IT Project Risks in Developing Economies: For the Contexts of Cambodia and Uganda

Completed Research Paper

One-Ki Daniel Lee **Josephine Namayanja**

Abstract

The information technology (IT) project environment in developing economies is complex and dynamic due to their unique social, technological, cultural, political, and financial contexts. This study proposes a theoretical framework for identifying risks in IT projects in developing economies by considering the unique characteristics of project management in developing economies, which involve broader stakeholder groups, technology and project inexperience, infrastructural immaturity, and local uniqueness. The proposed framework serves as guidance to identify specific IT project risks in two developing economies, Cambodia and Uganda. For this, a total of 17 project cases were examined via a series of expert interviews. The findings achieved through this retroductive process are used to validate the proposed framework as well as to conceptualize unique risk factors in IT projects in the two developing economies. Additional analyses are conducted to better understand the risk factors, especially in the comparison of the two developing economies.

Keywords: IT project, project risk, developing economies, Cambodia, Uganda

Introduction

Many information technology (IT) project managers working in developing economies either partially or completely fail to achieve their project goals (i.e. scope, time, cost, and/or quality goals) (Dada 2006; Olawumi and Chan 2019; United Nations 2014). This is mainly because they do not have a sufficient understanding of the complexity and unique context involved in their project environment (Heeks 2002; 2010; Muriithi and Crawford 2003). Developing economies are generally classified as such based on their poor economic performance, high poverty level, high corruption rate, lack of critical infrastructure, and high inequality of wealth and access to quality education (Adeoye and Islam 2019; Chang et al. 2015; Sila 2019; World Bank 2014). Although these social, cultural, political, and financial contexts are the most important components of projects in developing economies (Avots 1972; Ndou 2004; Yanwan 2012), many IT project managers do not understand their unique work environment and relevant risks. In 2010, for example, the Maji Matone (water drops) program was established in rural Tanzania to enable a mobile-based reporting system on faulty water pumps. However, the project failed for the following reasons; 1) presence of strong social ties among individuals, who were not willing to use the system to report incidents due to fear of those in higher authority, 2) inadequate target users specifically women who did not have access to mobile phones, and 3) immature technological infrastructure where mobile access was limited due to poor network coverage (Taylor 2013). The risks associated with the Maji Matone program clearly show some of the gaps in addressing the cultural background of people and unique technological requirements surrounding developing economies.

Several researchers have pointed out potential factors leading to such high failures in IT projects in developing economies, which include immaturity of project management (PM) practices, social and political inefficiency, cultural diversity, and financial weakness (Abbasi and Al-Mharmah 2000; Heeks 2002; Muscatello and Parente 2006; Rasmy et al. 2005; Walton and Heeks 2011; Wang et al. 2007). However, in developing economies where project teams are typically lacking in project resources and professional PM skills (Abbasi and Al-Mharmah 2000; Nguyen 2007; Yanwan 2012), risk identification and mitigation has seldom been an important management priority in IT projects. Furthermore in the literature, a systematic approach to identify IT project risks in developing economies has not been proposed. Therefore, the risk factors in IT projects in developing economies have been ill-understood, and the strategies to manage them remain blurry to both practitioners and academics.

The objectives of this study are two-fold. One is to propose a theoretical framework for identifying IT project risks in developing economies. The other is to apply this framework to specific developing economies and identify a context-specific list of IT project risks. To achieve these objectives, we adopt a retroductive approach in which a theoretical perspective is advanced through an iterative dialogue between ideas and evidence (Ragin 1994; Van Maanen et al. 2007). Following this approach, first, we propose a theoretical framework that investigates the effects of the unique characteristics of project management in the context of developing economies (i.e. broader stakeholder groups, technology and project inexperience, infrastructural immaturity, and local uniqueness) on key elements of IT projects (i.e. people, process, technology, and external environment). Second, we collect data and evidence regarding IT project risks in specific developing economies. Particularly, we investigate two developing economies, Cambodia in South East Asia and Uganda in East Africa, via a series of expert interviews. Third, using the results from the expert interviews, we validate the proposed framework and further conceptualize the risk factors of IT projects in the two developing economies. We then develop implications with additional analyses about the risk factors from different perspectives. These implications help us better understand the risk factors in IT projects in developing economies and their underlying causes.

The rest of the paper is organized as follows; first, we discuss previous studies pertinent to the topics of IT project risks and characteristics of developing economies. In particular, we focus on a global setting, since most IT projects in developing economies involve partnership with foreign project teams or sponsors (Saad et al. 2002). Then, we propose a theoretical framework of risk identification for IT projects in developing economies. After introducing our data collection process, we identify risk factors captured through expert interviews in Cambodia and Uganda. Next, we provide an analysis of the identification results from various perspectives. Finally, we discuss the potential contributions, implications, and future directions of this study.

Theoretical Framework

To develop a theoretical framework for identification of the IT project risks in developing economies, we review the extant literature on (1) risks in global IT projects and (2) characteristics of projects in developing economies.

Risks in Global IT Projects

Project risks are generally understood as uncertainties that deviate from the expected or planned outcomes of a project (Barkley 2004). If not properly managed, they increase the likelihood of project failure (Lyytinen et al. 1998). Thus, risk management has been considered one of the top priorities in IT project management (Schmidt et al. 2001). With the current trends of globalization and virtualization in IT projects, risk management becomes more critical since project risks are getting more complex and dynamic (Lee and Baby 2013). In particular, prior studies in global IT project risk management have highlighted various multiplicity factors in global IT projects, such as heterogeneous cultures, processes, and technologies among multiple project members and groups (Lee and Baby 2013; Persson et al. 2009; Schmidt et al. 2001). To manage these multiplicity factors properly, project managers should understand the unique aspects of the dynamic project environment, particularly the discrepancies among the various groups within an IT project (Lee and Baby 2013).

