should strive to obtain qualitative data. In-depth interviews would be helpful to further explain why and how individual values influence SDM practice. In fact, an

extension of sampling to in-house IT professionals would create a perfect conceptualisation.

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