

Knowledge leakage and protection in interorganizational projects: Evidence from Karachi Green Line Metrobus

Introduction

In an interorganizational project, organizations work together to produce a desired product or service which cannot be achieved by the stand-alone organizations (Iftikhar & Ahola, 2022), which makes it easy to share knowledge (Estrada et al., 2016) but can also lead to knowledge leakages (Ritala et al., 2018). Knowledge leakage is a situation in which an organization loses important knowledge to others that, in turn, lowers organization performance (Easterby-Smith et al., 2008). Some organizations adopt knowledge protection strategies, especially in contexts of coopetition (Balle et al., 2019; Estrada et al., 2016) such as interorganizational projects. Knowledge protection is an organizational capability that enhances the competitive advantage of the organization through formal or informal mechanisms to protect knowledge against imitation (Balle et al., 2019).

Prior research predominantly focused on knowledge leakage adverse impact on collaborative relations and innovation (Flammer & Kacperczyk, 2019; Frishammar et al., 2015; Ritala et al., 2018), including loss of revenue, damaged reputation, loss of productivity and costs arising from breached confidentiality agreements (Ritala et al., 2015). One research stream considers that knowledge leakage occurs due to usage of mobile devices (Durst et al., 2015) or social networks (Yahav et al., 2014). Knowledge protection is important to secure the interests, creativity, legal rights and patents of the knowledge's owners (Balle et al., 2019). There are different kinds of protection mechanisms, such as contracts and social governance, which can reduce the risk of knowledge leaking (Ritala et al., 2015), especially in interorganizational contexts (Wang et al., 2024). For example, employees are key actors in sharing knowledge; thus, they are also in a key position to protect critical knowledge from leaking (Ritala et al., 2015).

The study of knowledge leakage and protection in interorganizational projects appears to be underdeveloped. In particular, for infrastructural projects, where information and knowledge about designs, technical and financial proposals are observed to be the most prone to leak. It is thus essential for the organizations to protect their joint projects from the risk of knowledge leakage (Sharif et al., 2020). Hence, this research unpacks the knowledge leakage and protection in interorganizational project by answering the following research questions:

How does knowledge leakage occur in interorganizational project?

How do organization protect knowledge in interorganizational project?

Literature review

Knowledge leakage

According to Jiang et al. (2013), knowledge leakage is the transmission of knowledge beyond the scope of the agreement, intentionally or unintentionally. Intentional knowledge leakage refers to the organization loss of knowledge to partners through opportunistic activities such as private learning and unauthorized imitation. Partners begin to act opportunistically and acquire the unauthorized valuable knowledge resources of the focal organization. Sometimes organizations are driven by the motivation to outperform each other; therefore, they attempt to acquire one another's capabilities (Jiang et al., 2013), or simply they carry some hidden agenda for stealing secrets (Das & Teng, 2001). Unintentional knowledge leakage, also called accidental knowledge leakage, occurs when the organization is unaware of transferring the

knowledge to its partner (Mohr & Sengupta, 2002), usually through frequent communication and interactions among staff or individuals across the alliance interface (Kale et al., 2000). Accidental knowledge leakage occurs when employees are unclear about the limits of what can be shared with external allies, and thus, they end up disclosing more than is required (Arias-Pérez et al., 2020; Bloodgood & Chen, 2022).

Knowledge protection

Knowledge protection refers to the strategies and actions organizations employ to safeguard their valuable knowledge assets and to prevent knowledge leakage to unauthorized individuals or entities (Manhart & Thalmann, 2015). Organizations are especially vulnerable to knowledge leakage where there are knowledge exchanges such as interorganizational projects (Ritala & Hurmelinna-Laukkanen, 2013). In interorganizational projects, organizations often safeguard their resources (Andersén, 2012; Hamel et al., 1989) and “protect information from bleeding through to a partner” (Hamel, 1991, p. 96) to prevent leakage of knowledge. In general, knowledge protection focusses on: (i) the prevention of knowledge leakage to non-authorized people (Manhart & Thalmann, 2015); (ii) the reduction of knowledge visibility which is concerned with the observability of knowledge by externals (Lee et al., 2007).