In global IT projects, the multiplicity factors are embedded in the key project elements (i.e. people, process, technology, and external environment) (Lee and Baby 2013; Persson et al. 2009). The *people* element of an IT project refers to all participating teams and their members at various locations and positions. The *process* element refers to the operational and strategic dimensions of project management, such as procedures, policies, methodologies, and strategic plans. The *technology* element refers to technological means, such as services, development, infrastructure, and platforms that support the people and process elements in an IT project. Lastly, the *environmental element* refers to a project's external environments, such as political and legal contexts, which are frequently beyond a project team's control, and thus generating serious uncertainties (Lee and Baby 2013; Persson et al. 2009). Table 1 shows examples of relevant risk areas for each of the project elements.

Table 1. Relevant Risk Areas for Each of the Project Elements

Elements	Relevant Risk Areas
People	Relationships among project members and groups, sharing of project goals, levels of knowledge, individual backgrounds, etc.
Process	PM practices, organizational structures, roles, rules, and policy, operational processes, etc.
Technology	Accessibility to IT resources, such as hardware, software, and human IT resources, technology standards and requirements, etc.
External Environment	Legal and compliance requirements, external support (e.g. government), financial resources and stability, etc.

IT projects in developing economies also involve these project elements. However, they have a more unique set of risks due to their distinctive characteristics.

Characteristics of Projects in Developing Economies

Previous studies discuss the following characteristics of projects in developing economies:

Broader Stakeholder Groups

Projects in developing economies typically have multiple key stakeholders. In particular, they often have great public visibility and government involvement (Abbasi and Al-Mharmah 2000; Avots 1972; Muriithi and Crawford 2003). For example, government, local and foreign organizations, non-governmental organizations (NGOs), private or public sectors, financial institutions, media, and various international communities usually play a critical role in a project's sustainability. This diverse setting of stakeholder groups generates new types of challenges for projects in developing economies associated to high bureaucracy and inefficiency (Yanwan 2012).

Technology and Project Inexperience

Projects in developing economies are often unprecedented in terms of project scope, requirements, and technologies involved, thus requiring new approaches (Avots 1972). Hence, this unprecedented dimension refers to the state of newness of technology and IT projects in developing economies. Projects often lack well-established practices and procedures that govern the project setting. Additionally, they are incapacitated due to lack of well-trained and efficient human resources, appropriate technology, and external support, such as financial resources. Overall, there is a general lack of awareness about project management that poses risk to the attainment of project goals (Yanwan 2012).

Infrastructural Immaturity

Projects in developing economies experience a shortage of the latest infrastructure, such as social, public service, and technological, which are required to support the operation of projects (Adeoye and Islam 2019; Avots 1972; Ndou 2004). Services provided by these infrastructure are particularly crucial

for projects in developing economies (Yanwan 2012) and yet a large percentage of populations in developing economies are still out of reach from technological infrastructure, such as secure web servers, data centers, and broadband internet connections (Chang et al. 2015; Kapurubandara and Lawson 2006; Moertini 2012; Ndou 2004). New technologies for projects are also frequently unmatched with the existing technological infrastructure which is characterized by the existence of the digital divide in developing economies (Dewan and Riggins 2005; James 2002). Projects in developing economies are also characterized by social limitations due to participants' lack of prior relationships (Sabherwal 1999). Such lack of social ties results into questionable motives of participants, which impacts overall project performance. More so, dishonest practices defined by corruption and bribery that exist within certain political and social settings lead to inefficient operation of projects (Yanwan 2012).

Local Uniqueness

Each developing economy has its own unique culture and needs. Culture consists of prevailing and shared values, norms, assumptions, belief systems, languages, and behavioral patterns in a society or cultural group (Aycan 2004). Previous literature has addressed a variety of cultural dimensions that can be used to distinguish different countries or economies – developing versus developed (Hofstede and Bond 1988; Krishna et al. 2004; Muriithi and Crawford 2003). Muriithi and Crawford (2003), for example, argue that project team members from developing economies are more likely to accept an unequal distribution of power and authority within their team. They also argue that project team members from developing economies tend to have stronger emotional resistance to change. With such societal disparities, project collaboration suffers due to different work processes, perceptions, needs, and values across diverse cultural groups within a project (Krishna et al. 2004). Table 2 summarizes the definitions of the four characteristics of projects in developing economies.

Table 2. Characteristics of Projects in Developing Economies

Characteristics	Definitions
Broader Stakeholder Groups	The mesh network of broader stakeholders that exist in projects in developing economies, usually involving government, public, local, and foreign organizations as prime interest groups
Technology and Project Inexperience	The state of newness of technology and IT projects in developing economies, which lead to limited knowledge, experience, and resources
Infrastructural Immaturity	The limitation of the social, physical, organizational, operational, and technology infrastructure needed to support projects
Local Uniqueness	The unique behavioral patterns of individuals and groups that are shaped by the cultural identities, values, and societal norms they belong to, which have dramatic impact on project operations

We believe these project characteristics of developing economies shape the risks in IT projects, generating a unique set of risk factors that differ in association to the context governing IT projects. Reflecting these four characteristics on the IT project elements (i.e. people, process, technology, and external environment), therefore, we propose a preliminary framework for identification of risk factors in IT projects in developing economies as the form of a 4x4 matrix defined by an intersection of the project elements and the characteristics of developing economies (please refer to Table 4 in the following section).

