IDENTIFYING RISKS IN IT PROJECTS FOR DEVELOPING ECONOMIES

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Abstract

The emergence of information technology (IT) projects for developing economies is becoming a trend, as developing economies are striving to achieve modernization and industrialization. The IT project environment in developing economies is complex and susceptible to the economies' unique social, cultural, political, and financial contexts. This study proposes a framework for identifying the risks involved in IT projects for developing economies. For this, the study identifies unique characteristics of project management in the context of developing economies, which involve a broader stakeholder group, lack of precedence, infrastructural limitations, and cultural uniqueness. The study discusses how these characteristics shape project risk factors in terms of both internal (people, process, and technology) and environmental (legal and natural) elements of an IT project.

Keywords: IT Projects, Developing Economies, Project Risks

1 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). This is mainly because they do not have a sufficient understanding of the unique contexts involved in their project environment (Heeks 2002; Heeks 2010; Muriithi & Crawford 2003). Developing economies are generally classified as such based on their poor economic performance, high poverty level, high corruption rate, lack of critical infrastructures, and high inequality of wealth and access to quality education (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.

The complexity and uniqueness of IT projects is an important area to investigate when considering their high failure rate in developing economies (Heeks 2010; Muriithi & Crawford 2003). Researchers have identified several factors leading to such failures, which include immaturity of project management practices, social and political inefficiency, cultural diversity, and financial weakness (e.g., Abbasi & Al-Mharmah 2000; Heeks 2002; Muscatello & Parente 2006; Rasmy et al. 2005; Walton & Heeks 2011; Wang et al. 2007). In developing economies where project funding is limited and resources are scarce, however, project teams typically cannot afford to spend much time and resources on detailed project planning, especially for project risk management (Nguyen 2007). Risk identification is not seen to be an important management priority in IT projects for developing economies. Therefore, the unique risk areas in IT projects for developing economies have not been clearly identified, and thus their appropriate management for project success remains ill-understood.

This study aims to identify risks in IT projects for developing economies. Through this study, we attempt to answer the following key research questions: (1) What are the unique characteristics of developing economies that affect IT projects? and (2) How do these characteristics shape project risks and generate a unique set of IT project risks in the context of developing economies?

To address these questions, we propose a framework that investigates the effects of the unique characteristics of project management in the context of developing economies (i.e., broader stakeholder groups, lack of precedence, infrastructural limitations, and cultural uniqueness) on key elements of IT projects (i.e., people, process, technology, and environment).

The next section describes 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 for developing economies involve partnership with foreign project teams or sponsors (Saad et al. 2002). Based on these conceptual foundations, we develop a framework for identifying the risks in IT projects for developing economies in the following section. In the conclusion, we discuss the potential contributions, implications, and future directions of this study.

2 LITERATURE REVIEW

2.1 IT Project Risks in a Global Setting

Risks are generally understood as uncertainties that seep into a project and deviate from the expected outcome (Barkley 2004). In particular, a software risk denotes an aspect of a development task, process, or environment. When ignored, it increases the likelihood of project failure (Lyytinen et al. 1998). Thus, project risk management has been considered to be at the top of software project managers' agendas. In the literature, some commonly addressed risk factors in software projects include lack of top management commitment, lack of project management skills, and failure to gain user commitment (e.g., Schmidt et al. 2001).

Researchers also have identified more complex risks in a global setting. Persson et al. (2009) suggest eight critical risk areas that require the attention of project managers of global IT projects: task distribution, knowledge management, geographical distribution, collaboration structure, cultural

distribution, stakeholder relations, communication infrastructure, and technology setup. In particular, they highlight multiplicity factors in global IT projects, such as different cultures, processes, and technology adoptions of distributed groups. They suggest that to manage these multiplicity factors properly, project managers should understand the various aspects of the distributed project environment, as well as the local environment in which the projects are operating. Similarly, Schmidt et al. (2001) highlight the significant influence of cultural factors pertaining to global IT projects. Project members from high uncertainty-avoidance countries (e.g., Hong Kong), for example, may have conflicts with other members from low uncertainty-avoidance countries who are more risk seeking (e.g., the United States or European countries such as Finland).

