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Abstract

Purpose: The purpose of this study is to consolidate the existing research on interorganizational projects and to explore how organizations learn by closely examining multilevel learning, i.e., organizational and interorganizational learning.

Design/methodology/approach: This article adopts a single case study approach, examining the Islamabad-Rawalpindi Metro project in Pakistan, with data consisting of interview results and archival data. An inductive approach is used for data analysis.

Findings: We developed an empirically grounded learning model based on an interorganizational project following eight lessons: capacity building, personality traits of leadership, working procedures, impeccable planning and implementation, involvement of stakeholders, design compatibility, investigation of underground services, conditions and maintenance of databases, and conceive rational timelines. These lessons learned were classified into three categories: (i) organizational capacity, (ii) organizational embeddedness, and (iii) collective awareness.

Originality/value: This paper develops a novel learning model that can deepen our understanding of the practices and processes involved in multilevel learning. This study contributes to and extends the literature on organizational and interorganizational learning by studying an interorganizational setting.

Keywords: Lessons learned, organizational learning, interorganizational learning, interorganizational projects.

Introduction

Lessons learned are key project experiences which have business relevance for future projects (Fuller *et al*., 2011; Carrillo *et al*., 2013; Mainga, 2017). They have been validated by a project team and represent a consensus regarding an insight that should be considered in future projects. Lessons learned are important both for projects and for organizations executing projects (Schindler and Eppler, 2003; Sense, 2008), but their role becomes crucial when a project is interorganizational, meaning that it has multiple organizational stakeholders. In this sense, learning is critical since it provides lessons not only for a single organization (i.e., organizational learning) but for multiple organizations consisting of clients, consultants, contractors, and subcontractors involved in the project (i.e., interorganizational learning). Research on interorganizational projects has focused primarily on interorganizational collaboration (Van Marrewijk *et al*., 2016) in a service network context (Peronard and Brix, 2019), unexpected circumstances (Beck and Plowman, 2014), interorganizational tensions (Marcandella and Guèye, 2018), and flexible behaviors (Ligthart *et al*., 2016). Past research on organizational learning has focused on innovation (Tolsby, 2018), the enhancement of organizational performance (Eiriz *et al*., 2017), challenges and opportunities for learning (Rupčić, 2018), project-based learning (Scarbrough *et al*., 2004), inter-project learning (Prencipe and Tell, 2001), and intraorganizational project learning (Brady and Davies, 2004).

According to Ayas and Zeniuk (2011), a significant amount of learning may occur within a project and it is particularly important for interorganizational projects. The need to learn from one project to the next is important but is often neglected (Williams, 2008; Fuller *et al*., 2011). Several factors may inhibit learning, such as the temporary nature of project organizations and the fundamental complexity of projects (Williams, 2008). Previous studies have largely focused on learning that occurs within a single permanent organization (Prencipe and Tell, 2001) or project (Scarbrough *et al*., 2004), or when something unexpected happens (Garud *et al*., 2011). According to Sydow *et al*. (2004), projects are different from permanent organizations. Projects are temporary organizations formed for a unique and complex task (Turner, 2006), do have a time limitation, and rely on teamwork (Cummings and Pletcher, 2011). Permanent organizations have naturally defined goals rather than tasks, considering survival rather than time, and working organization rather than teams (Lundin and Söderholm, 1995). In prior research, less attention has been paid to learning in an interorganizational setting – complex temporary setting, where diverse organizations engage simultaneously for a certain period to perform complex tasks (Ahern *et al*., 2015). Therefore, we contend that there is a gap in the literature, i.e., the scant research attention is given to learning in general and learning from interorganizational projects in particular. Moreover, in this paper, we explore and exploit learning within and across organizations (Brix, 2019) within the context of an interorganizational project; this provides a different context relative to conventional projects and organizations. In this paper, we aim to answer the following question:

How do organizations learn from an interorganizational project?

This study alleviates the aforementioned gaps by exploring the lessons learned from the interorganizational Islamabad-Rawalpindi Metro project in Pakistan. According to Anand *et al*. (2020), management research has mainly considered individuals, teams, and organizations as units of analysis. Conversely, the unit of analysis in this study is an interorganizational project. Our study makes three main contributions. First, our main contribution is the empirically grounded interorganizational project learning model (Figure 2). The model explains lessons learned and their interplay with learning processes. Second, it offers an opportunity for diverse organizations to increase their robustness by building project capability for future projects (Brady and Davis, 2004). Third, it provides evidence which extends the literature on multi-level organizational learning i.e., organizational learning and interorganizational learning.

The paper is organized as follows: The next section provides a review of the relevant theory; this is followed by the methodology section. Subsequently, we present the findings and discuss them. Last but not least, we draw conclusions from the paper.

Theory

Multilevel aspect of learning

Learning is a multilevel phenomenon (Rupčić, 2018) involving both organizational learning and interorganizational learning (Mariotti, 2012; Andreou *et al*., 2016; Anand *et al*., 2020). O*rganizational learning* occurs within an organization (Argote and Ophir, 2002). Organizational

learning is not simply the sum of learning among the individuals involved (Hedberg, 1981); rather, it is the process whereby knowledge is created, distributed across the organization, communicated among organization members, and integrated into the strategy and management of the organization (Duncan and Weiss, 1978). Individual learning occurs when a person acquires new ideas or skills, whereas organizational learning occurs when an organization institutionalizes new routines or acquires new information (Miner and Robinson, 1994). Organizational learning is a process that enables collaboration between organizational actors to improve the organization's overall performance (Brix, 2017). It helps organizations to enhance their practices and to improve their prospects in dynamic and competitive environments (Argote, 2011). Organizational learning occurs through the processes of intuiting, interpreting, integrating, and institutionalizing (Crossan *et al*., 1999; Wiewiora *et al*., 2020; Iftikhar and Wiewiora, 2020). Individuals learn through intuition by recognizing familiar patterns from past events, experiences, and situations. Individuals connect with teams through the process of interpretation and reshaping new knowledge through individual and collective efforts. Learning on the team level occurs through a process of integration and through developing shared understanding through collective actions and shared practices. Organizations learn through the process of institutionalization, in which learning becomes embedded in the organization's systems, structures, routines and practices for the collective benefit (Crossan *et al*., 1999, 2011). Learning takes place in both feedback and feedforward directions. Feedback learning helps in exploiting existing and institutionalized knowledge and making this knowledge available to teams and individuals. Feedforward learning assists individuals and teams in exploring new knowledge and in institutionalizing this knowledge on the organizational level (Wiewiora *et al*., 2020).