Identifying IT Project Risks in Developing Economies

Following the retroductive approach (Ragin 1994; Van Maanen et al. 2007), we collect data and evidence to validate the proposed framework and further conceptualize the unique IT project risk factors in developing economies. This iterative process is known to be useful to devise a middle-range theory for more specific contexts (Bensaou and Venkatraman 1995), which is believed to be applicable in our case. In particular, we investigate two developing economies as the specific contexts of this study,

Cambodia and Uganda. According to the World Bank (2014), the characteristics of these economies match those of developing economies described (also see IMF 2019). While Cambodia and Uganda belong to distinctive cultural groups of the South East Asia and East Africa, respectively, they share certain common characteristics, such as post-conflict, yet fast growing economies (Leliverld 2008). Hence, an investigation and comparison of these two economies is believed well-fitting to the purpose of this study.

Data Gathering and Risk Identification Procedures

For our data gathering, we conducted semi-structured face-to-face interviews with industry experts who have experienced various IT-related projects in the target areas (Flick 2009). During the interviews, the industry experts were asked to elaborate on their experiences of IT project management and the risks that they faced during their projects, particularly related to the key elements of the projects (i.e. people, process, technology, and external environment). The duration of each interview was approximately 1 to 2 hours.

For this study, a total of 17 experts were interviewed. Our interviewees consisted of project managers, company owners, and senior project members who have worked on several IT related projects. We selected these groups of individuals because we believed that in their capacity, they oversaw the projects and thus were able to provide details with respect to that. The project domains include but are not limited to health, finance, manufacturing, telecommunications, software development, and education. These projects are categorized under their sectors, such as private (commercial), government, and public (NGO). The interviewees are also categorized based on their role in the project, such as vendor, client, subsidiary and sponsor, and their origins, such as local and foreign. The demographics of the expert interviewees and their projects are summarized in Table 3.

Table 3. Demographics of the Investigated Projects and Expert Interviewees

Demographics	Categories	N	%
Regions	Cambodia	9	53%
	Uganda	8	47%
Types of Project	Private Project (Commercial)	7	41%
	Government Project	6	35%
	Public Project (NGO)	4	24%
Main Project Organizations	Third Party Vendor	7	41%
	Internal IT Department	5	29%
	NGO	5	29%
Origin of Leading Project Organization	Local	6	35%
	Local and Foreign	6	35%
	Foreign	5	29%
Positions of Expert Interviewee	Project Manager	10	59%
	Senior Project Member	6	35%
	Project Sponsor	1	6%
Origins of Expert Interviewee	Local	14	82%
	Foreign	3	18%
Sides of Expert Interviewee	Vendor	9	53%
	Client	6	35%
	Subsidiary (Internal IT)	1	6%
	Sponsor (Financial)	1	6%

Based on the interview scripts, risk incidents were identified and matched with the proposed risk identification framework through multiple rounds of independent coding by the two researchers involved in this study. During coding of the risk incidents, we utilized an inductive approach, in which a predefined list of codes is not required (Miles and Huberman 1994). Following suggestions in literature, we wrote up the interview data, reviewed the data line by line, and labeled each of the risk incidents (Strauss 1987). Through this iterative process, we identified a total of 257 risk incidents (Cambodia=138, Uganda=119) from the 17 project cases. The coded risk incidents were then matched with the proposed framework, and the results from each of the researchers were compared. Through multiple rounds, the matching outcomes were improved and the consistency between the two researchers was improved from 49% to 98%. Based on the matched results, we then conceptualized the risk factors in IT projects in developing economies.

Identified Risk Factors

In this study, we identified 16 risk factors as summarized in Table 4. This section provides a breakdown for each of the identified risk factors highlighting some examples of risk incidents from the two developing economy contexts.

Table 4. Matching and Conceptualization Results of Risk Factors

Characteristics of Developing Economies / Project Elements	Broader Stakeholder Groups	Technology and Project Inexperience	Infrastructural Immaturity	Local Uniqueness
People	Heterogeneous Interests among Stakeholders	Lack of Knowledge on Technology and IT Project	Immature Social Capitals	Unique Cultural Backgrounds
Process	Heterogeneous Processes among Stakeholders	Lack of Formal PM Practices	Immature Operational Infrastructure	Unique Work Procedures and Practices
Technology	Heterogeneous IT Resources among Stakeholders	Lack of IT Resources	Immature Technological Infrastructure	Unique Technology Requirements
External Environment	Heterogeneous Legal and Political Environments among Stakeholders	Lack of External Supports for Project Continuity	Immature Social Infrastructure	Unique Public or Local Value

Risk Factor 1. Heterogeneous Interests among Stakeholders

This risk factor is about inconsistent and unclear project goals, objectives, and desired outcomes among broader stakeholder groups, such as local versus global, public versus private, government, NGO or commercial, etc. A total of 28 risk incidents (10.9%) were matched with this risk factor (Cambodia=19, Uganda=9). An example is:

- *No setting of clear project goals by the headquarters which viewed projects in Cambodia as experimental*

Risk Factor 2. Lack of Knowledge about Technology and IT Projects

This risk factor is about the lack of knowledge on the technologies used or required as well as other requirements for project implementation. A total of 28 risk incidents (10.9%) were matched with this risk factor (Cambodia=15, Uganda=13). An example is:

- *No plan for operation and maintenance within the organization after system development due to the client's (government) lack of understanding and experience in IT projects*

