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Learning from the ambiguous past with project reviews

Structured abstract

Purpose: Knowledge is supposedly a good ally of the future. Post project reviews aim to create knowledge and improvements based on the past, but what happens when those observations are ambiguous? Based on intriguing observations on developing structured post-project reviews, implications of the ambiguities of the past are analyzed and discussed.

Design/methodology/approach: The present research departed from an interactive clinical action research approach (Schein, 1987), employing several rounds of interaction over 11 months. The studied company had a clear objective to improve its project evaluations and learn from three past projects to improve future ones by developing a framework to facilitate project evaluation.

Findings: Despite top management support and a benevolent organizational climate, the development process encountered problems. The list of issues to consider grew ever more extensive, and the expected data refinement and accompanying insights did not happen. Participants debated what to observe, and there was uncertainty about how to link the elements and confusion and disagreement about what was learned.

Research limitations/implications: Learning from past projects was more problematic and difficult than predicted based on the post-project review literature. The past did purvey multiple interpretations.

Practical implications: Learning from the past is not effective if the goal is generating causal knowledge, scoring forms, and checklists for future use. Post project reviews provide an opportunity to decide what the past should be about rather than identifying what it was about.

Originality/value: The past might appear stable, but, when examined, ambiguity emerges. Research on knowledge generation from post-project reviews assumes that a project's past is more or less stable and agreed upon. However, this study addresses the critical role of ambiguity about the past and the challenges when organizations try to learn from history through project reviews and evaluation processes.

Keywords: Project review, post-project review, evaluation, action research, clinical, ambiguity, the ambiguity of the past, learning, knowledge, experience, the ambiguity of experience, assessment.

1. Introduction: Learning from the past

Intuitively, as projects often fail to deliver on their promises (Nelson, 2007), it is crucial to attempt to learn about their frailties. Post project reviews—sometimes also called ex-post project reviews—may help managers and employees to learn from the past and create new knowledge (Wheelwright and Clark, 1992; Koners and Goffin, 2007; Anbari *et al.*, 2008) in order to make projects more predictable and generate knowledge for future use as in facilitating foresight (Nathan, 2004). The effects of such post-project reviews (Goffin and Koners, 2005; Anbari *et al.*, 2008; Brady and Davies, 2004) have been researched in several industries, such as information systems (Dingsøyr, 2005; Newell *et al.,* 2006), space technology (Kotnour and Vergopia, 2005), construction (Franco *et al.,* 2004; Tan *et al.,* 2007; Scarbrough *et al.,* 2004; Chou and Leatemia, 2016), and capital goods suppliers (Brady and Davies, 2004), as well as within the areas of research and development (R&D) (Von Zedtwitz, 2003) and product development (Goffin and Koners, 2011; Koners and Goffin, 2007).

Reviews are understood as organizational development activities that facilitate knowledge generation (Goffin and Koners, 2011), lead the organization on the road to corporate success (Albert et al., 2017) and as a method of continuous improvement (Boer *et al.,* 2001). To develop insights, the past must be analyzable. This may not be a realistic assumption. Knowledge is supposedly a good ally of the future. It is often based on reflections on the past with a view toward their application in the future. Project reviews aim to make knowledge and improvements based on the past, but what happens when those observations are ambiguous? We often assume the past is analyzable and stable, but investigations of the past can open the black box of the past or create leaks (Callon and Latour, 1981). The past might be as uncertain as the future, and past experiences might not be as clear as expected (March, 2010). Interpretations might be ambiguous and subject to negotiation. Therefore, trying to learn from the past is a brave act.

Cohen *et al.* (1972) and March and Olsen (1982) were adamant that the past is inherently ambiguous. If so, this ambiguity must guide the research activity to get closer to the past. One way to get better access to history is to engage with it and investigate how experience is constructing the past (March, 2010). This is routinely done in many

ways (March, 2010:101). It may happen through interactions between university researchers and practitioners, as in 'mode 2 research' (MacIntosh and MacLean, 2001:1348); research in manufacturing (Hill *et al.,* 1999); or action research (Coughlan and Coghlan, 2002; Reason and Bradbury, 2002). With its constant flow back and forth between the theoretical and the practical, action research has theory-building potential (Westbrook, 1995). Action research studies share common themes, including focusing on research in action and being concurrent with the action; they also have a participative element and a sequence of events focused on problem-solving, action, and reflection (Altrichter *et al.,* 2002; Coughlan and Coghlan 2002).

Background for the present study

The manager of the computer integrated manufacturing (CIM) (Dean and Snell, 1996) systems group in an electronic device company asked researchers from the Copenhagen Business School (CBS) to help to improve the group's knowledge and to learn about project management.

The CIM manager was especially interested in developing a way to obtain knowledge about potential correlations between the different development approaches used in CIM projects and their outcomes. Approaches cover project management practices, means, and methods (Collyer and Warren, 2009).

Hence, the action research described here took the form of a clinical inquiry/research project (Schein, 2002). The CIM manager first pointed to two recent projects and later added one more project. These projects had been delivered to different manufacturing units, had very different project approaches, and were perceived quite differently by the receiving units and the users.