Interorganizational learning occurs between organizations, as organizations learn from each other through collaboration (Lane and Lubatkin, 1998; Holmqvist, 2003). However, for interorganizational learning to occur, it is pivotal that organizations share information with one another (Holmqvist, 2004). Lane and Lubatkin (1998) emphasize three types of interorganizational learning: (i) passive (acquiring knowledge, such as via seminars, books, and journals), (ii) active (collaborating with external consultants to learn how to use new software or to implement the use of new hardware in organizational routines), and (iii) interactive (when learning represents activities through which complex knowledge is created and implemented in collaboration with external agents) (Lane and Lubatkin, 1998; Schulz and Geithner, 2010). Moreover, Jones and Macpherson (2006) proposed an extension to Crossan *et al*.'s (1999) framework by adding a learning process of intertwining, which facilitates interorganizational learning by institutionalizing external learning.

Project-based learning is a subset of organizational learning (Keegan and Turner, 2001; Sense, 2008). The term "project-based learning" is used inclusively to encompass both the creation and acquisition of knowledge within projects (Ayas and Zeniuk, 2001; Nilsen, 2013) and the subsequent transfer of such knowledge to other parts of the organization, including other projects (DeFillippi and Arthur, 1998). Project-based learning is generally referred to as

encompassing (1) the creation and acquisition of knowledge within project ventures and (2) the codification and transfer of this knowledge to an enduring environment (Prencipe and Tell, 2001; Scarbrough *et al*., 2004). In fact, the available literature suggests that projects present a "learning paradox." On the one hand, through their transience and inter-disciplinary nature, project ventures are likely to be highly suitable for creating knowledge in the context of its application (Gann and Salter, 2000; Hobday, 2000; Grabher, 2004; Scarbrough *et al*., 2004). On the other hand, however, the temporary nature of a project also limits any transient organizational form of *sediment* knowledge, because as soon as the project team is dissolved and participants move on, the knowledge created is likely to disperse (Cacciatori, 2008; Grabher, 2004; Ibert, 2004; DeFillippi and Arthur, 1998). If specific knowledge of that project is not directly needed, organizational amnesia begins (Schindler and Eppler, 2003).

Lessons learned refer to the learning gained from the process of performing the project (PMI, 2004, p. 363). Project members can learn from their own project experiences as well as the experiences of others involved in the project. Lessons learned can be used to improve future projects and future stages of current projects. They can be formulated as recommendations that may be valuable for future projects (Rowe and Sikes, 2006). However, previous research has emphasized the difficulties that organizations face when they attempt to encapsulate the learning gained through projects and transfer it to their wider organizations (e.g., Middleton, 1967; Keegan and Turner, 2001). There is a risk that the knowledge and experience gained is lost when the project ends, the team disbands, and its members transition to other projects or are reabsorbed into the organization. Unless lessons learned are communicated and experience gained through one project is transmitted to subsequent projects, there is also a risk that identical mistakes will be repeated (Middleton, 1967, p. 81) and opportunities to implement effective processes to successfully complete existing and future work will be overlooked (Rowe and Sikes, 2006). "Lesson learned" is a popular expression; however, it is often only lip service to the idea of learning from experience (Smith and Elliot, 2007); as Williams et *al*., (2012) state, "there are many lessons identified, but not very many learned."

Interorganizational project

An interorganizational project is defined as a project in which multiple organizations temporarily collaborate on a shared activity to coordinate and realize complex products and services (DeFillippi and Arthur, 1998; Jones and Lichtenstein, 2008; Bakker, 2010; Ahern *et al*., 2015). An interorganizational project focuses on a network between organizations (Schulz and Geithner, 2010). In a network, collaborating organizations are interdependent (Marcandella and Guèye, 2018), which produces outcomes that could not have been achieved by the individual organization independently (Schulz and Geithner, 2010). Pooling various resources and types of expertise to complete a project successfully requires that distinct organizations work together (Oliveira and Lumineau, 2017). It assembles a diversity of legally independent but functionally interdependent organizations to create complex products and services (Jones and Lichtenstein, 2008). Two central characteristics of interorganizational projects are (1) temporariness and (2)

the flexibility. Projects are temporary because they have a specific beginning and a defined endpoint which is known to all project participants (Lundin and Söderholm, 1995). Regarding flexibility, lead organizations create and recreate new organizational structures based on the demands of a project or the needs of clients, and because the project is a temporary organizational setting, organizing through projects is inherently flexible and reconfigurable (Bechky, 2006). When new projects are initiated, lead organizations can select partner organizations whom they perceive to be ideally suited to perform the task at hand, and these partner organizations can then adapt their involvement in different projects to their capacities (Ligthart *et al*., 2016). Hence, they can learn new work behaviors which otherwise would not be possible (Holmqvist, 2009; Mainga, 2017).