Risk Factor 3. Immature Social Capitals

This risk factor is about the low levels of social ties, trust, ethical standards, and other general people skills. A total of 3 risk incidents (1.2%) were matched with this risk factor (Cambodia=2, Uganda=1). An example is:

- *Unfamiliarity of agency surcharge for digital service transactions by local users, leading to resistance to adopt the service*

Risk Factor 4. Unique Cultural Backgrounds

This risk factor is about the unique cultures (e.g. unique customs and social behaviors) of local stakeholder groups, such as local government, local users, and local developers. A total of 18 risk incidents (7.0%) were matched with this risk factor (Cambodia=17, Uganda=1). An example is:

- *Lack of understanding of locals' strong collectivism culture by the foreign project manager, e.g. calling members using the titles of family structure based on their positions*

Risk Factor 5. Heterogeneous Processes among Stakeholders

This risk factor is about the inconsistent work processes among broader stakeholder groups, requiring complex coordination among them. A total of 15 risk incidents (5.8%) were matched with this risk factor (Cambodia=4, Uganda=11). An example is:

- *Difficulty in communicating project progress among various stakeholders due to their highly complex communication channels involving multiple positions in the organization's hierarchy, particularly in government projects*

Risk Factor 6. Lack of Formal PM Practices

This risk factor is about the lack of formal or professional PM principles and practices, such as PM best practices (e.g. Project Management Body of Knowledge). A total of 66 risk incidents (25.7%) were matched with this risk factor (Cambodia=29, Uganda=37). Some examples are:

- *Lack of involvement of the project technical team in the planning process, e.g. providing project durations to the team after many commitments had been made between upper level positions*
- *No formal vendor selection processes, but ad hoc or relationship-based selection*

Risk Factor 7. Immature Operational Infrastructure

This risk factor is about the low level of operational efficiency necessary to sustain productivity of a project due to societal immaturity. A total of 11 risk incidents (4.3%) were matched with this risk factor (Cambodia=6, Uganda=5). An example is:

- *Loosing staff (i.e. high turnover rate) due to the absence of effective human resource management practices under highly uncertain project environments (e.g. too frequent changes)*

Risk Factor 8. Unique Work Procedures and Practices

This risk factor is about the unique work procedures and practices common to or required by local stakeholder groups. A total of 18 risk incidents (7.0%) were matched with this risk factor (Cambodia=13, Uganda=5). An example is:

- *Project decisions were handled only by top-level management (especially in government projects)*

Risk Factor 9. Heterogeneous IT Resources among Stakeholders

This risk factor is about the discrepancy in available or required IT resources and standards among broader stakeholder groups. A total of 5 risk incidents (1.9%) were matched with this risk factor (Cambodia=2, Uganda=3). An example is:

- *Different IT maturity levels among stakeholders (i.e. local vendor, foreign headquarters, and government), causing gaps in available IT resources (e.g. running new software of the vendor in old hardware of government)*

Risk Factor 10. Lack of IT Resources

This risk factor is about the limited availability, accessibility, and quality of both tangible (software and hardware) and human IT resources. A total of 23 risk incidents (8.9%) were matched with this risk factor (Cambodia=7, Uganda=16). An example is:

- *High dependence on foreign vendor due to the absence of internal (local) human IT resources and capabilities (e.g. starting the project without a local PM)*

Risk Factor 11. Immature Technological Infrastructure

This risk factor is about the insufficient and unstable technological infrastructure (e.g. network and data infrastructure) required for project support. A total of 11 risk incidents (4.3%) were matched with this risk factor (Cambodia=5, Uganda=6). An example is:

- *Resistance to mobile or online payment mainly due to the low quality of IT infrastructure (e.g. unstable and insecure network connection)*

Risk Factor 12. Unique Technology Requirements

This risk factor is about the unique requirements for IT or Information System (IS) design and implementation of local stakeholder groups. A total of 10 risk incidents (3.9%) were matched with this risk factor (Cambodia=6, Uganda=4). An example is:

- *Unexpected approaches and requirements in using a technology (e.g. mobile phones and apps) by local users (e.g. no use of text-based communications due to the high rate of illiteracy in rural areas)*

Risk Factor 13. Heterogeneous Legal and Political Environments among Stakeholders

This risk factor is about the diverse and complex political determinants and legal or compliance requirements among broader stakeholder groups. A total of 6 risk incidents (2.3%) were matched with this risk factor (Cambodia=1, Uganda=5). An example is:

- *Government's conservative or negative perspective on diffusion of particular technologies (e.g. social networking services due to being used as an avenue for potential public criticism towards government)*

Risk Factor 14. Lack of External Support for Project Continuity

This risk factor is about the limited and unstable funding sources and inability to utilize government resources for IT projects. A total of 7 risk incidents (2.7%) were matched with this risk factor (Cambodia=4, Uganda=3). An example is:

- *High dependency of project continuity on external budget availability (usually from foreign organizations, especially for NGO and e-government projects)*

Risk Factor 15. Immature Social Infrastructure

This risk factor is about the insufficient and underdeveloped social infrastructure, especially for public education and professional trainings. A total of 6 risk incidents (2.3%) were matched with this risk factor (Cambodia=6, Uganda=0). An example is:

- *Lack of educational infrastructure for emerging technologies characterized by existence of only an old-fashioned education system (e.g. no educational program for professional PM practices and certificates)*

