Learning from interorganizational projects

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Abstract

Purpose: The purpose of this study is to consolidate existing research on interorganizational projects and to explore how organizations learn, taking a closer look at multilevel learning i.e. organizational and interorganizational learning.

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

Findings: We developed an empirically grounded learning model from 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 grouped into three categories: (i) organizational capacity, (ii) organizational embeddedness, and (iii) collective awareness.

Originality/value: This paper develops a novel learning model that deepens our understanding of the practices and processes of 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 on an insight that should be considered in future projects. Lessons learned are important both for projects and for organizations carrying out projects (Schindler and Eppler, 2003; Sense, 2008), but their role becomes crucial when a project is interorganizational, having 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 consists of client, consultant, contractors, subcontractors involved in the project i.e. interorganizational learning. Research on interorganizational projects focuses mainly 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 focuses 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 take place 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 largely focus on learning which either takes place within a single permanent organization (Prencipe and Tell, 2001) or project (Scarbrough *et al*., 2004), or when something unexpected has happened (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 can argue that there is a gap in the literature, i.e., the scant research attention 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) from an interorganizational project, which provides a different context from 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 learning 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. In contrary, 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 1). 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. (i) organizational learning and (ii) 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 of 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* takes place within an organization (Argote and Ophir, 2002). Organizational learning is not simply the sum of learning of 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). Organizational learning helps organizations to enhance their practices and to improve their prospects in dynamic and competitive environments (Argote, 2011). Organizational learning occurs through processes of intuiting, interpreting, integrating, and institutionalizing (Crossan *et al*., 1999; Wiewiora *et al*., 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 takes place through a process of integration, developing shared understanding through collective actions and shared practices. Organizational level learning occurs in the process of institutionalization, embedding learning 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 for teams and individuals. Feedforward learning assists individuals and teams to explore new knowledge and to institutionalize this knowledge on the organizational level (Wiewiora *et al*., 2020).

Interorganizational learning takes place 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, for example, via seminars, books, and journals), (ii) active (collaborating with external consultants to learn to use new software or to implement the use of new hardware in organizational routines), and (iii) interactive (when learning represents activities where 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 very 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 refers 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 could be valuable for future projects (Rowe and Sikes, 2006). However, previous research has emphasized the difficulties that firms face when they attempt to capture 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 finishes, the team dissolves, and its members move on to other projects or are reabsorbed into the organization. Unless lessons learned are communicated and experience gained on one project is transmitted to subsequent projects, there is also a risk that the same mistakes will be repeated (Middleton, 1967, p. 81), and opportunities to implement good processes to successfully complete existing and future work will be missed (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 work together 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). Interorganizational project focuses on a network between organizations (Schulz and Geithner, 2010). A network where collaborating organizations are interdependent (Marcandella and Guèye, 2018), which leads to outcomes that could not have been achieved by the individual organization by itself (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 brings together a diversity of legally independent but functionally interdependent organizations for the accomplishment of complex products and services (Jones and Lichtenstein, 2008). Two central characteristics of interorganizational projects are (1) temporariness: projects are temporary because they have a specific beginning and a defined endpoint which is known to all project participants (Lundin and Söderholm, 1995), and (2) the flexibility they offer, i.e. lead organizations create and recreate new organizational structures

around 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 best 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 wouldn't be possible (Holmqvist, 2009; Mainga, 2017)

Methodology

Research design

We conducted a single case study approach to explore lessons learned in an interorganizational setting. 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. We selected this particular case in order to explore the lessons learned from this project. We addressed our research question through an inductive and in-depth study. To conduct our research, we followed 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 links 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 the daily commuters. Private transport is the major means of mobility between the two cities, with vans plying on 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 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 (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 were selected as a primary data gathering method due to their insightfulness, and the possibility of gaining 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. 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. Interviews were tape-recorded with the informants' authorization and transcribed.

Archival data was used to gain a better understanding of the project context. We utilized archival sources of data acquired through 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 to 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 to build a solid and sound background to the context.

*** Insert Table I about here***

Data analysis

An inductive approach was followed in the analysis of the data. An inductive 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 three-step process: open coding, axial coding and selective coding. Open coding is to identify the concepts, let the data 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 might be related and labeled. We devoted subsequent readings to assembling these concepts into categories that defined similar ideas, issues, or relationships which were of relevance to the informants. Selective coding for integrating and refining categories (Strauss and Corbin, 1998). For instance, initial open coding, such as, *involvement of technical people* and *community involvement and participation* were grouped together to form the axial coding labeled *involvement of stakeholders*. Finally, axial coding was aggregated into selective coding of *collective awareness*. We categorized lessons

learnt into (i) organizational capacity, (ii) organizational embeddedness, and (iii) collective awareness.