Methodology

Research design

We conducted a single case study approach to explore lessons learned in an interorganizational project. An interorganizational project is a complex, temporary setting in which different organizations engage simultaneously. The case study method is particularly suited to research questions which require a detailed understanding of the object of study (Hartley, 2004). Our empirical study focuses on the Islamabad-Rawalpindi Metro project in Pakistan. The Islamabad-Rawalpindi Metro project was selected because it is an ideal depiction of an interorganizational setting, as it involves multiple organizations to coordinate temporarily to deliver complex product or service (i.e., a metro). We selected this particular case to explore the lessons learned from this project. By closely examining the data from several organizations, we addressed our research question through an inductive and in-depth study. To conduct our research, we employed the process of theoretical sampling (Glaser and Strauss, 1967). Project staff members were given copies of analysis (discussed in detail below) and were asked to provide corrections of facts. Their comments were incorporated into revisions of the final analysis.

The case: The Islamabad-Rawalpindi Metro project

Murree Road is one of the busiest and most popular connecting roads between the twin cities of Islamabad and Rawalpindi in Pakistan due to its relatively short length. During the last few years, there has been an unprecedented increase in vehicular traffic in the city, resulting in severe traffic congestion on this route. This congestion causes excessive delays, environmental pollution, and associated socio-economic problems for daily commuters. Private transport is the primary means of mobility between the two cities, with vans taking various routes within and between the two cities. However, prior to the metro bus project, the level of services offered by the private vans and buses was far below any acceptable standard, with excessive delays, unclear pricing, and poor vehicle conditions. There was not an organized urban bus transport service within the city nor between the cities of Islamabad and Rawalpindi. There was a dire need for a decent and affordable public transport service in these cities.

The metro bus project was completed in eight packages, referred to here as sub-projects (five sub-projects for Islamabad and three for Rawalpindi). These were smaller-scale projects that contributed to the completion of the metro bus project. The entire length of the route is 23km, of which 8.6km of the metro bus corridor is in the Rawalpindi area, while about 14km is in Islamabad. The bus services run on a dedicated track which is signal-free. The track contains 24 stations in total, with 10 in Rawalpindi and 14 in Islamabad. The project comprised 11 different organizations consisting of a client, a designer and consultant, an executing agency, eight different contractors, and numerous sub-contractors. The civil works were divided into eight packages (sub-projects) assigned to contractors (Archival data).

Data collection

We collected data using (1) semi-structured interviews and (2) archival and project documents (details can be found in Table I). Semi-structured interviews (see Appendix A for the interview guide) were selected as a primary data gathering method due to their insightfulness and the possibility of acquiring rich data (Gubrium *et al*., 2012). We conducted interviews with 18 participants, ranging from 35 minutes to 90 minutes in length. Primary data was collected through face-to-face interviews with project directors, project managers, and other project management team members (deputy project managers and site engineers) from the client, contractors, sub-contractors, and the consultant who were involved in the project (details can be found in Table I). Informants were asked a core set of structured questions and open-ended probes. We utilized a snowball technique that entailed asking each informant for additional contacts who they believed could help us understand learning in interorganizational project. The initial interview protocol was wide-ranging, as we sought to gain a general understanding of the project. Subsequent interviews included more focused questions as themes began to emerge from the data. We achieved theoretical saturation because the additional interviews did not yield any ground-breaking information, as the last three interviews repeating the same themes. Interviews were tape-recorded with the informants' authorization and then transcribed.

Archival data was used to gain an enhanced understanding of the project context. We utilized archival sources of data acquired via searching on the internet and provided by informants. First, we searched for "Islamabad-Rawalpindi metro bus" on Google. Second, we asked the client, contractors, and consultant to provide the necessary documents that could help us develop a better understanding of the project. The archival data consists of internal and publicly available data, including PowerPoint presentations, an environmental impact assessment report, design details (layout and drawings), a project feasibility report, and a planning commission (PC-1) document. In this study, archival data helped us build a solid and sound background to the context.

*** Insert Table I about here***

Data analysis

An inductive approach was employed in the analysis of the data. Such an approach is useful for developing an understanding of the meaning of complex data through the development of themes or categories from the data. It reflects reported patterns in the data (Thomas, 2006). We adopted

grounded theory codification for data analysis. This method recommends coding the interview transcripts by using the subsequent three-step process: open coding, axial coding, and selective coding. Open coding is intended to identify the concepts, which allow the data to speak for itself by reading the interview transcripts. We identified numerous terms and concepts utilized by the informants. Axial coding to aggregate abstract concepts derived from open coding. It is to develop a higher level of abstraction and conceptualize various codes which might be related and labeled. We devoted subsequent readings to assembling these concepts into categories that defined similar ideas, issues, or relationships which were relevant to the informants. Selective coding was performed to integrate and refine categories (Strauss and Corbin, 1998). For instance, initial open coding, such as, *involvement of technical people* and *community involvement and participation* were classified together to form the axial coding labeled *involvement of stakeholders*. Finally, axial coding was aggregated into selective coding of *collective awareness*. We categorized lessons learned into (i) organizational capacity, (ii) organizational embeddedness, and (iii) collective awareness. Figure 1 below illustrates the data structure resulting from our analysis.