Risk Factor 16. Unique Public or Local Value

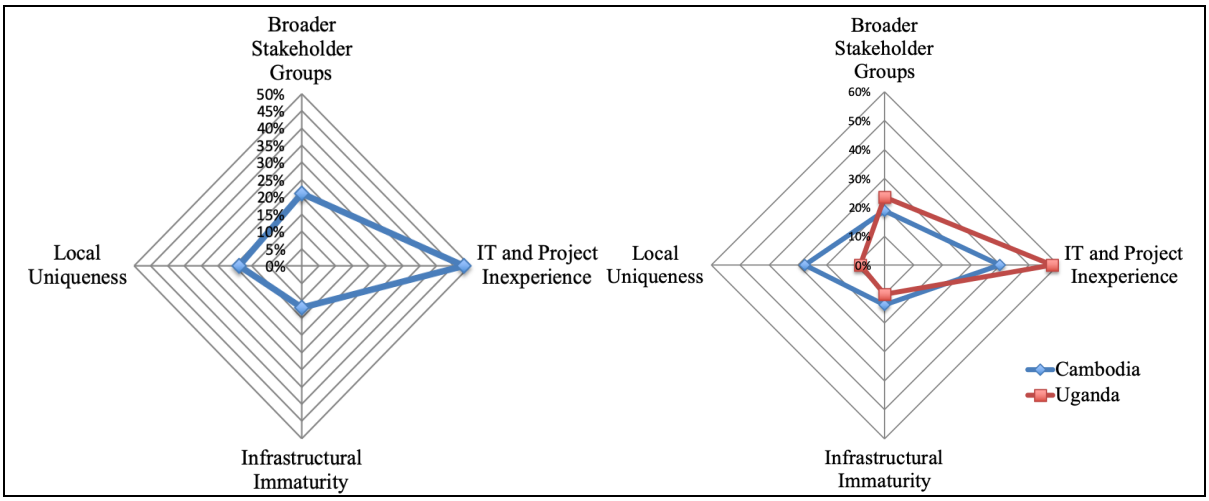
This risk factor is about the unique social and cultural values of local stakeholder groups. A total of 2 risk incidents (0.8%) were matched with this risk factor (Cambodia=2, Uganda=0). An example is:

- *Lack of government's understanding on software value and other local stakeholders' perspective due to the overall low recognition of social value on software*

Understanding IT Project Risks in Developing Economies

Analysis of Developing Economy Characteristics

In order to enhance our understanding of IT project risks in developing economies, we explored the data from various perspectives. First, the coded risk incidents (n=257) were compared in terms of the four characteristics of project management in the selected developing economies as shown in Figure 1.



(a) Overall risk analysis (b) Comparison between Cambodia and Uganda

Figure 1. Risk Analysis for the Project Characteristics

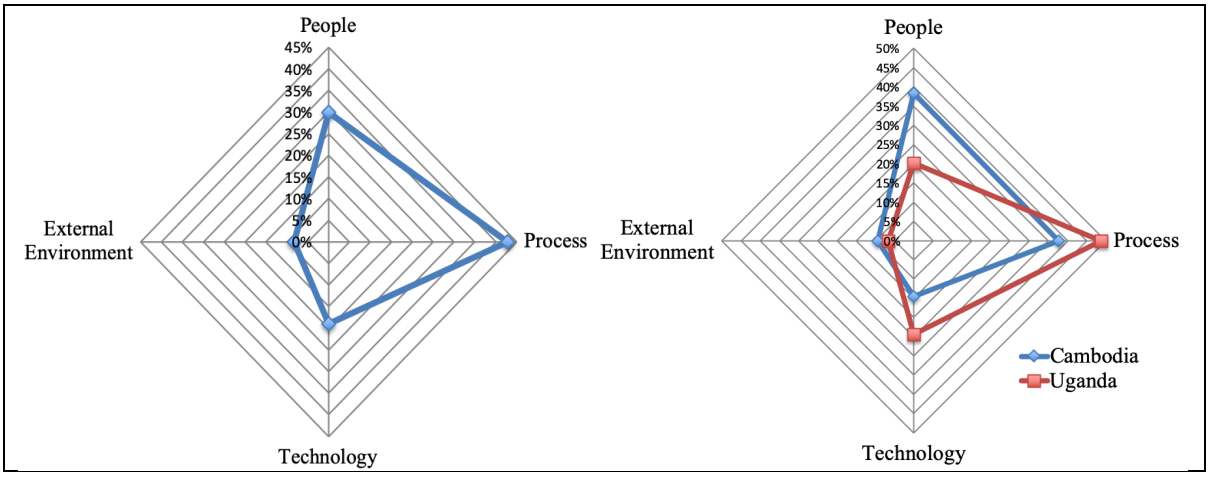
According to Figure 1(a), IT and Project Inexperience is the most frequent risk characteristic (48%) in both economies (n=257) compared to other characteristics, specifically, Broader Stakeholder Groups (21%), Infrastructural Immaturity (12%), and Local Uniqueness (19%). With the segregated data sets for the two economies, interestingly, Figure 1(b) also shows similar results to those in Figure 1(a). The project risks corresponding to IT and Project Inexperience are higher in Uganda (58%) compared to Cambodia (40%). On the contrary, the project risks associated with Local Uniqueness are higher in Cambodia (28%) compared to Uganda (8%). These results indicate that IT projects in Uganda suffer more from their lack of experience in IT projects in general than in Cambodia.