The present study is an essential inquiry because prior research on project evaluation has been based on a strong belief that knowledge is discoverable. The study aimed to facilitate a project review framework and capture knowledge with the involved actors. The results, as discussed in detail below, led to some surprising observations about the ambiguity and fluidity of knowledge that has not been addressed in prior research on post-project reviews.

The research process was interactive, adhering to action research guidelines (Coghlan and Shani, 2018) and outlined by Edgar Schein in what he called clinical research (Schein, 1987). Schein's client-driven approach starts with the client's needs and involves the researcher in the client's issues rather than involving the client in the researcher's issues (Karlsson, 2016).

The empirical observations from this collaborative study pointed to a need to further reflect on the process of generating knowledge from ex-post project reviews. The aim is not to generalize but to provide an alternative interpretation that might lead to an understanding of why learning from past projects is an honorable—and sometimes elusive—ambition.

Structure of the paper

This remainder first provides an overview of prior research on post-project evaluations and describes the action research approach. Clinical inquiry/research "involves the gathering [and analysis] of data in clinical settings that are created by people seeking help" (Schein, 2002:228). Accordingly, this paper includes a presentation of the interactive processes of the researchers and the client, the analysis conducted for and with the client, and the various efforts made to develop the framework to facilitate the learning process requested by the client. We present some reflections on the intriguing observations made during the study about the challenges associated with trying to learn from an ambiguous past. The final section offers conclusions.

2. Post project reviews

Post project reviews (PPRs) can be conducted in numerous ways (Busby, 1999; de Weerd-Nederhof *et al.,* 2002; Haass and Guzman, 2019; Schindler and Eppler, 2003) and with multiple objectives (Haass and Guzman, 2019) as to determine success or failure (Albert *et al.,* 2017) while the focus here is on using PPRs to learn from. The PPRs with focus on learning shares the view that the challenge is to generate, collect, and disseminate knowledge, as explained by Anbari *et al.* (2008: 633):

> The data gathered from post-project reviews provide the historical database from which future project teams can develop meaningful project plans based on their organization's project learning cycle.

> This database can provide project managers and teams with the information they need […]

Since the end of the 1950s (Koners and Goffin, 2005), PPRs have been recognized by practitioners and academics (Nelson, 2007) for private and public projects (Chou and Leatemia, 2016) as an appropriate method to capture experiences and generate knowledge about projects. There is a growing body of research dealing with the evaluation of projects concerning ex-ante, interim, and ex-post reviews. This has recently been critically reviewed by Haass and Guzman (2019). Their comprehensive review focuses on performance reviews rather than from a learning perspective. According to Koners and Goffin (2007), PPRs generate tacit and explicit knowledge and support project-to-project learning. Although their empirical foundation (Koners and Goffin, 2005) and theoretical underpinnings have been questioned (Haass and Guzman, 2019), the use of PPRs is accepted, and researchers claim that well-prepared and well-conducted PPRs will generate useful knowledge (Gwillim *et al.,* 2005; Koners and Goffin, 2005, 2007; Nelson, 2007; Yip *et al.,* 2019).

Research on learning from past projects has focused on identifying relevant knowledge using systematic approaches (Von Zedtwitz, 2002; Anbari *et al.,* 2008) to make tacit knowledge explicit. However, it is not easy to generate knowledge (Nonaka, 1995; Goffin and Koners, 2011), and several are concerned that PPRs focus too much on formal and technical aspects of the reviews (Koners and Goffin, 2005, 2007) or ”biased toward objectivistic short term evaluation” (Haass and Guzman, 2019: 17). Several studies have investigated the limitations of knowledge dissemination and noted issues with the diffusion of learning from one project to other projects and the wider organization (Anbari et al., 2008; Bresnen et al., 2003). Knowledge sharing can be difficult as knowledge is often locally created and nested (Scarbrough et al., 2004) and not easily generalized (Bresnen et al., 2003) or those outside the project may not regard the experiences useful for their situations (Newell et al., 2006).

Busby (1999) identified several limitations with project reviews: lack of data, shallow analysis of history, and lack of generalizations, but was still positive about the potential to learn from project reviews. Reluctance to share knowledge and lack of attention was addressed by Tan *et al*. (2007). The local and situated nature of the knowledge

generated in project reviews has been discussed by Bresnen *et al.* (2003). They mentioned how the social patterns, practices, and processes of each project affect knowledge generation. Knowledge generation processes in post-project reviews are generally not well understood (Busby, 1999). Findings indicate that the learning processes in project reviews are rather complex and evolves in a non-sequential way (de Weerd-Nederhof *et al.,* 2002).

Yip *et al.* (2019) discussed how a particular leadership style and cultural orientation against addressing problems and failures work against the use of PPRs. Serafeimidis and Smithson (2003) stress how knowledge generation requires open free debate and collective sensemaking (Weick, 1995). Surprisingly, in their empirical study, Serafeimidis and Smithson (2003) found that, despite management claiming to perform PPRs, they did not. Their study revealed that there were no incentives for the managers to engage in the reviews, and one of the companies in their study abandoned PPR, considering it to be a waste of resources. Furthermore, collective knowledge generation was found to conflict with individual career, departmental, and organizational hierarchies (Serafeimidis and Smithson, 2003). Others point to low levels of satisfaction with the reviews because of quality issues (Dingsøyr, 2005), lack of management support (Gwillim *et al.* 2005), and the observation that tacit knowledge is not easily extracted (Koners and Goffin, 2005), or the risk that employees might not consider the data to be reliable (Newel el at., 2006).