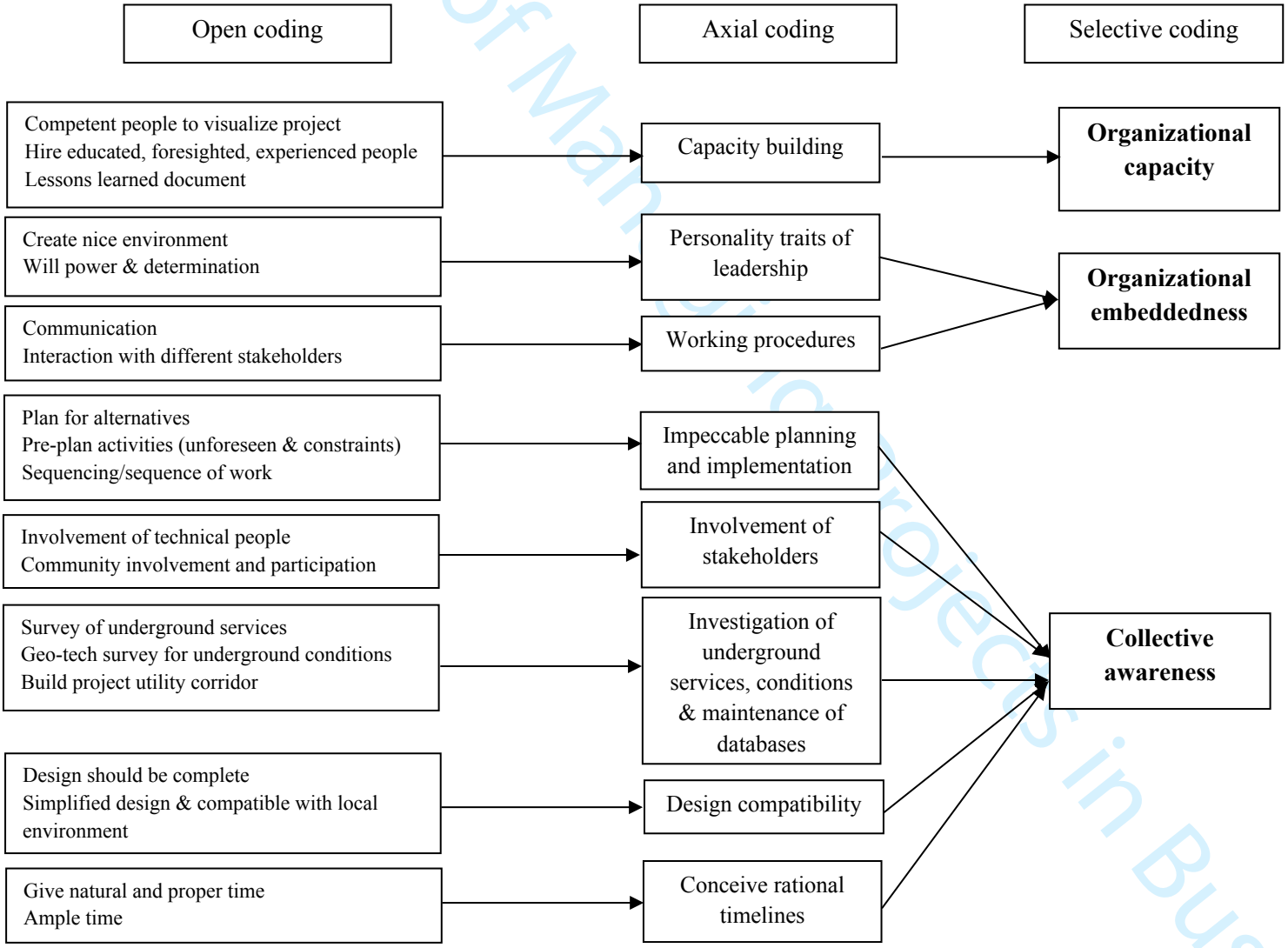

Figure 1: Data structure

Findings

In this section, we describe how organizations learn in an interorganizational project. We identify lessons learned from different organizations involved in the interorganizational project. Below, we describe these elements and emergent theoretical dimensions in greater detail, with illustrative quotations.

Organizational capacity

Organizational capacity concerns whether an organization can handle such a large project, and the organization's capacity in terms of specialized personnel and experts, etc. Interorganizational projects are useful for building the capacity of organizations.

Capacity building

Another important lesson learned is the capacity building of different stakeholders, namely, the client, consultant, contractor, and sub-contractor. Capacity building increases the abilities of teams and organizations to perform core functions, solve problems, and define and achieve objectives. Capacity building is primarily an internal matter; it means building and developing capabilities to conceive, develop, promote, and manage projects with excellence and to promote desired goals and missions (Farazmand, 2004). As illustrated below:

> *Main engineers from the client, consultant, and contractor must be highly educated…. Project Manager should be technical. The client should be technical. You must have experienced people who already perform a similar task. (Deputy Project Manager, Consultant)*

Contractors provide recommendations which suggest that by having experienced and professional people, they can build their capacity; rather than asking the consultant about every minor issue, they hire professional and qualified people to build and enhance highly qualified and skilled personnel. Capacity can be built by documenting the lessons learned and keeping them accessible within the organization. In this way, subsequent staff will understand what problems were faced and how they were resolved. As stated below:

> *We should document the lessons learned. It is documented in a way that it has covered all the issues... Mistakes should be mentioned, or brief SWOT analysis of all that happened. We have made the reports, but still is not a part of the project document or a part of the enterprise. There should be a scanty document, which specifically addressed all the lessons learned. (Deputy Director 1, Client)*

Organizational embeddedness

Multiple organizations are working together in an interorganizational project. There is task dependency and interdependence; thus, organizations and their personnel have to interact with each other. This interaction then precipitates the development of an understanding of the working procedures of each organization, which could be useful for upcoming projects, since the

organizations are familiar with each other's working styles. We classify personality traits of leadership and working procedures under the category of organizational embeddedness.