On the other hand, Cambodia is more influenced by their regional uniqueness, such as culture and political requirements, than Uganda. Based on the Broader Stakeholder Groups, there is a variance between the two economies (Uganda 24% and Cambodia 19%). According to our interview results,

Uganda tends to involve more foreign broader stakeholder groups, such as neighboring countries in addition to other foreign vendors and budget providers. On the other hand, such collaborations with neighboring countries are unusual in Cambodia. Thus, more conflicts and complexity could be found in IT projects in Uganda. In line with this, less cultural conflicts could be expected in the Uganda context among stakeholders from neighboring countries that share a certain level of cultural and social similarities. On the other hand, Cambodia is known to have strong cultural and unique historical backgrounds (e.g. a long history of Khmer Empire, French colonization, Khmer Rough regime, etc.) (Wikipedia 2019), which might generate comparatively more unique social and behavioral patterns. All in all, understanding these variations will be instrumental to project managers and sponsors who are initiating IT projects in these economies.

Analysis of Project Elements

We also analyzed the data in terms of the four key project elements as shown in Figure 2.



(a) Overall risk analysis (b) Comparison between Cambodia and Uganda

Figure 2. Risk Analysis for the Key Elements of IT Projects

Figure 2(a) shows that among the four project elements, the predominant source of project risks is defined by issues of Process (43%) in general (n=257), compared to other elements specifically (People 30%, Technology 19%, and External Environment 8%). However, segregated analyses in Figure 2(b) indicate that for IT projects in the Cambodia context, both the People and Process elements are the biggest sources of project risks (38% for each). As a result, the project risks regarding the People element are higher in Cambodia (38%) compared to Uganda (20%). In line with prior findings about the higher Local Uniqueness characteristic in the Cambodia context, this finding indicates that IT projects in Cambodia may confront more risks in the relationships among stakeholders mainly due to their different cultural and social uniqueness. For example, an interviewee who was involved in multiple NGO projects in Cambodia reported a serious conflict between local project members and a foreign project manager mainly due to the foreign project manager's misunderstanding of local cultures, such as a strong collectivistic and family-oriented relationships not only for personal but also for official ones (e.g. calling top management or project manager as uncle). This misunderstanding or lack of understanding of local cultures causes subsequent risk factors in other areas, such as lack of sharing of project goals, poor communications, loss of trust, etc.

On the other hand, the data for the Uganda context reveals that both the Process (49%) and Technology elements (24%) are the predominant sources of project risks than in Cambodia (Process 38% and Technology 14%). These findings indicate that the IT projects in Uganda face more risks relating to project management processes and technology-related concerns (e.g. comparability and IT resource availability) compared to Cambodia. For example, several interviewees reported a lack of formal project management practices. Particularly, project requirements were not properly assessed. In two

instances, an interviewee mentioned that it was not clear if the project was needed in the first place. In other cases, the feasibility of the project was not conducted which minimized evaluation of the critical project elements, such as the availability of the right technology resources (e.g. software, hardware, network infrastructure, etc.) required to support the project. The lack of a feasibility assessment resulted into derailing of the project to try address the gaps, which inherently led to unexpected project changes simply to fit the project into the available resources. Overall, this project inexperience subsequently caused other risk factors in the areas of acquiring project resources, prioritizing of project tasks, or involving the key project parties.

All in all, these findings help us better understand the risk factors in IT projects in developing economies and their underlying causes, which will be useful for developing appropriate risk mitigation strategies.

Discussion and Conclusion

With rapid advancement in technologies and large opportunities of development in developing economies, more and more IT projects are initiated in the contexts of developing economies. Global aid agencies, such as United States Agency for International Development (USAID), World Bank, United Nations Development Programme (UNDP), and United Nations Children's Fund (UNICEF), have already paid attention to information and communication technologies for development (ICT4D) projects to address developing countries' economic and social problems. Through these IT projects, many new technologies have been introduced as a means to gain a competitive advantage of developing economies. Many project organizations, however, are not adequately prepared to face unique challenges and project risks in those complex and unique environments. Regardless of its significance and urgency, IT project risk management in developing economies has largely been ignored in the literature. Thus, our understanding of the risk factors in IT projects in developing economies and their sources is very limited and largely untapped.

Through this study, we aimed to propose a theoretical framework for identifying unique risk factors in IT projects in developing economies. For this, we conceptualized four characteristics of projects in developing economies through a literature review in the relevant areas. The characteristics include broader stakeholder groups, technology and project inexperience, infrastructural immaturity, and local uniqueness. We applied these characteristics to the four elements of IT projects (i.e. people, process, technology, and external environment) to form our framework.

Following a retroductive approach (Ragin 1994; Van Maanen et al. 2007), we then collected data from two specific contexts of developing economies, Cambodia in South East Asia and Uganda in East Africa, using a series of expert interviews of 17 project cases. The interview outcomes were successfully coded into a total of 257 risk incidents by two independent coders. The coded risk incidents were then matched with the proposed framework through multiple rounds. As an outcome of this process, we conceptualized 16 risk factors from the two developing economy contexts. Lastly, in order to achieve further insight into IT project risks in developing economies, we analyzed the risk incidents from the perspective of the project characteristics in developing economies, the IT project elements, and the comparison between Cambodia and Uganda. Findings resulted into the development of several implications considering their unique social, cultural, and historical backgrounds.