Although the task is challenging, PPR research is generally optimistic about its potential for knowledge generation (Anbari *et al.,* 2008; Brady and Davis, 2004; Busby, 2009; de Weerd-Nederhof *et al.,* 2002; Franco *et al.,* 2004; Goffin and Koners, 2011). Anbari and colleagues, are also optimistic and claim that constructing a historical database is relevant and states that it is possible to find the ”historical information” if one looks hard enough (Anbari *et al.,* 2008: 640).

However, the post-project review literature does not explicitly discuss what constitutes knowledge and what is privileged as knowledge in the processes but mentions the role of social patterns and processes (Bresnen *et al.,* 2003) and that reviews can stimulate metaphorical knowledge (Goffin and Koners, 2011).

Thus, there is a growing body of literature pointing to the usefulness of PPRs to generate knowledge for learning. However, there is a need for well-prepared and structured research to attain a high level of credibility, thereby increasing employers' trust in and use of reviews and understanding the challenges with learning from the past. Therefore, the present research question is as follows: Can an interactive action research approach—using the clinical action research approach—provide high-quality ex-post reviews that are trusted and found useful by the employees and managers involved?

3. Method: Clinical action research

Action research began with Kurt Lewin (1939/1997), and it has been applied to a richly diverse range of approaches (Marshall, 2011) documented in handbooks (O'Grady, 2013; Reason and Bradbury, 2002; Rowell et al. 2017). One definition of action research is "a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview [....] as a practice for the systematic development of knowing and knowledge" (Reason and Bradbury, 2002:1).

Lewin (1946) considered action research to include movements back and forth between an ever-deepening analysis of the problem situation and a series of research-based action experiments and analysis of the actions. As Lewin (1946:38) stated, action research is "a spiral of steps, each of which is composed of a circle of planning, action, and fact-finding about the result of the action." Action research is often depicted as a research cycle that includes an objective setting and a monitoring element and is carried out in several rounds (Coughlan and Coghlan 2002). Moreover, action research is not only about facilitating change. According to some, the only way to truly understand a system is to try to change it (Van de Ven, 2007:28); therefore, developing PPRs represents an opportunity to gain deep insights into the organization. By engaging organizational stakeholders in the process, the researcher directly gathers information on the study's context and the organization's desired outcomes (Liu, 2008).

Action research has developed into a diverse set of approaches (Reason and Bradbury, 2002). Initially, action research recommended taking research subjects or change

program targets and turning them into researchers of their own situation. Clinical research is different; the clinical situation and the research opportunity are created by the people seeking help (Schein, 2002). In the present study, the client and the researchers initially discussed the most suitable engagement approach. Action research with a low-level of client involvement, labeled contract, or expert consulting (Schein 2002:231) could have been an option if the purpose was merely to test or do limited experiments. However, after screening prior research in the field of post-project reviews, it was concluded that the present issue provided an opportunity to co-develop a framework that suited the company to help achieve a high-quality review framework as prior research has asked for (Dingsøyr, 2005). Besides, the action research had the needed management support (Gwillim *et al.,* 2005), and interactive involvement with the client could help overcome skepticism towards data (Newel *el at*., 2006) and lack of data (Busby, 1999).

The terms clinical inquiry and clinical research are used interchangeably (Schein, 2002). Clinical research represents action research initiated by a client, where there is a high level of involvement from the client and researcher (Schein, 2002:229). This separates clinical research from contract research and expert consulting (Schein, 2002), where the client is the receiver of advice. In clinical research, the product—and processes—are based on collaboration and co-construction between the researcher and the client. The initial operating mandate in the clinical perspective (Schein, 1987) starts with "a conversation between the researcher and the organization to identify the intersection between the researcher's interests and the organization's business challenges" (Zhang *et al.,* 2015:160).

As clinical research has the advantage of being based on a client request, there are no issues about gaining access to the organization. The client organization will typically be interested in providing access to data, materials, employees, and meetings, as needed, and willing to participate in the intervention (Schein, 2002). On the one side, the "helping relationship limits the degree to which the helper can define a research agenda on top of the primary helping agenda." (Schein, 2002:231). On the other hand, the role as—invited—helper also potentially legitimizes a broader and more in-depth investigation than a researcher-driven approach would facilitate. Furthermore, clinical research's focus on helping provides an opportunity for new and unexpected data to

surface. Everything "the helper/clinician does is an intervention and, at the same time, every intervention reveals new data" (Schein, 2002:233). The data comes voluntarily from the organization members. The client is actively engaged in the process—not to improve the data but to improve the quality of the helping process (Schein, 2002).