Personality traits of leadership

Personality traits of leadership are crucial in these kinds of projects. There is an intense amount of pressure which could be managed by creating a relaxed work environment, defining a line of action and a line of command, and fostering willpower and determination. An illustrative quote is provided below:

> *It is a big project, and you have a short time period, if you have willpower and determination that you will do this then work can be done… I learned a lot that from cool mind, you can run the project smoothly. Do not take pressure then these projects can be done. If you lose your courage from the very first day, then you cannot do project. (Chief Engineer, Client)*

Working procedures

This theme highlights that lessons learned have enabled an enhanced understanding of working procedures or ways of working. In the project, the client, consultants, contractors, and sub-contractors are directly involved. Working with different organizations, both directly and indirectly, builds an understanding of their working practices, which then allows for a better working relationship if the organizations are involved in a future project together. As stated below:

> *We have established a liaison with the utility agencies now. We are working on a road in Adyala, an airport road is under construction and high court road is under construction. So, all the agencies are the same, we understand their working, how to coordinate, how to do a survey, timely payments and then we're shifting the utility we have to look for such a safe place where it does not become a hindrance in any future project. (Deputy Director 1, Client)*

Collective awareness

We found that the project stakeholders lacked collective awareness of the project's objective, scope, and constraints. Each project has a planning phase, and it is essential to execute things according to the plan. Collective awareness can be described in terms of each organization, including internal and external stakeholders, having the same level of understanding regarding the project. Naturally, such a collective awareness should prevail from the planning phase of the project. We grouped collective awareness into the following themes: impeccable planning and implementation, involvement of stakeholders, investigation of underground services, conditions, and maintenance of databases, design compatibility, and conceive rational timelines.

Impeccable planning and implementation

In an interorganizational project, it is essential to have proper plans. This can allow to move further into implementation. As one of the informants described:

> *Plans should be implemented properly… You should have a substitute for your task. If one person leaves, you must have an alternative. For example, we cannot get cement from option A then we know there is option B, we should get from him… Planning can be done beforehand… If I will do this project again, this project must have plan A to C at least. It should be a must. (Site Manager, Contractor 5)*

The organization should plan its activities, since this is the means by which organizations can know what the future will entail. There are several interdependent activities; thus, it is crucial to consider them at the very beginning. As informant described:

> *While activity is going on, the project manager should think about how to plan the next activity... The planning of fourth or fifth activity should be done with the execution of first activity… It is not like that; you finish one activity and then you will do a mental exercise and think about what to do next. Sequencing of activities is very important and should be done beforehand. (Project Manager, Contractor 1)*

Involvement of stakeholders

This theme highlights the participant's elucidation of how lessons learned have precipitated the involvement of stakeholders. Stakeholders include technical people and the general public; technical people need to make decisions; everything should be done through technical means since they have the knowledge and expertise, so we should benefit from their knowledge. As illustrated below:

> *A non-technical person cannot tell that in how many months project will be built. This is not a lump sum thing. That I saw a table and tell you I will make this table in 2 days. It is possible to make it, but then never ask for quality. If you need quality then give time. (Deputy Project Manager, Consultant)*

> *I think the involvement of the community would have been much more than it was because, I think, ultimately it is the community which has to absorb and accept this project. So, it is utmost necessary that the community should have been involved in a better way in this project so that at the completion of the project the community must accept this from the core of their heart. (Deputy Director 2, Client)*

Investigation of underground services, conditions, and maintenance of databases

An investigation of underground services and conditions is imperative. However, in this project, service agencies are not aware of where their services and utilities are placed, and data is not properly maintained. The important lesson we derive is that a proper examination of underground services and utilities should be carried out before starting the project, and a proper database should be maintained. As illustrated below:

> *I cannot do a survey in the whole area because I do not have time for that. First, I will do a survey of all underground utility and services by going into the subsurface. For the whole project, I will do have a record of all the utilities and survey. It should not be like when I start excavation then suddenly something pops up. This thing should not happen; I want to do a complete survey. (Assistant Director 1, Client)*

Underground conditions, namely water table and soil (hard/soft, rocks or stones, etc.), are neglected and considered to be the same across the entire project area; as this is not the case,

design changes are required, as well as changes in procurement or redoing things. As described below:

> *We learn that a geotechnical survey should be done before the project begins. In my view, this is a flaw that there was no geotechnical testing done and because of that, we faced problems… We consider the soil to be the same throughout. Geotechnical survey has to be done... you could have prior assessments… to see what is lying underneath especially if you are doing a project in a hilly area. In plain areas, the soil is almost the same… As far as I am concerned, if I will be deployed on a megaproject in future, I would go for the geotechnical survey in the beginning before estimation. (Deputy Director 3, Client)*

Design compatibility

It is imperative to assess the compatibility of the design in relation to the local environment and weather conditions. Meanwhile, the design should be simple, as an extraordinary design requires extraordinary efforts from both the contractor and client, which will typically compromise the project's timeliness. As illustrated below:

> *Use the simplified design, which may be aesthetically compromised but it should be workable at least. Because you are having time constraints… so it should not be cumbersome technically. This is the major technical lesson. Secondly, the design should be compatible with the local environment. This is, no doubt, an amazing design; but I do not find it compatible with the environment here... You should keep in mind the local climate. (Deputy Director 1, Client)*

Conceive rational timelines

Organizations tend to underestimate the efforts entailed. Similarly, in our case, insufficient time was allocated to planning, designing, and executing the project. The lesson learned is that the timeline should be rational and realistic. A project should not merely be viewed in terms of time constraints but in terms of the thousands of activities involved in it. As informant described below:

> *Time-constrained should be fit in. It should not be too optimistic; it should be in accordance with the work, it should be realistic... We want to finish this project on deadline, but it finished in the realistic time frame. (Assistant Director 1, Client)*

Discussion

Learning is a multilevel process (Rupčić, 2018) involving both organizational learning (Argote and Ophir, 2002; Andreou *et al*., 2016) and interorganizational learning (Mariotti, 2012; Anand *et al*., 2020). Learning improves work behaviors; however, the process of organizational learning is dynamic, nonlinear, and complex (Crossan *et al*., 2011); interorganizational settings make learning processes more complex (Holmqvist, 2003; Mariotti, 2012). Interorganizational learning facilitates the development of new behaviors which could not be attained within a single organization (Holmqvist, 2009).