Project risks caused by such multiplicity factors are likely to become more dynamic as a project progresses from one phase to next by involving additional multiplicity factors, such as multiple groups of people, different set of processes, incompatible technologies, and unexpected environmental requirements (Lee & Baby 2013). While these risks are also applicable to IT projects for developing economies due to their global setting, their risks in developing economies would be more complex due to the unique context.

2.2   Characteristics of Developing Economies

In the literature, researchers discuss multiple characteristics of developing economies. First, IT projects for developing economies typically have *a broader stakeholder group*. In particular, they often have great public visibility and government involvement (Abbasi & Al-Mharmah 2000; Avots 1972; Muriithi & Crawford 2003). In IT projects for developing economies, the government usually plays a critical role in the project's sustainability by exerting its power over the groups involved in completing the project. In addition to these key stakeholders, projects within developing economies have other prime interest groups, such as local and foreign organizations, such as nongovernmental organizations (NGO), private or public sectors, financial institutions, media, and various international communities. This diverse setting of project stakeholder groups generates new types of challenges for projects in developing economies.

Second, IT projects for developing economies are often unprecedented in terms of project scope, requirements, and technologies involved, thus requiring new approaches (Avots 1972; Yanwan 2012). New technologies for projects are frequently unmatched with the existing technological infrastructure and human resources. Hence, this unprecedented dimension, i.e., *lack of precedence*, refers to the state of newness of projects in developing economies.

Third, a shortage of up-to-date infrastructures and an ability to maintain them remain major challenges in developing economies (Avots 1972; Ndou 2004). This *infrastructural-limitations* dimension refers to the limitations of social and technology infrastructures that are required to support the operations of IT projects for developing economies. These infrastructures, involving public education, transportations, electricity and water supply, and telecommunications, support a society's daily functions. Services provided by these infrastructures are particularly crucial for IT projects. A large percentage of populations in developing economies are still out of reach from these infrastructures, which include such technological infrastructures as secure web servers, data centers, and broadband Internet connections (Kapurubandara & Lawson 2006; Moertini 2012; Ndou 2004).

Last, each developing economy has its own *cultural uniqueness*. 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 (e.g., Hofstede & Bond 1988). Muriithi and Crawford (2003), for example, argue that developing economies generally show a higher power distance, meaning that project team members are likely to accept an unequal distribution of power and authority within their team. They also argue that developing economies demonstrate more uncertainty-avoidance behavior, which is characterized by low risk-taking behaviors and strong emotional resistance to change.

3   FRAMEWORK DEVELOPMENT

By connecting the project elements (i.e., people, process, technology, and environmental) with the four unique characteristics of development economies, we identify unique risk factors in the IT projects for developing economies. Table 1 shows our framework for identifying the risk factors.

Project Elements / Characteristics of Developing Economies	Broader Stakeholder Group	Lack of Precedence	Infrastructural Limitations	Cultural Uniqueness
People	Lack of Trust among Stakeholders	Lack of a Teamwork Concept	Communication Barriers	Different Social and Behavioral Norms
Process	Lack of Interoperability of Organizational Structures and Processes	Lack of Formal Project Management Practices	Low Operational Efficiency	Different Perceptions of Project Positions and Roles
Technology	Heterogeneous or Lack of Technology Strategies	Un-readiness to New Technologies	Lack of Technological Infrastructure	Ignorance of Unique Local Requirements
Environmental	Unconducive Legal Environments	Unprepared Legal and Government Supports	Lack of Project Continuity	Immaturity of Intellectual Property

Table 1. Framework for identifying global IT project risks in developing economies.

3.1   People Risks in IT Projects for Developing Economies

The people element of an IT project refers to all participating teams and their members at various locations and positions (Lee & Baby 2013).

3.1.1   Lack of Trust among Stakeholders

The multiple stakeholders in IT projects for developing economies have diverse interests, depending on their positions and how they expect to benefit from the project. This diversity can introduce various tensions and conflicts among the public, government, local project team, and foreign teams at different stages of the project. Posan (1993), for example, identifies the government's strict control over information services, as a critical concern that hinders a collaborative environment among the various stakeholders. Governmental restrictions for online communications can hamper innovation and creativity by depriving project teams of their access to helpful sources of information and knowledge, including government data. This lack of information and knowledge access can create an environment of distrust among stakeholders. Trust requires transparency, information flow, and access to important information. Yet, high corruption rates in many developing economies prevent transparency and reliable information flow, thus developing distrust among the various stakeholders. These conditions are detrimental to IT projects, because they increase the cost and time required to access requisite information and thus make it more difficult for collaboration partners to reach agreements (Nguyen 2007).