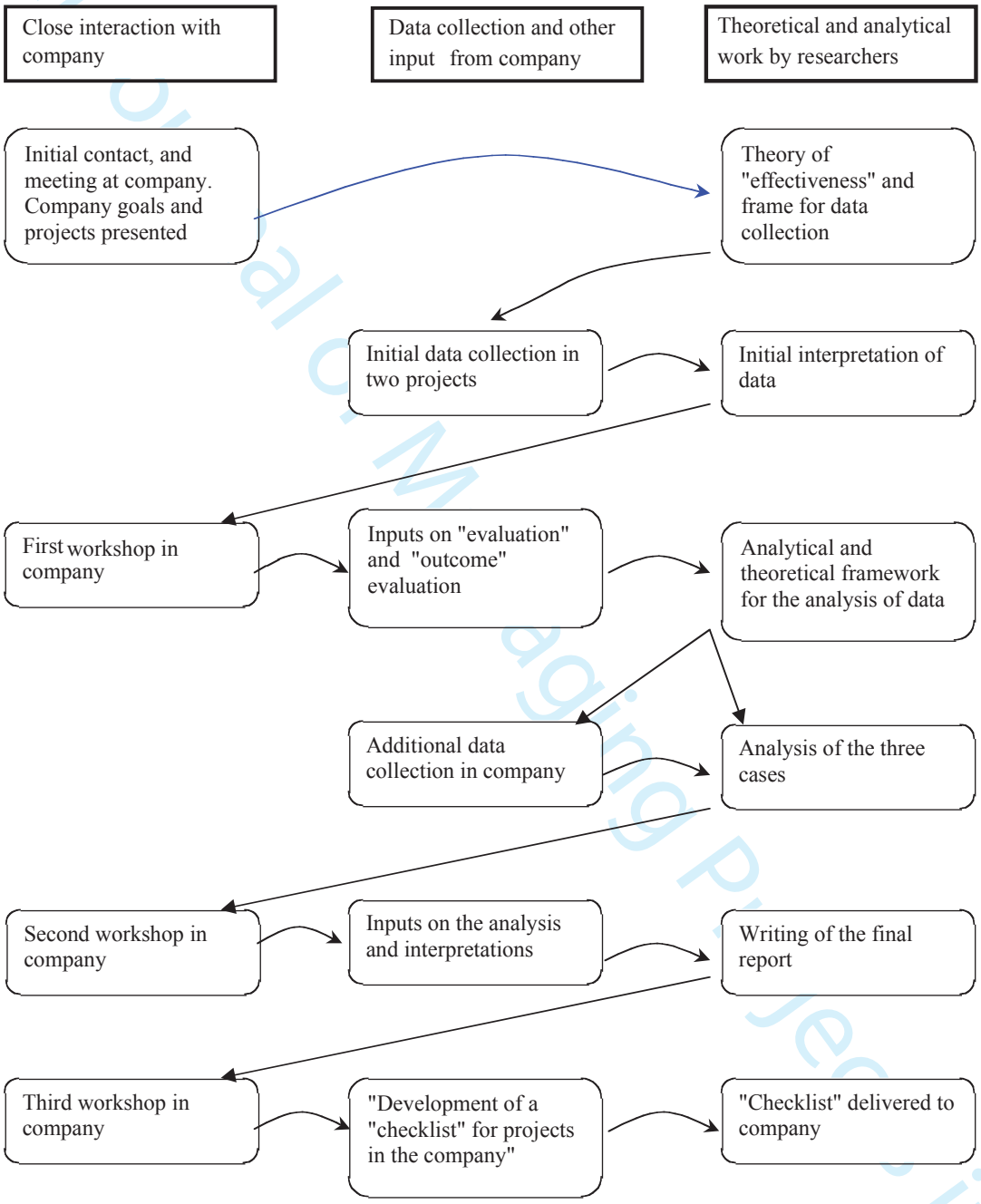

Figure 1: Interactive processes between the company and the researchers.

The iterative process in the present clinical action research is an adaption of action research to the specific circumstances (Zuber-Skerritt, 2003) and moved between

observations, data collection, analysis, construction of solutions, and critical debates and reflections. The workshops functioned as core anchors for presentations, discussions, and feedback, as well as agenda settings for the next steps in the process, thus sharing some similarities to the action research approach used by Coghlan and Coughlan (2006). They also organized their collaborative efforts around a series of meetings. In the present study, the first workshop was held three months after the initial project agreement, with the second and third workshops held at subsequent three-month intervals. The final checklist was delivered to the company two months after the third workshop.

Data collection and analysis

The researchers conducted 15 interviews undertaken in several rounds using interview protocols, which were progressively modified. Interviews were transcribed in full on 353 pages, and audio recordings of the workshops were transcribed on 103 pages. Copious notes and internal company documents were also gathered and stored in the project database shared by all researchers. Researchers also talked informally with employees from two manufacturing units involved in the three studied projects. In total, 20 days were spend in the organization.

The transcribed data from the first round of interviews was immediately analyzed by researchers as inputs to the first design efforts. Later, interviews served as feedback on preliminary drafts of the project review framework and inputs to the revisions. Interviews also provided data on the projects. Coding protocols were used for each framework development round to identify and classify interview statements into review area groups and sub-groups based on theoretical sampling, which is defined as follows:

> ”the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses data and decides which data to collect next and where to find them to develop theory as it emerges. This process of data collection is controlled by the emerging theory, whether substantive or formal” (Glaser, 1978:36).