Based on our findings, we propose an interorganizational project learning model, as illustrated in Figure 2. The model demonstrates the interplay between organizational capacity and

embeddedness and the collective awareness of the participants in an interorganizational project with underlying processes of institutionalization and intertwining. The three concepts in the model align with the three types of interorganizational learning introduced by Lane and Lubatkin (1998). Specifically, organizational capacity relates to passive learning, organizational embeddedness to active learning, and collective awareness to interactive learning. The model further extends the existing theory on organizational learning by identifying eight distinct lessons learned during the execution of an interorganizational project. These include capacity building, personality traits of leadership, working procedures, impeccable planning and implementation, involvement of stakeholders, investigation of underground services, conditions and maintenance of databases, design compatibility, and conceive rational timelines.

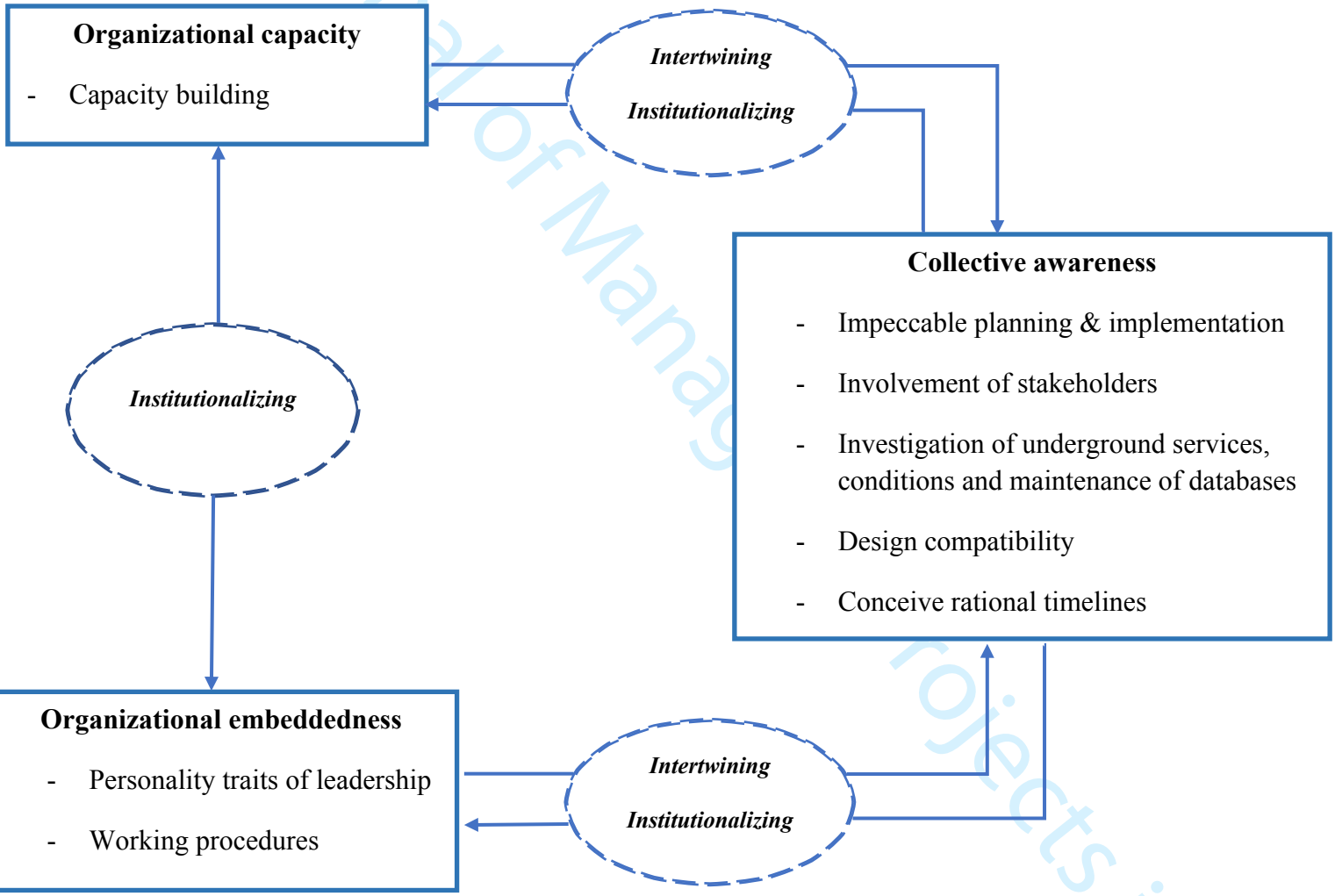

Figure 2: Interorganizational project learning model

Underlying learning processes

The underlying learning processes are not the outcomes of findings. However, they are based on the research of Crossan *et al*., (1999) and Jones and Macpherson (2006), which explains how the interorganizational project learning model works. The collective lessons learned from the case study concerned both intra- and interorganizational behaviors. Explicitly stated, lessons learned relate to the "organizational capacity," and "organizational embeddedness" signifies the improvement of behavior and competence within an organization. In earlier literature, this type of learning was referred to as "institutionalization" (Crossan *et al*., 1999). Institutionalizing is the process of ensuring that actions become routinized (Jones and Macpherson, 2006), contributing to efficient operations, and enabling the organization to deliver more efficiently (Crossan *et al*., 1999). Institutionalization refers to individual and team learning being embedded in the organization's systems, structures, strategies, routines, and practices (Jones and Macpherson, 2006). The remaining five lessons learned concern with improvements in behavior and the development of competence across organizations. This process of learning, referred to as "intertwining," indicates learning between organizations and not merely within organizational boundaries (Jones and Macpherson, 2006). It suggests an active engagement between the organization and its network (Holmqvist, 2003). Intertwining process identifies the role of external organizations as supporting the development of processes, systems, and routines that distribute and institutionalize learning within interorganizational projects (Jones and Macpherson, 2006).