3.1.2   Lack of a Teamwork Concept

When implementing an unprecedented IT project for developing economies, local project team members may not fully understand the project's strategic importance or long-term benefits. Instead, team members tend to focus on their short-term rewards or career ambitions (Nguyen 2007). In such project environments, members with diverse skillsets, cultural backgrounds, languages, ethnic affiliations, and socio-economic status cannot share a strong teamwork. The lack of a teamwork concept among the project members generates complex issues in team collaborations and communications, often leading to failures in global IT projects (Aycan 2004; Lee & Baby 2013).

3.1.3 Communication Barriers

Communication barriers consist of two elements: language barriers and limited communication media. In developing economies, language barriers become a more serious issue when they involve diverse groups and rural areas where local education is underdeveloped. Many developing economies feature a variety of local languages and dialects. Local residents may not be proficient in a common language or in international languages, such as English. These problems can cause serious issues in project communications (Lee & Baby 2013). In local areas, moreover, Internet-based communications, such as e-mail, messenger, and video conferencing, are frequently limited due to technical and language barriers (Moertini 2012; Ndou 2004). Many times, for example, local computer languages are neither available nor interoperable among various platforms, because the efforts for localizing computer languages usually focus on the primary local languages and ignore others.

3.1.4 Different Social and Behavioral Norms

Differences in social and behavioral norms between project members and stakeholders, such as managers vs. members or foreign vs. local, present serious risks affecting team dynamics and a project's human resource management. The different cultural backgrounds between local and foreign members can cause conflicts of interest between them, which negatively affect how the members work together. In high power-distance societies, for example, lower-level staff members are often unwilling to make decisions without referring to their superiors (Muriithi & Crawford 2003) and top management has the ultimate power in decision making. Many developing economies have these cultural characteristics. As a cultural norm, managers and senior staff members expect respect and loyalty from their subordinates (Aycan 2004). In addition, managers in developing economies typically exhibit a paternalistic leadership style, becoming involved in their subordinates' personal and professional lives. This leadership style, however, is not widely accepted by members from western societies, who value autonomy, self-reliance, and self-determination (Aycan 2004).

3.2 Process Risks in IT Projects for Developing Economies

The process element refers to the operational and strategic dimensions of project management, such as procedures, policies, methodologies, and strategic plans (Lee & Baby 2013).

3.2.1 Lack of Interoperability of Organizational Structures and Processes

In developing economies, organizational structures and business processes are unlikely to be standardized. Interoperability issues arise when project teams must collaborate with multiple groups having different organizational structures and work processes. The approval process and change management process for project scope, for example, can be very different among the participating groups. As a result, projects can be easily delayed. Government organizations in developing economies are typically hierarchical and predominantly organized in a functional structure, whereas many NGO projects are run in a flat structure. Such different organizational structures among project groups can lead to indecisiveness in decision-making processes, resulting in delay and inefficiency.

3.2.2 Lack of Formal Project Management Practices

Top management or project leaders in developing economies are frequently unaware of formal project management practices, such as PMBOK and PRINCE2 (Abbasi & Al-Mharmah 2000; Yanwan 2012). This problem often results in overlooking important elements of a project, such as quality assurance and change management. It can also lead to inefficient project organizations having extra layers of administration and unclear lines of authority, responsibility, and accountability (Nguyen 2007). In particular, changes are difficult to manage in IT projects for developing economies due to the lack of formal project management practices while political and cultural conflicts are dominant. The absence of formal project management practices also means that project managers cannot utilize tools that are useful for efficient and effective project management.

3.2.3   Low Operational Efficiency

Due to limited social and industrial infrastructures like roads, bridges, railroads, and airlines, projects for developing economies can suffer from low mobility among their participating groups and members. This limitation seriously constrains flexibility in using project resources, particularly personnel, and thus projects can experience unexpected time and cost increase during their implementations. Apart from this, the limited technological infrastructure in developing economies also generates a major operational inefficiency in IT projects. For instance, slow and unreliable Internet connections and inadequate and costly power supplies are common problems in many developing economies. These limitations can affect several major components of project management, including scope, time, cost, quality, HR, and communication management.