The coding and analysis process used first-order concepts, second-order themes, and aggregate dimensions for each interview round (Gioia *et al.,* 2013). First, similarities and differences were grouped as first-order concepts, which were then grouped into second-order theoretical themes. Finally, aggregate dimensions were constructed by ordering the themes into groups (Gioia *et al.,* 2013:21). This was done separately by the two researchers for each round to facilitate the learning during the process, whereby researchers engage in an inquiry-reflection process (Coughlan and Coughlan, 2002).

Raelin (1997:567) considered the ability to reflect as critical for facilitating learning as "reflection constitutes the ability to uncover and make explicit to oneself what one has planned, observed, or achieved in practice [....] it is concerned with the reconstruction of meaning.". This reflection must be brought into the open to clearly understand the knowledge creation process and make it explicit to those involved (Coughlan and Coughlan, 2002). Such a dialogical approach to new knowledge creation "involves making knowledge relevant to the situation at hand" (Tsoukas, 2009:14) and includes a dialogue in which individuals negotiate their understandings. Tsoukas (2009) has pointed out that this involves the ability to make self- distanciation and accept new information.

The first interview round was based on a rough draft of a review framework proposal produced by the researchers. Following the intentions in action research were "initial questioning is followed through into action and threads back again iteratively to reflection" (Marshal, 2011: 249) interweaving reflection and practice to engage respondents in theory construction (Mouritsen and Kreiner, 2005). Schein suggested two main validation methods in clinical research. First, the interactive and always dynamic process helps researchers with ongoing testing and confirmation; if this constant testing is insufficient, the second criterion is replicability (Schein, 2002:235). Replicability requires that the interpretations are made transparent and that observations are shared and critically examined within the researcher team. External validity was achieved with the continuous cycles between the interviews, analysis, design/redesign of the framework, and workshops, as indicated in Figure 1.

4. The development of a post-project review framework

The client company manufactures luxury consumer electronic appliances, has approximately 2,000 employees, and operates internationally from Europe. CIM systems provide significant advantages in multiple areas, such as improving productivity and engineering quality and decreasing design costs and lead times, by supporting the connection and coordination of a wide range of manufacturing system activities (Rehg and Kraebber, 2004). The development and implementation of CIM systems are considered critical in achieving the benefits (Spanos, 2012).

The CIM manager had been working on software development in the company for eight years. Five years before the present study, he was asked to form a group focused on the design, development, and implementation of computer-integrated software for the various assembly and manufacturing units. The CIM group originally consisted of seven employees: four programmers, one senior programmer, one technician, and the manager. The senior programmer was promoted to assistant manager at the end of the clinical research project. The company's central IT department had more than 60 employees.

As the CIM manager explained, the CIM group focuses on software that "integrates various systems, but [is] not intended to automate everything or integrate everything, instead [it is intended] to create systems that support the production and the operators." Typically, the CIM employees handled the technical design, development, and implementation, while employees from the relevant manufacturing units provided specific knowledge of the processes to be managed. The CIM manager had tried different ways to develop the CIM employees' skills and methods to improve overall productivity and ensure successful processes and projects.

Two research project objectives were agreed upon in meetings with the two CIM group managers. 1) from prior research and interactions with the company, identify relevant criteria for the evaluation of past projects. 2) facilitate the learning process by stimulating a discussion of possible relationships between project approaches and their outcomes. These objectives should be accomplished by analyzing—together with the employees—past projects. Furthermore, the following questions were posed: did some approaches produce better results than others? What knowledge could be gathered from past projects?

Three workshops were held to discuss the development of the reviews intended to facilitate ex-post learning. The agenda for each was negotiated with the managers beforehand. The format was the same for each workshop: Researchers presented some results from their reflections and analysis. Employees commented on these and came up with suggestions for the next round. The floor was open for comments from all. All workshops were scheduled to last 11/2 hours, and participants are shown in table 1.

First workshop	**Second workshop**	**Third workshop**
One CIM programmer	Three CIM programmers	Four CIM programmers
One senior programmer/Assistant manager	One senior programmer/ Assistant manager	
CIM group manager	CIM group manager	CIM group manager
		Two managers from central IT department
	One manager manufacturing	One manager and one employee from manufacturing
Two researchers	Two researchers	Two researchers

Table 1: Participants in the three workshops.