Interorganizational learning does not occur by itself; it occurs because of an encounter and a combination of organizations' experiences (Holmqvist, 1999). In accordance with Peronard and Brix (2019), our model adopts a dual focus on learning, in which organizational learning can be used to foster interorganizational learning by intertwining new insights with existing routines (i.e., feedforward process) (Holmqvist, 2004; Jones and Macpherson, 2006). Similarly, interorganizational learning creates value for the individual organization via the institutionalization of new insights (i.e., feedback process) (Jones and Macpherson, 2006; Brix, 2017).

Organizational capacity

Organizational capacity refers to the availability of people, tools, systems, and work procedures to make interorganizational projects successful (Ingram, 2017). It involves passive learning to understand the objective of learning, as it is the process by which organizations obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to do their jobs competently (Lane and Lubatkin, 1998). Han *et al*. (2009) demonstrated that the lack of organizational competence and capabilities in a complex project is among the major issues affecting project schedules and budget performance. Capacity building develops organizational capabilities which enables organizations to not only cope with and manage ongoing current challenges of governance and administration but also to act well beyond that by performing through anticipation, proactive skills, and self-corrective organizational behavior (Farazmand,

2004). Brix (2019b) illustrates different levels of analysis for capability building, namely individual and organizational. Our findings present evidence of organizational capacity building which enables and improves structures and processes that support managers in achieving the goals (project) of the organization.

The model (Figure 2) suggests that organizational capacity has two implications: (i) institutionalizing and (ii) intertwining. According to Crossan *et al*. (1999, 2011) and Jones and Macpherson (2006), institutionalizing encompasses learning at the organizational level. Through institutionalizing, the new work procedures, competencies, and rules get embedded into organizational routines, which builds organizational capability. Organizational capacity institutionalizes organizational embeddedness. However, interorganizational learning involves intertwining– knowledge and expertise from external organizations. The model demonstrates both feedforward and feedback learning flows. It is a part of the feedforward process, as interorganizational links solve the problems of the client, consultant, contractor, and sub-contractor. Furthermore, intertwining with client, consultant, contractor, and sub-contractor promotes a feedback learning flow within the recipient company– institutionalization of external knowledge within the organization (Jones and Macpherson, 2006). In our model, organizational capacity facilitates an intertwining process, which leads to collective awareness.

Organizational embeddedness

The organizational embeddedness of an interorganizational project provides "understandings and rules for collaboration that distinct organizations bring to their joint activities, reducing transactional uncertainty and facilitating coordination" (Jones and Lichtenstein, 2008, p. 239). This form of active learning occurs when the observable portion of another organization's experience such as leadership traits and working procedure can be acquired (Lane and Lubatkin, 1998). When organizations have relationships with other organizations or long-term patterns of interorganizational interaction that transcend the scope and duration of the project, it is likely that certain general understandings and expectations about how to act are in place, such as established communication links (Jones and Lichtenstein, 2008).

Our findings also signify that learning leadership competencies is important. During an interorganizational project, several organizations interact with each other to accomplish the task at hand – this requires competencies beyond technical capacity, scope, cost, and schedule management. According to Thamhain (2004), project leaders must foster a work environment supportive to their team members. Effective project leaders can inspire and influence the attitude and commitment of team members in relation to the project objectives (Thamhain, 2004). Furthermore, organizations involved in interorganizational projects maintain relationships beyond the scope and duration of a single project. When project partners and actors interact repeatedly, they generate a shared interpretation of the task at hand through repeated collaboration, which eases coordination and efficient communication. This reduces uncertainty because agents know how others have behaved in the past and can, therefore, predict how they will behave in the future (Schüßler *et al*., 2012).

Organizational embeddedness enables (i) institutionalizing, and (ii) intertwining processes (Crossan *et al*. 1999, 2011; Jones and Macpherson, 2006). Learning the new leadership traits and work procedures and styles embedded in organizational routines builds organizational embeddedness through institutionalizing. Organizational embeddedness institutionalizes organizational capacity. Moreover, organizational embeddedness enables intertwining process, leading to collective awareness (coordinate joint activities) via a feedforward process. However, this is insufficient because without organizational capacity such as resource sufficiency and required competencies, the institutionalization of leadership traits and work procedures cannot be realized (Ingram, 2017).

Collective awareness

Collective awareness refers to project stakeholders' shared understanding and coordinated efforts to ensure successful coordination throughout the project's lifecycle (Calamel *et al*., 2012). According to Levering (2015), collective awareness can be described as a shared understanding of who is responsible for what and who knows what should be done. It triggers interactive learning whereby complex knowledge is created and implemented in collaboration with other organizations (Lane and Lubatkin, 1998; Schulz and Geithner, 2010). Collective awareness must begin at the project planning phase (Calamel *et al*., 2012; Kerzner, 2013). The planning phase establishes who has to do what and when (Kerzner, 2013, p. 23). Our findings include five lessons learned that focus on collective awareness, namely impeccable planning and implementation, involvement of stakeholders, the investigation of underground services, condition and maintenance of databases, design compatibility, and conceive timelines.

The importance of planning and implementation was highlighted by Yeo (1995), who indicated that effective project planning and the involvement of stakeholders such as designers, subcontractors, and management throughout the organization and its external partners is crucial to success, particularly for projects with high levels of complexity (Yeo, 1995; Thamhain, 2004). Another lesson relates to the unforeseen ground conditions triggered by poor underground investigations during the design phase. In the observed case, this caused a ripple effect, generating delays in other predefined or new activities, resulting in design modifications and significant reworking (Han *et al*., 2009). A complete investigation of underground services and the condition and maintenance of databases is an important takeaway. Furthermore, the mission of the project was not clearly articulated; therefore, project requirements and designs changed frequently. The changes in the project scope resulted in an inability to effectively estimate and control project deliverables and costs (Kimmons, 1990). In the absence of collective awareness in an interorganizational project, stakeholders tend to underestimate the time (duration) required to perform quality work. It is imperative to conceive rational timelines for projects since temporal pressure exerts a negative effect on the project, as well as on learning itself (Schindler and Eppler, 2003). In our model, collective awareness (external new learning) institutionalized organizational capacity and organizational embeddedness via feedback process.