Contributions

The proposed framework and the findings through this study will be useful for both academics and project practitioners who are or will be involved in IT projects in developing economies. First, both the proposed framework and the retroductive approach adopted in this study provide theoretical insight into risk identification for IT projects in developing economies. The proposed framework in this study is an early attempt to provide a theoretical perspective in identifying and understanding potential IT project risks in developing economies by considering the unique characteristics of developing economies. Furthermore, the research approach adopted in this study, which is characterized as an iterative dialogue between ideas and evidence (Ragin 1994; Van Maanen et al. 2007), results in successful conceptualization of context-specific identification of specific risk factors. When considering the inability to generalize risk factors to all developing economies due to the unique social, political, and

cultural backgrounds of each developing economy, we believe our context-specific approach is more accurate and useful. Therefore, by applying the proposed framework and the same procedure for identifying project risks in other developing economies, the body of knowledge in IT project risks in developing economies will grow in the relevant literature. In line with this, the importance of deeper understanding of the history, cultures, customs, and economics through cross-disciplinary studies needs to be highlighted.

Second, the outcomes of this study (i.e. the coded risk incidents and the matching results between the framework and the risk incidents) provide practical insight to better understand the IT projects and their challenges in the two developing economies. According to our findings, the biggest sources of project risks in the two economies are inexperience in technology and IT projects and the lack of standardized or professional PM practices. Many projects in developing economies are mainly dependent on the availability of project budgets, without a proper process of project feasibility studies. Our findings clearly point out the significance of setting up formal PM processes in early stages of project initiation in developing economy contexts. Our findings also show that the cultural factors largely influence the IT projects in developing economies. By ignoring or misunderstanding the uniqueness of local culture and social value systems, the IT projects are likely to fail. In line with this, it should be noted that our identified risk incidents will provide useful insights to deal with such local uniqueness. More so, our comparisons between Cambodia and Uganda cases provide additional insights about how unique contexts of each economy shape the risk factors. To achieve better outcomes, project managers should understand these unique aspects of their projects.

Limitations and Future Research Directions

This study is an early attempt to understand the practical implications of IT project risks, particularly in two specific developing economies and thus has limitations in its findings. In the future, we aim to extend this study to other developing economies in order to gain sufficient insight that can be potentially applicable to more generalizable contexts of developing economies. In addition, this study adopted a qualitative approach in coding and understanding IT project risks from the interview results. This approach may have its own weaknesses (e.g. subjective results), although a rigorous process suggested by the relevant literature was applied. To augment our current findings and gain more objective insight, the study can adopt alternative approaches, such as text mining with more systematic coding procedures (Yu et al. 2011) to detect patterns or themes in project risks. Other methods, such as the Delphi technique (Keil et al. 2002; Schmidt et al. 2001), can be utilized to extend the current study. This technique is known to be useful to develop a better understanding of the importance of each of the identified risk factors as well as to determine the likelihood or project outcomes associated with identified risks. In the future, we will also extend the current framework by modeling the different levels of significance or impact of risk factors on project outcomes. Furthermore, the framework will be extended by defining mitigation strategies along the dimensions of project elements and/or project characteristics.

References

Abbasi, G., and Al-Mharmah, H. 2000. "Project Management Practice by the Public Sector in a Developing Country," *International Journal of Project Management* (18:2), pp. 105-109.

Adeoye, O. A. and Islam, S. M. N. 2019. “Comparing Public-Private Partnership Infrastructure Financing Approach in a Developing and Developed Economy,” *International Journal of Business and Economics* (4:1), pp. 33-57.

Avots, I. 1972. "Projects in Developing Countries," *Business Horizons* (15:4), pp. 69-73.

Aycan, Z. 2004, "Leadership and Teamwork in the Developing Country Context," in: *The Blackwell Handbook of Global Management: A Guide to Managing Complexity,* H. W. Lane, M. Maznevski, M. E. Mendenhall and J. McNett (eds.), John Wiley & Sons, pp. 406-423.

Barkley, B. 2004. *Project Risk Management* McGraw-Hill Professional, New York, NY.

Bensaou, M., and Venkatraman, N. 1995. "Configurations of Interorganizational Relationships: A Comparison Between U.S. and Japanese Automakers," *Management Science* (41:9), pp. 1471-1492.

Chang, Y., Kim, H., Wong, S. F., and Park, M.-C. 2015, "A Comparison of the Digital Divide Across Three Countries with Different Development Indices," *Journal of Global Information Management* (23:4), pp. 55-76.

Dada, D. 2006. "The Failure of E-government in Developing Countries: A Literature Review," *The Electronic Journal of Information Systems in Developing Countries* (26:7), pp. 1-10.

Dewan, S., and Riggins, F. L. 2005. "The Digital Divide: Current and Future Research Directions," *Journal of the Association for Information Systems* (6:12), pp. 298-337.

Flick, U. 2009. *An Introduction to Qualitative Research*, (Fourth ed.) Sage, London.

Heeks, R. 2002. "Information Systems and Developing Countries: Failure, Success, and Local Improvisations," *The Information Society* (18:3), pp. 101-112.

Heeks, R. 2010. "Emerging Markets Development 2.0: The IT-Enabled Transformation of International Development," *Communications of the ACM* (53:4), pp. 22-24.

Hofstede, G., and Bond, M. H. 1988. "The Confucius Connection: From Cultural Roots to Economic Growth," *Organizational Dynamics* (16:4), pp. 5-21.

IMF 2019. "World Economic Outlook, Database—WEO Groups and Aggregates Information, October 2018," from https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/groups.htm. accessed at 24 Apr. 2019.

James, M. J. 2002. "Low-cost Information Technology in Developing Countries: Current Opportunities and Emerging Possibilities," *Habitat International* (26), pp. 21-31.

Kapurubandara, M., and Lawson, R. 2006. "Barriers to Adopting ICT and e-Commerce with SMEs in Developing Countries: An Exploratory Study in Sri Lanka," in: *CollECTeR*, Adelaide, Australia.