The researchers identified criteria from prior research on organizational performance evaluation (Scott and Davis, 2007). Campel (1977) identified 30 criteria used in studies of organizations, and Cameron (1978) identified nine dimensions, while Steers (1975) demonstrated that different types of criteria were used differently based on the situation and project which has recently been confirmed by Albert et al. (2017). Already Friedlander and Pickle (1968) showed how constituents used different criteria for different sets of values, and Cameron and Quinn (2011) discussed how criteria might be competing and represent opposite values (e.g., control versus flexibility). Furthermore, according to Connolly *et al.* (1980), the representation of different values requires a multiple-constituency approach. Taskinen and Smeds (1999) developed a framework to measure the management of change projects, but their scoring was not explicitly explained. A recent review has confirmed that reviews of projects,

concerning success, is characterized by company and project adaptations and variations, including both hard and soft measurements (Albert et al., 2017) and various stakeholders have their own favorites (Connolly et al., 1980; Albert et al. 2017). Three main categories (Scott and Davis, 2007) emerged as relevant for developing a framework to facilitate PPRs and learning: project objectives, internal process, and knowledge management. Project management studies were used to develop project objectives (Anbari et al., 2008; Collier et al., 1996). These categories were first discussed with the CIM manager and the assistant manager and later addressed in the employee interviews (Table 2).

Meeting project objectives • Resources • Time • Technical quality • Other project objectives
Internal process in projects • Internal collaboration processes • Motivation and enthusiasm among participants
Knowledge management performance • Creation of knowledge • Integration of knowledge

Table 2: Three sets of criteria for ex-post project review derived by the researchers and used in the first interviews with employers.

To gain more in-depth knowledge about the CIM projects, field test the criteria, and receive comments from the employees, data from interviews and internal material was collected on two recent projects. The first project involved developing planning and control software for the assembly of electrical devices on a production line using a new technology called Paolina. The second project, Conveyer, was intended to manage the production line of a new consumer appliance.

The interviews became occasions for dialogue (Skordoulis and Dawson, 2007) in line with action research thinking (Reason and Bradbury, 2002) and reflections (Dewey, 1933) and even theory building (Kreiner and Mouritsen, 2005) in a disciplined way

(Marshall, 2011). This approach facilitated the creation of a marketplace (agora) of reflection. It helped "[c]ultivate a culture of trust within the 'marketplace'—to create a non-threatening climate in which dialogue can freely occur" and "[c]reate an alignment of unconventional vision—to foster lateral thinking and new collaborations" (Skordoulis and Dawson, 2007:1000), but being aware of potential defensive routines (Argyris, 1985).

After each round of development of the post-review framework, in between the workshops, at least two employees were asked to comment on the proposal and discuss the projects in the framework. The CIM employees found it interesting as it provided an opportunity to reflect on these projects. The CIM assistant manager said, "Just getting the projects into this framework is an accomplishment."

The first workshop: Presenting a first draft framework and adding another project

The employee interactions, the interviews, and the analytical work with the framework expanded the framework to 25 criteria (Table 3), which was mailed to the participants before the first workshop. The table thus represents the researchers' work based on the first round of interactions and is an intermediate product to the first workshop.

Meeting project objectives Specification of: • Resources • Time plan • Technical solution • Other project objectives Management of: • Budget • Time plan • Technical solution • Other project objectives	Knowledge management performance • Reflections on resources • Reflections on time • Reflections on technical solutions • Reflections on results (outcome objectives) • Reflections on knowledge sharing • Management of resources • Management of time • Management of technical solutions • Management of results (outcomes) • Management of knowledge sharing during the project
Internal process in projects • Knowledge about the competences of others • Shared objectives • Agreement on means • Motivation for the project • Communication • Conflicts solved/addressed • Acceptance of new ideas	

Table 3: The 25 criteria presented at the first workshop.

It was suggested from the first workshop that the criteria were scored on a five-point Likert scale from 1 to 5, with 5 indicating desirable behavior. Table 4 shows sample scores for three indicators. Detailed scores were not prepared for all 25 criteria at the first workshop, but the methodology was demonstrated and discussed by scoring one of the projects. The employees explicitly asked for "comprehensible" scoring scales to avoid misunderstandings and use the scales in other projects.

Area / Score / Indicator		1	2	3	4	5
Planning	*Specification of budget upfront*	No specification for any area	No specification, but there is an overall budget	Specifications for some areas, and overall budget	Specifications for most areas and overall budget	Specifications for all areas and overall budget
Internal process	*Involvement in project*	Little interest in project	Some show some interest	Many are keen to participate	Most are keen to participate	Everyone is keen to participate
Know-ledge manage-ment	*Thoughts on knowledge sharing*	Not consid-ered	Some thoughts, but not on type and not on how	Some thoughts on type but not on how	Some thoughts on type and on how	Some thoughts on type and on how (de-pending on the type)

Table 4: Example five-point scorecard for three indicators for the first workshop.

Table 4 represents an example of the researchers' work trying to adjust to employers requirements. This spurred further debate. Otherwise, the conversation at the first workshop centered around a general debate on project evaluations, comments on the presented criteria; and discussion of the researchers' initial scoring of the Paolina project. The CIM manager then suggested including a third project in the analysis. The Soft Flow Control project (SFC) aimed to move several production systems to a new programming language since the existing system could not handle needed functionalities.

In the table with the project summary below here, project approaches represent the selection of project management practices, means, and methods used by the specific project (Collyer and Warren, 2009). Two of the projects were formally organized. *Paolina* was a team-based effort working with a prototyping approach. This implied many software iterations implemented and then "tested" in actual use in manufacturing, and followed but updates in many rounds. *Conveyor* followed a more traditional waterfall approach, with detailed analysis and development and implementation. The *SFC* project was not officially established as a project.