Interorganizational projects

Interorganizational projects consist of multiple organizations working together on shared activities over a defined period to coordinate the supply of complex products, subsystems, and services (Roehrich et al., 2023). According to Manning (2017), they can be characterized as a unique organizational form with strong temporal boundaries and collaborations among different organizations for a highly customized goal that may benefit society at large (Fernandes et al., 2023; Sydow, 2022). An interorganizational network achieves outcomes that would not have been possible if each organization operated independently. A project requires the collaboration and pooling of resources and the expertise of various organizations (Oliveira & Lumineau, 2017). In an integrated effort to produce a product or service, each organization focuses on its own distinctive competencies, while the others focus on complementary activities (Barringer & Harrison, 2000). By virtue of its complementarities, the project thus entails an interaction between organizations (Braun & Sydow, 2019).

Protection motivation theory

The protection motivation theory (PMT) assists individuals and organizations in responding when faced with a threat, to protect themselves (Anderson & Agarwal, 2010). According to PMT, individuals and organizations protect themselves by assessing their threat and coping capacities. A threat appraisal is based on the perceived severity of a threatening event and its probability of occurrence. The coping appraisal examines how the individual and organization responds to the situation (Rogers, 1975). The lens of PMT is used (Anderson & Agarwal, 2010; Rogers, 1975) to rethink knowledge leakage as a threat and knowledge protection as a coping behavior.

Methodology

Research design

An interorganizational project is considered as a single case study to understand the knowledge leakage and protection within the project. Due to the richness of data that can be gathered in a case study context, the case study method is particularly well suited to addressing research questions that require detailed understanding (Hartley, 2004). This study examines the Green Line Metro Bus (GL) project in Karachi, Pakistan. The research questions are addressed through an inductive and in-depth study.

Case context

Karachi: Green Line Metrobus

The Green Line (GL) commences in Karachi. GL is about 23.2km long and includes 10.5 km elevated track and 9.3 km at grade, with a total of 25 stations. GL is designed to carry up to 30,000 passengers per hour in each direction. Each day, approximately 300,000 passengers are supposed to travel through GL. It cost Rs. 35 billion (USD 250 million) to complete the project. The execution of the project started in February 2016.

GL was initially divided into 20 packages (sub-projects); however, 2 packages got cancelled. The civil work is divided into 9 packages (sub-projects), the electronic and mechanical works (E&M) into 6 packages (sub-projects) and the road works into 3 packages (sub-projects), all assigned to different contractors. The project became operational in December 2021 (archival data).

Data collection

This study utilized two methods of data collection. First, semi-structured interviews provided the primary method of data collection. Second, archival data was used for the cross-validation of information from different sources (Yin, 2018). 11 interviews with 11 participants were conducted through MS Teams, ranging from 45 minutes to 107 minutes in length (details are provided in Table 1). The study also relied on archival sources of data that were provided by interviewees. Documents were requested from the client, the contractors, and the consultants.

Table 1: Methods for data collection

Interviews				
<i>Role of organization</i>	<i>Designations</i>	<i>Education</i>	<i>Experience (years)</i>	<i>Interview duration (minutes)</i>
Client	Communication manager	MBA	11	62
	Senior manager	Masters	12	60
	Transport manager	MSc.	10	107
Design consultant	Senior project manager	Masters	35	45
Operating consultant	Technical director	MSc.	14	104
Contractor 1	Project manager	Masters	9	85
	Assistant planning engineer	Masters	5	68
Contractor 2	Project manager	Bachelor	8	72
	Planning engineer	BE	10	66
Contractor 3	Project manager	Masters	13	89
Digital marketing agency	Digital marketing manager	MBA	18	75
Archival data				

<i>Type of archival data</i>	<i>Quantity</i>
Bid evaluation reports	20
Environmental impact report and funding reports	3
Feasibility report	4
PC-1	15
Master plan	10
Topography study report	141
Traffic count	24
Visual data	
Videos	1

Data analysis

Data analysis was carried out using thematic analysis. In thematic analysis, patterns (themes) are systematically identified and organized, and insights are provided (Braun & Clarke, 2012). This study followed Braun and Clarke's (2012) practical guide for applying thematic analysis. The transcriptions were first read and explored inductively to identify different methods of knowledge leakage and protection. Second, sub-themes were developed of employee mobility, information disorder, misuse of knowledge sharing tools, and diverse stakeholders' involvement, non-disclosure agreement, standard operating procedures, education and trainings, and sharing relevant knowledge. In the third step, the main themes were determined by reviewing the sub-themes.