3.2.4   Different Perceptions of Project Positions and Roles

In high power-distance societies (like many developing economies), a person's position is a symbol of power and influence (Hofstede & Bond 1988). People with authority and power (either local or foreign) are central points for conflict resolution and decision making. In such societies, solving internal conflicts among project team members highly depends on their hierarchical position. Due to their diverse cultural backgrounds, however, project participants have different perceptions of their positions and roles. As a result, conflicts frequently remain unresolved and dramatically impact the team dynamics and working relationships among the team members.

3.3   Technology Risks in IT Projects for Developing Economies

The technology element refers to such technological means as services, development, infrastructure, and platforms that support the people and process elements in an IT project (Lee & Baby 2013).

3.3.1   Heterogeneous or Lack of Technology Strategies

Diverse project partners in IT projects for developing economies may operate with different IT strategies, which make it difficult for partners to collaborate and work effectively on a joint project. The risk of utilizing multiple development platforms and technology infrastructures have been discussed as being critical and dynamic (Lee & Baby 2013). This risk is more serious and intense in projects for developing economies due to the dynamics of broader stakeholder groups, which lead to disagreements about technology road maps to use and how to implement them. In many cases, project participants from government entities may not have clear technology strategies. Therefore, foreign project sponsors or other interest groups can easily influence new technology adoption without proper project planning or consideration of specific contexts or constraints (Heeks 2010; Ndou 2004).

3.3.2   Un-readiness to New Technologies

The introduction of new technologies into IT projects for developing economies not only opens up new opportunities but also may require unexpected time and effort to improve existing technologies and train project participants. In a new IT project, project members from developing economies usually experience a larger learning curve due to their lack of experience and the limited infrastructure available to support new technologies. Moreover, new technologies introduce new security and financial risks, which local project teams are not ready for and cannot anticipate. Knowledge transfer from foreign participants is usually limited due to various social (e.g., language barriers) and structural issues (e.g., lack of knowledge management practices and tools) (Lee & Baby 2013).

3.3.3   Lack of Technological Infrastructure

In developing economies, the IT infrastructure (e.g., broadband Internet, mobile services, data access, computing support, etc.) is very limited and unequally developed (Kapurubandara & Lawson 2006; Moertini 2012; Ndou 2004). Government and private sectors are unwilling to invest their capital in building IT infrastructure to support rural areas, because the cost exceeds the benefits (Ndou 2004). The resources to build IT infrastructure, including hardware, software, and experienced engineers, are

scarce in developing economies. These limitations constrain technology options available for the project. A slow Internet connection, for example, may impose longer latency on data transfer, teleconferences, and project collaboration. The lack of industry-level IT supports will also be likely to generate unexpected problems during the project.

3.3.4 Ignorance of Unique Local Requirements

Each society has unique values and beliefs that its citizens uphold (Hofstede & Bond 1988) and that IT projects must take into consideration. Ignoring these locally imbedded cultural norms will lead local stakeholders to resist the project or be ignorant of the project outcomes (Muriithi & Crawford 2003). When this occurs in the beginning stages of a project, it can delay and change of scope in the middle of the project, or even terminate the project early.

3.4 Environmental Risks in IT Projects for Developing Economies

The environmental element refers to a project's external environments, such as legal and natural, which are frequently beyond project team's control, thus generating serious uncertainties (Lee & Baby 2013).

3.4.1 Unconducive Legal Environments

Regulations play an extremely important role in governing projects in developing economies. They have a strong power to influence the three internal elements of a project (i.e., people, process, and technology). In many developing economies, the legal environment is unfavorable because legal processes are complicated and slow. According to World Bank (2014), many developing economies rank amongst the lowest in the "Ease of Doing Business" index, which measures the conduciveness of a regulatory environment. Political instability and a high corruption rate also contribute to such unfavorable project environments.

3.4.2 Unprepared Legal and Government Supports

Given the early stages of IT penetration in developing economies, laws governing high-tech products and services are loosely defined and ineffective in protecting the interests of project organizations. This lack of legal or governmental support can generate serious obstacles, especially for projects implementing new technologies. For example, in some developing economies, such as Haiti and Afghanistan, regulations state that money transfer services via mobile phones can be operated only by a bank and not by mobile network operators (TechChange 2014). This is a major hurdle for a mobile money project, because services through banks incur higher costs that are not appealing to end-users in those regions.