Findings

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

Organizational capacity

Organizational capacity is about 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, i.e. the client, consultant, contractor, and sub-contractor. Capacity building increased the abilities of teams and organizations to perform core functions, solve problems, and define and achieve objectives. Capacity building is mainly an internal matter; it means building and developing capabilities to conceive, develop, promote, and manage projects with excellence and to move toward 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 give a few recommendations which show that by having experienced and professional people, they can build their capacity; instead of asking the consultant about every single minor thing, 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, so organizations and their personnel have to interact with each other. This interaction then leads to 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 styles of working. We find 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 dealt with by creating a relaxed work environment, defining a line of action and a line of command, and with willpower and determination. 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 led to a better 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 find that the project stakeholders lacked collective awareness of the project objective, scope, and constraints. Each project does have a planning phase, and it is essential to do 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 themes of impeccable planning and implementation and the involvement of stakeholders.

Impeccable planning and implementation

In an interorganizational project, it is essential to have proper plans, and then we can 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 know what the future will entail. There are several interdependent activities, so it is crucial to think about 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 description of how lessons learned have led to the involvement of stakeholders. Stakeholders included 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 laid, 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, i.e. water table and soil (hard/soft, rocks or stones, etc.) are ignored and considered to be the same across the whole 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 keep in view the compatibility of the design with 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 usually 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 plan, design, and execute the project. The lesson learned is that the timeline should be rational and realistic. A project should not merely be seen 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 hence 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 couldn't be attained within a single organization (Holmqvist, 2009).

Based on our findings, we propose an interorganizational project learning model, shown in Figure 1. The model expresses the interplay between organizational capacity and embeddedness

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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 are 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.
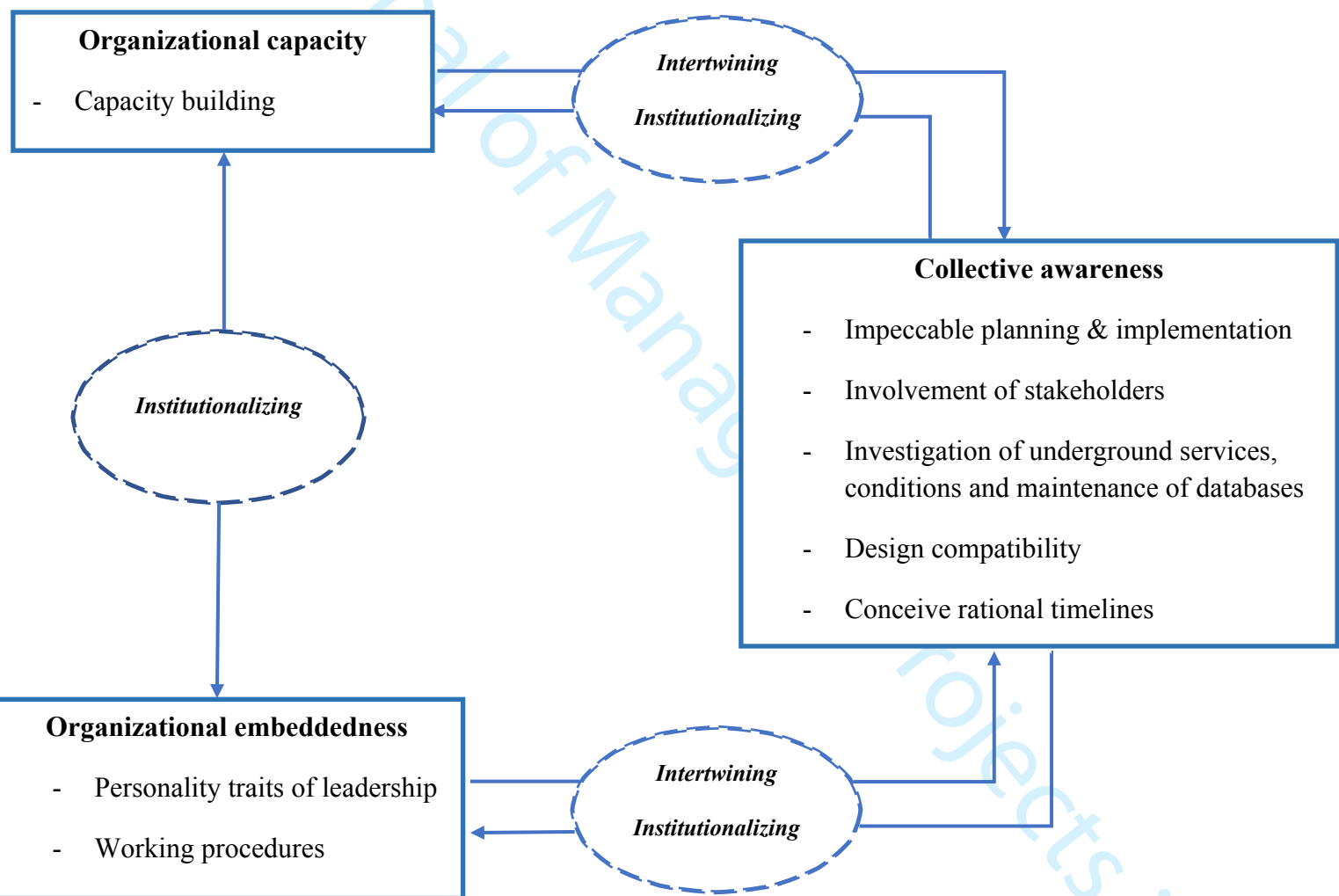
Figure 1: Interorganizational project learning model