Project	Paolina	Conveyor	Soft flow control (SFC)
Objective	Assembly line support system	Assembly line support system	Migration of several systems to new Java-based system
Special challenges	New assembly line and new programming language.	Customized production. Training users in producing specifications.	Employee empowerment in production flow
Approach	Prototyping. Some external collaboration.	Waterfall. Detailed analysis followed by development	Infrequent meetings. Manufacturing unit acquired software from an external vendor.
Project management	Three developers worked independently with little formalization. Weak collaboration with users.	Formalized objectives and planning with regular user-meetings and suggestions for improvements	Ad-hoc, as other activities allowed
Perception in manufacturing	Chaotic at first but finally worked	Built on prior system modules and was well executed	Lack of communication
Time	18 months	12 months	Scheduled to six months, but closed after three years.

Table 5: Summary of the three selected CIM projects

In the first workshop, 90% of the time was spent revisiting the Paolina and Conveyer projects. The participants explained and discussed what actually happened and why and how different stakeholders were involved. Only in the last 10 minutes of the workshop did the CIM manager begin to reflect on the future use of the framework and how it could improve the preparation, planning, and management of new projects. The assistant manager then asked about connections between approaches and outcomes.

The first workshop concluded with an agreement to further develop the framework by adding explicit scoring for all dimensions and including an outcome dimension to document what the projects produced and the effect(s) of project outcomes. It was

decided that some criteria could focus on staying within time and budget, but there should also be technical, knowledge management, and employee-related criteria. A distinction between short- and long-term effects was also discussed.

Expanding the project review framework

Following the first workshop, subsequent interviews with employees and managers, and discussions among the researchers, three sets of criteria with 13 additional performance indicators were identified and later put into a table (Table 6).

Evaluation of short-term outcomes	Evaluation of long-term outcomes (effects)
System criteria: • On budget • On-time • Functionality regarding - System stability - System performance Participant and motivational criteria: • Produced a collaborative spirit • Motivation for project work • Stimulating project management style	Technical aspects: • Re-usability of solutions • Robustness of solution • Maintenance evaluation Knowledge management criteria • Level of integration of knowledge

Table 6: Additional short- and long-term outcome performance indicators developed between the first and second workshop

The 13 performance criteria were identified and drafted by the researchers, discussed with CIM team members at the second workshop, and subsequently added to the complete list shown in table 7. Surprisingly for the researchers was the particular interest from the employers of assessment of knowledge sharing and the internal project processes. The complete list was organized into four groups of criteria by the researchers.

Criteria regarding objectives
1) Specification of the budget before the project start
2) Specification of the schedule (plan) before the project start
3) Specification of the technical solution before project start
4) Specification of other objectives and deliverables before project start
5) Monitoring of the budget during project execution against performance baseline
6) Monitoring of plans (time) during project execution against performance baseline
7) Monitoring of the technical solution during project execution against performance baseline

8) Monitoring of the project objectives during project execution against performance baseline

Criteria regarding internal processes

1) Degree of knowledge about competences of others
2) Degree of shared and agreed on project objectives
3) A shared view of the road to the objectives (means-ends)
4) Level of commitment to the project
5) Level of communication within the project
6) Shared and agreed-upon solutions are implemented in the final product
7) Openness to new ideas during project execution

Criteria for knowledge management

1) Degree of thoroughness in dealing with resource issues
2) Degree of thoroughness in dealing with time estimates
3) Degree of thoroughness in dealing with technical objectives
4) Degree of thoroughness in dealing with final project objectives and deliverables
5) Degree of thoroughness in dealing with knowledge sharing
6) Degree of thoroughness in dealing with resource planning and allocation
7) Degree of thoroughness in dealing with monitoring time planning
8) Degree of thoroughness in dealing with monitoring technical objectives
9) Degree of thoroughness in dealing with monitoring project objectives and deliverables
10) Degree of thoroughness in dealing with monitoring knowledge sharing

Criteria regarding outcome evaluation

1) Is the project within the budget?
2) Is the project on time?
3) Is functionality as desired and against project performance baseline?
4) Is the system in stable operation?
5) Is system) performance within the planned and against performance baseline?
6) Participants' evaluation of involvement, task integration, and competences?
7) Degree of collaboration during project execution related to conflict handling, communication, and meetings
8) Level of motivation for the project work related to engagement and collaboration (cohesion)
9) Project manager pays attention to both progress and organizational issues
10) Level of potential re-use of both technical competencies and experiences from the project process in other projects
11) Robustness of the system solution concerning changes and further development
12) Smooth and quick system maintenance possible?
13) Excellent level of integration of participants' knowledge into the solution?

Table 7: The 38 evaluation criteria, organized into four groups

Second workshop: Discussion of the revised framework

A detailed presentation and discussion of the framework (table 7 here) and the scoring (scales) for each project were prepared and presented. The debate in this workshop centered on the indicators in general but also continued the search for the correct version of the past. The attendees, especially the CIM manager and the assistant manager, engaged with great enthusiasm in the search for explanations of how and why the three projects developed as they did. Participants suggested modifications for some

scores but openly recognized that during the projects and afterward (i.e., at the time of the workshop), there were ambiguities regarding what had actually happened and why. The participants were less occupied with trying to establish relationships between cause and effect but more interested in trying to explain how and why the projects developed as they did; in this way, they were trying to agree on the sensemaking of the projects.