Keil, M., Tiwana, A., and Bush, A. 2002. "Reconciling User and Project Manager Perceptions of IT Project Risk: A Delphi Study," *Information Systems Journal* (12:2), pp. 103-119.

Krishna, S., Sahay, S., and Walsham, G. 2004. "Managing Cross-Cultural Issues in Global Software Outsourcing " *Communications of the ACM* (47:4), pp. 62-66.

Lee, O.-K. D., and Baby, D. V. 2013. "Managing Dynamic Risks in Global Projects: Agile Risk-Management Using the Principles of Service-Oriented Architecture," *International Journal of Information Technology and Decision Making* (12:6), pp. 1121-1150.

Leliveld, A. 2008. "Growth Accelerations in Developing Countries: Uganda and Cambodia Compared," *Working Paper for the Tracking Development Project*, downloaded from http://www.institutions-africa.org.

Lyytinen, K., Mathiassen, L., and Ropponen, J. 1998. "Attention Shaping and Software Risk – A Categorical Analysis of Four Classical Risk Management Approaches," *Information Systems Research* (9:3), pp. 233-255.

Miles, M. B., and Huberman, A. M. 1994. *Qualitative Data Analysis: An Expanded Sourcebook* (2nd ed.), Sage Publication, Beverly Hills.

Moertini, V. S. 2012. "Managing Risks at the Project Initiation Stage of Large IS Development for HEI: A Case Study in Indonesia," *The Electronic Journal of Information Systems in Developing Countries* (51:7), pp. 1-23.

Muriithi, N., and Crawford, L. 2003. "Approaches to Project Management in Africa: Implications for International Development Projects," *The Journal of Project Management* (21:5), pp. 309-319.

Muscatello, J. R., and Parente, D. H. 2006. "Enterprise Resource Planning (ERP): A Post-Implementation Cross-Case Analysis," *Information Resources Management Journal* (19:3), pp. 61-80.

Ndou, V. D. 2004. "E-Government for Developing Countries: Opportunities and Challenges.," *The Electronic Journal of Information Systems in Developing Countries* (18:1), pp. 1-24.

Nguyen, M. 2007. "The Challenges of Transferring Modern Project Management Principles and Methodologies to Developing Countries," in: *2007 PMI Global Congress* Hong Kong.

Olawumi, T. O. and Chan, D. W. M. 2019. "Development of a Benchmarking Model for BIM Implementation in Developing Countries," *Benchmarking: An International Journal* (26:4), pp.1210-1232.

Persson, J. S., Mathiassen, L., Boeg, J., Madsen, T. S., and Steinson, F. 2009. "Managing Risks in Distributed Software Projects: An Integrative Framework," *IEEE Transactions on Engineering Management* (56:3), pp. 508-532.

Ragin, C. C. 1994. *Constructing Social Research: The Unity and Diversity of Method*, Pine Forge Press, Thousand Oaks, CA.

Rasmy, M., Tharwat, A., and Ashraf, S. 2005. "Enterprise Resource Planning (ERP) Implementation in the Egyptian Organizational Context," in: *European Mediterranean Conference on Information Systems*, Cairo, Egypt.

Saad, M., Cicmil, S., and Greenwood, M. 2002. "Technology Transfer Projects in Developing Countries—Furthering the Project Management Perspectives," *International Journal of Project Management* (20:8), pp. 617-625.

Sabherwal, R. 1999. "The Role of Trust in Outsourced IS Development Projects," *Communications of the ACM* (42:2), pp. 80-86.

Schmidt, R., Lyytinen, K., Keil, M., and Cule, P. 2001. "Identifying Software Project Risks: An International Delphi Study," *Journal of Management Information Systems* (17:4), pp. 5-36.

Sila, I. 2019. "Antecedents of Electronic Commerce in Developing Economies," *Journal of Global Information Management* (27:1), pp. 777-780.

Strauss, A. L, 1987. *Qualitative Analysis for Social Scientists* Cambridge University Press, New York, NY.

Taylor, B. 2013. "Let's Make a Success of Failures," AfricanBarins: Innovation for Education, from https://africanbrains.net/2013/08/07/lets-make-a-success-of-failures/

United Nations. 2014. "E-Government for the Future We Want," Economic & Social Affairs, from https://publicadministration.un.org/egovkb/en-us/reports/un-e-government-survey-2014

Van Maanen, J., Sorensen, J. B., and Mitchell, T. R. 2007. "The Interplay between Theory and Method," *Academy of Management Review* (32:4), pp. 1145-1154.

Walton, M., and Heeks, R. 2011. "Can a Process Approach Improve ICT4D Project Success." *Manchester Centre for Development Informatics Working Paper Series* (47), pp.1-33.

Wang, E. T. G., Lin, C. C.-L., Jiang, J. J., and Klein, G. 2007. "Improving Enterprise Resource Planning (ERP) Fit to Organizational Process through Knowledge Transfer," *International Journal of Information Management* (27:3), pp. 200-212.

Wikipedia 2019. "Cambodia," from https://en.wikipedia.org/wiki/Cambodia, accessed at Feb. 2019.

World Bank. 2014. "World Development Report: Risks and Opportunities," The World Bank.

Yanwan, W. 2012. "The Study on Complex Project Management in Developing Countries," *Physics Procedia* (25), pp. 1547-1552.

Yu, C. H., Jannasch-Pennell, A., and DiGangi, S. 2011. "Compatibility between Text Mining and Qualitative Research in the Perspectives of Grounded Theory, Content Analysis, and Reliability," *The Qualitative Report* (16:3), pp. 730-744.