Underlying learning processes

The collective lessons learned from the case study concerned both intra and interorganizational behaviors. Explicitly stated, lessons learned related to the 'organizational capacity' and 'organizational embeddedness', signify the improvement of behavior and competence within an organization. In earlier literature, this type of learning has been termed 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 better (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 are concerned with improvements in behavior and the development of competence across organizations. This process of learning, referred as 'intertwining', indicates learning between organizations and not just 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 to support 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 to Peronard and Brix (2019), our model adopts a dual focus on learning. In which organizational learning can be used to create 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 by 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). Organizational capacity 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 lack of organizational competence and capabilities in a complex project are among the major issues affecting project schedules and budget performance. Capacity building develops organizational capabilities which enable organizations to not only cope with and manage ongoing current challenges of governance and administration but also to act well beyond by performing through anticipation, proactive skills, and self-corrective organizational behavior (Farazmand, 2004). Brix (2019b) illustrates different levels of analysis for capability building, i.e. individual and organizational. Our findings present evidence of organizational capacity building which enables and improves structures and processes that support managers in reaching the goals (project) of the organization.

The model (Figure 1) 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 concerns learning at the organizational level. Through institutionalizing, learning the new work procedures, competencies, and rules get embedded into organizational routines, which builds organizational capability as well as embeddedness. 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 part of the feedforward process as interorganizational links solved the problems of client, consultant, contractor, and sub-contractor. Furthermore, intertwining with client, consultant, contractor, and sub-contractor promotes feedback learning flow within the recipient company– institutionalization of external knowledge within the organization (Jones and Macpherson, 2006). In our model, organizational capacity facilitates 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 kind 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 go beyond 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 towards the project objectives (Thamhain, 2004). Furthermore, organizations involved in interorganizational projects have 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 allows for 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 intertwining process, leads to collective awareness (coordinate joint activities) via feedforward process. However, this is not enough 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 where 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, i.e. 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, especially for projects with high levels of complexity (Yeo, 1995; Thamhain, 2004). Another lesson relates to 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, and therefore project requirements and designs changed frequently. The changes in 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 time pressure has 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 always 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 lead to 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 learned identified in an interorganizational project. This research brings out 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, 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 makes three main contributions to organizational and interorganizational learning in large complex interorganizational project literature. 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 considered as success factors and used to increase the robustness of an upcoming project. Third, our findings confirm and demonstrate the accomplishment of learning at multiple levels, with a focus on collecting 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 leads to 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, 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 finishes, personnel move on 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 likelihood of successfully managing a project as they provide a roadmap for project participants and organizations.

Our study opens up 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 1) 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 study the application of 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 is collected from a heterogeneous set of organizations. According to Williams (2008), it is important 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 e.g. IT, telecommunication, engineering, oil and gas, etc.

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Table I: Methods for data collection

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