3.4.3 Lack of Project Continuity

While many developing economies remain vulnerable to natural disasters, they lack comprehensive disaster management, such as enforced building codes and installation of early warning systems (World Bank 2014). Project continuity is threatened by the lack of proper disaster recovery and business continuity plans (Lee & Baby 2013). Many local IT organizations pay little attention to disaster recovery due to its high cost and their lack of experience. Although disaster recovery systems are beneficial in the long term, the government and private sectors are often reluctant to invest in them because of the initial high cost. In addition to natural disasters, man-made disasters, such as internal frauds and terrorist attacks, potentially threaten project continuity in developing economies.

3.4.4 Immaturity of Intellectual Property

Regulations governing intellectual property are still immature in many developing economies (Weerawarana & Weeratunge 2004). The lack of strategy and slow adoption of new technologies within governments is one reason why many developing economies are unable to catch up with IT trends and establish proper measures and guidelines for the ethical and safe use of information

technologies. As a result, IT projects for developing economies frequently face difficulties in their efforts to distribute outcomes properly.

4   DISCUSSION AND CONCLUSION

With rapid advancement in technologies and fast-growing economies, more IT projects are expected to emerge for developing economies. Global aid agencies, such as USAID and World Bank, have already paid attention to information and communication technologies for development (ICT4D) projects to address developing countries' economic problems. In addition, many IT projects have begun to introduce new technologies as a means to gain a competitive advantage in developing economies. Many project organizations, however, are not adequately prepared to face the challenges in those complex and unique environments. Sources of risk stated in the literature are limited to the context of developed economies, while risk management in IT projects for developing economies remains largely unexplored. .

In light of this problem, this study provides a preliminary framework that may be useful for analyzing unique risk factors in IT projects for developing economies. For this, we apply the proposed framework of four characteristics of developing economies (i.e., broader stakeholder groups, lack of precedence, infrastructural limitations, and cultural uniqueness) to the four elements of IT projects (i.e., people, process, technology, and environmental).

The proposed framework will be useful for both researchers and project practitioners in developing economies. First, our framework provides new insight into risk identification for IT projects for developing economies, which is a significant, yet unexplored research area. In particular, our framework serves as a base for future research in this area by providing a way to characterize the uniqueness of developing economies. Second, our framework serves as a guide for project practitioners, guiding them to consider all of the different aspects of project environments in which they are operating and to carefully examine the multiplicities involved in their projects in order to conduct effective risk management plans. The unique characteristics of developing economies are often overlooked in managing IT projects and thus play a critical role in project failure. Our risk identification framework can serve as a preliminary guidance to save time and effort when conducting IT projects for developing economies.

This research (as a research-in-progress) is in a preliminary stage and has several limitations that should be overcome through on-going research. First, we may not identify enough unique characteristics of developing economies, particularly for the cultural uniqueness dimension. This dimension underscores the unique behavioral patterns of people in developing economies. To better understand the cultural uniqueness of a specific developing economy (e.g., a country or a specific region), one should develop a deeper understanding of its history, cultures, customs, and economics through cross-disciplinary studies. In line with this, the framework can be further specified for each of the different developing economies, such as Middle East, Africa, Asia, and South America. While developing economies in general share some characteristics in common, they also have their own unique characteristics (Hofstede and Bond 1988), which should be understood for project success.

Second, through this study, we propose a conceptual framework based on extant literature and available public resources. The framework should be further developed and validated with broader opinions or direct/indirect observations on real project cases. In the project management literature, the Delphi technique has been well adopted to identify risk factors in various projects (e.g., Keil et al. 2002; Schmidt et al. 2001). This technique would be useful for our research, not only to further develop our risk identification framework but also to better understand the importance of each of the identified risk factors by ranking them. The expert review (or case interview) approach would also be useful for further validating the proposed framework. According to Flick (2009), this approach provides an opportunity to validate information, but also offers a possibility for educing new ideas and perspectives. Lastly, action research would be another potential approach for our further research. By being a part of an actual project, action researchers can develop an in-depth understanding of the relationships among project participants and the impacts of specific risks and mitigation strategies on project performance over both the short and long terms (Avison et al. 1999).

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