Conclusions, limitations, and future research directions

Learning has invariably been a central issue affecting the functioning of organizations (Schindler and Eppler, 2003), including project-business organizations (Sense, 2008; Mainga, 2017). Therefore, lessons learned are unique, significant, and actionable experiences with impactful implications for future project operations (Carrillo *et al*., 2013). Lessons learned by organizations promote the more successful completion and implementation of future projects (Akgün *et al*., 2003). Lessons learned, especially in interorganizational settings, are therefore vital (Mariotti, 2012; Anand *et al*., 2020).

We answered the question *"How do organizations learn from an interorganizational project"* by focusing on lessons identified in an interorganizational project. This research has yielded eight key lessons learned from an interorganizational project; these lessons are categorized as (1) organizational capacity, (2) organizational embeddedness, and (3) collective awareness and the underlying process of institutionalization and intertwining (Crossan *et al*., 1999; Jones and Macpherson, 2006). These three categories, and the eight specific lessons learned within them, provide further insights into the salient nature of passive, active, and interactive learning (Lane and Lubatkin 1998). This knowledge is important, for example, in the development of novel operationalizations of interorganizational learning. Our case of the Islamabad-Rawalpindi Metro project provided a rich context for refining theory about organizational learning focusing on both organizational and interorganizational learning processes (Holmqvist, 2003). Our study offers three main contributions to organizational and interorganizational learning in large complex interorganizational project literature. The first contribution is the interorganizational project learning model which explains lessons learned and underlying learning processes. Second, the identified lessons from an interorganizational project and from a pool of diverse stakeholders, project team members, and organizations could be regarded as success factors and be used to improve the robustness of an upcoming project. Third, our findings confirm and demonstrate the accomplishment of learning at multiple levels, with a focus on aggregating key lessons for organizational and interorganizational learning.

Based on the lessons learned, we developed a learning model for interorganizational projects. The model will assist in engaging project participants with the organizational learning process in a holistic manner. Organizations learn from their experiences (Argote, 2011). Learning results in improved planning of the timeframe and allocation of necessary resources, the assignment of roles and responsibilities, and the proper definition and assessment of indicators of progress, etc. (Lane and Lubatkin, 1998; Kerzner, 2013). Furthermore, lessons learned can assist in the planning of new projects, thereby preventing project managers from repeating past mistakes (Schindler and Eppler, 2003). The lessons we identified are pertinent for both single and multiple organizational settings. The temporary nature of projects means that after a project ends, personnel transition to new projects, and resources are relocated, rather than people being encouraged to reflect on experiences gained from the concluding project (Lundin and Söderholm, 1995, Turner, 2006). The lessons identified in this study would be helpful for

managers to enhance their ability to successfully manage a project as they provide a roadmap for project participants and organizations.

Our study opens several new avenues for further research. Future research might consider organizations and stakeholders as units of analysis, and compare the lessons learned by different organizations and key stakeholders (client, consultant, contractor, and sub-contractor) in interorganizational projects (Jones and Lichtenstein, 2008). Our interorganizational project learning model (Figure 2) might be modified or refined through a future study, and subsequent studies can then investigate the phenomenon at a more granular level. Moreover, we did not examine the application of the lessons learned, which would be useful to improve current and future projects. We believe that our framework is transferable beyond the interorganizational project since data was collected from a heterogeneous set of organizations. According to Williams (2008), it is crucial to gain generalizable lessons (isomorphic learning) rather than lessons specific to one particular project. The set of lessons learned in general could be applicable to other industries, such as IT, telecommunication, engineering, oil and gas, etc.

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Appendix A

Interview guide

Project background:

Background, role, and responsibility of interviewee

Description of project organization

Learning

What are the lessons you learned from this project? Would they be helpful for future projects?

What kinds of mistakes will you avoid making if the same project is repeated?

How did learning affect the overall progress of the project? What are examples from prior learning experiences?

Is there anything else that you perceive as important that we have not covered?

Table I: Methods for data collection

Interviews					
Organization	***Role of organization***	***Designations***	***Education***	***Experience (years)***	***Interview duration (minutes)***
Client	Sponsor	Director general	MSc	20	52
		Chief engineer	BSc	30	45
		Deputy director 1	MSc	13	52
		Deputy director 2	BSc	13	40
		Deputy director 3	BSc	27	33
		Deputy director 4	BSc	28	52
		Assistant director 1	BSc	6	35
		Assistant director 2	-	13	50
Consultant	Design and supervision	Project manager	BSc	25	39
		Deputy project manager	MSc	5	100
Contractor 1	Civil works	Project manager	MSc	10	34
		Deputy project manager 1	MSc	26	98
		Deputy project manager 2	-	17	106
Contractor 2	Civil works	Project manager	BSc	8	55
Contractor 3	Civil works	Deputy project manager	BSc	3	70
Contractor 4	Civil works	Deputy project manager	BSc	4	90
Contractor 5	Civil works	Site engineer	MSc	1	55
Sub-contractor 1	Civil works	Project manager	BSc	15	64

Archival data		
Type of archival data	***Detail of archival data***	***Quantity***
Project feasibility report	Project study report	1
Design details	Layout and drawings	10
Planning commission (PC-1) document	Summary Detailed document	28
PowerPoint presentations	Details regarding Package 1 Project brief Project background	8
Videos and Photos	Execution of the project	222