Findings

Knowledge leakage

Employee mobility

Knowledge leakage occurs when an employee leaves an organization and joins another organization. Sometimes competitor try to hire other organizations' employee with the intention of knowledge leakage. As illustrated below:

During the bidding the quantity surveyor (QS) was involved, suddenly, he moved to the other organization, we didn't stop him. The other organization was also in the bidding process for the same project, as soon as he was shifted, the organization won the bid, and they were awarded with the project. Upon investigation, we came to know that the bid price we had quoted was told to the other organization by our own ex-QS. (Project manager, Contractor 3)

Information disorder

The media is a big source for creating information disorder. People working on project sometimes leak information. Which were later presented by the media in such a way that it causes a negative impact on project. General public perception can also be distorted with such actions. As illustrated below:

As I mentioned, impediments were not considered in the design phase. Now obviously, the construction team, client, consultant and contractor should have kept it between them only, but these things got leaked in media and they made NEWS that design for this project has neglected the presence of gas lines and sewerage lines. The public starts observing the project negatively, that the project is not good. (Project manager, Contractor 3)

Misuse of knowledge sharing tools

Mostly misuse of both formal and informal knowledge sharing tools are the reasons for knowledge leakage. As stated below:

One of our contactors shared information on LinkedIn. However, in that LinkedIn post he leaked some information which he should not. (Transport manager, Client)

Diverse stakeholders' involvement

There are different points in knowledge sharing. So, knowledge could get leaked from any one point. Letters as the official mode of communication are delivered through mail carrier. It can get lost, or the carrier can open it and read the letter. As illustrated below:

We have a rider in all our offices, or we have a courier service, with whom we have a contract for monthly payments. A mail carrier comes to your office, picks up your courier and takes it away. You have made an envelope, it can be lost on the way, it could be misused. There are very few cases. But it happens sometimes. The information, letters especially are gone in this way openly. (Transport manager, Client)

Knowledge protection

Non-disclosure agreement

Knowledge protection can occur through non-disclosure agreements. Which will clearly state that if an employee leaves the organization, he/she cannot disclose any information. As illustrated below:

We sign the non-disclosure agreement (NDA) with every employee. We sign 2 papers; one is contract and the other is NDA... by doing this our employees are legally covered with NDAs and the terms for that are that if you leave a project, you cannot share information for another one year. (Digital marketing manager, Digital marketing agency)

NDA is one way to protect knowledge leakage happening due to employee mobility.

Standard operating procedures

To protect knowledge from leakage, there are standard operating procedures (SOPs). These SOPs are implemented in different setting for example in the surveillance room. As illustrated below:

We have set up the SOP, the person watching the cameras will not use his personal phone... If there is something sensitive and they record it on their mobile, after that it can go anywhere. Now we do create SOPs you cannot plugin mouse, keyboard or USB, you can only view. (Transport manager, Client)

Implementing SOPs could minimize knowledge leakage due to information disorder and misuse of knowledge sharing tools.

Education and trainings

Organizations should provide training to protect knowledge. These training sessions contain information about what knowledge they could share and what they could not. As illustrated below:

Organizations hold regular training sessions. In general, there are advisory circular to all the people about the proper use of knowledge and when they are appointed, they are given this guideline that how do they handle these things and what is the proper professional, ethical behavior in this respect. (Senior project manager, Design consultant)

Education and training would reduce information disorder and misuse of knowledge sharing tools as result knowledge leakage would be reduced.

Sharing relevant knowledge

Sharing relevant knowledge protects knowledge. In projects, all team members know their roles and responsibilities. The knowledge is shared with them relevant to perform their task. As illustrated below:

If there is a site engineer or a construction manager or a site supervisor, they know about their roles. They are only told about the directions and instructions which are related to their work. Like if there is a site engineer, he gets site engineer related information. (Planning engineer, Contractor 2)

Sharing relevant knowledge would help to reduce knowledge leakage particularly when diverse stakeholders are involved.

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