Generally, there was enthusiasm about the potential of the proposed framework and the indicators, as one employee said:

> This is a thing that I would use in any kind of project. Not only an IT project, but it could be [used in] other things also [….] Generally, we experience things, then, when things go bananas, it is the first time we deal with issues. However, [there are] other issues [that] we know that should have been dealt with from the start.

The assistant manager added, "We could use it [the framework] from when we begin writing about the goals [….] Also, [we could use it] to make it clear what the ambitions are regarding outcomes [and] to level aspirations that are different among stakeholders."

The comments on the actual possibility of ex-post project reviews based on the framework were also engaging. However, participants now surprisingly wondered whether they genuinely needed all of the criteria. One reflection from several participants facilitated the creation of a narrative that reduced the importance of the criteria on documentation and planning as unnecessary formalization. Furthermore, the participants remarked that documentation would reduce the possibility of managing the projects. Some participants suggested that clear objectives might potentially reduce the motivation and engagement of crucial CIM staff members, who were considered essential for project progress.

Therefore, the criterion on explicit project objectives was now considered optional, since unclear and even conflicting project objectives were allowed, as long as the project supported the company objectives. Also, the criterion for the establishment of a formal project organization was not considered compliant with the informal nature of

the CIM projects, which operate across the organizational hierarchy. The criterion regarding technical specifications was also viewed as less relevant by some. Often the technologies changed during the CIM projects, or the participants did not use the specifications. Another divergent narrative that emerged from the conversation was about performance management in terms of calculating used resources (e.g., hours or money spent). It was argued that it would kill projects by diverting focus from the objectives, such as in the case of improving the performance of the production system too (unnecessary) calculations.

Furthermore, a growing concern emerged, led by the CIM manager, about whether it was possible and relevant to identify cause and effect. Was it really possible to identify relationships between different project approaches and different outcomes? A performance criteria discussion introduced a new debate on contingency behavior in project management. The conversation moved away from why some projects did not score high on specific criteria toward why a specific project might deliberately choose (or be forced to choose or allow) an approach with lower ambitions and a lower score (such as not preparing a project plan) than the ideal world (the framework) would urge projects to do. For example, participants discussed why they might deliberately work on a project with little formal planning and a low user-motivation.

Finally, the meeting concluded with many reservations expressed about actually conducting ex-post project reviews because of concerns about the quality and representation of the data. However, the participants felt that the evaluation framework might still be useful. The CIM manager said that the CIM group "should make an assessment of the evaluation and scoring and [determine] whether what has been done is correct." The CIM assistant manager added, "I think this is good to have [the scoring framework] before one starts on a project because we have to evaluate [the project] on these issues—either in the process or afterward. Maybe even during the project." Besides, a CIM employee added that "It is essential that the scoring is correct; otherwise, the conclusions will be wrong. It is an excellent framework that has been developed, but with the wrong scorings, then there will be wrong conclusions."

Furthermore, the CIM manager added:

> Something that I feel has been powerful, if those involved are summoned for a review […] and if it is those people whom we will work with in the next project. Moreover, that is if we walk through this and then we will be standing very firmly next time. [We can ask ourselves] how did we do this last time, and what was the outcome of that? Are there some areas where we could improve, or was it actually fine, and should we just do it the same way? [….] It is an excellent foundation for having a debate on how to conduct projects [….] To say: here are some relevant questions—and if this is going to be a success then we need to look this through and check [and ask ourselves]: how are we actually doing on these dimensions?

The original request to the researchers—to help evaluate the projects and identify some form of consequentiality in the approaches since some practices were supposedly more efficient in producing certain outcomes than others—was still supported by the CIM manager and the assistant manager. However, at the same time—at the closing of the meeting—the CIM manager presented the idea of using the developed framework as a checklist:

> A specific way to use the framework […] as soon as we have it set up and [it is] agreed upon, then we can, from the beginning of a project, consider "this new project, which has this scope." Then, we can evaluate how the process needs to be carried out, as we know how certain practices are better in producing certain results than others.

The CIM assistant manager added:

> This will be very strong if these outcomes here can be related to specific practices and different types of approaches [….] What effect would it have to have such a framework to discuss in project meetings to prepare a type of grading of projects? That would stimulate debate in these meetings.

A final concern at the second workshop was if the data collected by the researchers were sufficient and representative. Researchers were asked to interview more

employees, especially in the units that had 'received' the outputs from the three projects analyzed. The second workshop ended with the researchers promising to recheck the data, and the employees were asked to check whether they had more comments and input to submit. The researchers also promised to double-check the project scoring with the employees and contact additional employees for their input. The researchers agreed to develop the evaluation of the project outcomes further so that practices and outcomes could be discussed around a final scoring of the three projects.

Third workshop: More debate of the framework and the scoring

This workshop was held three months after the second workshop and after the CIM group had received a draft of the final report with the framework and updated scoring of the three projects. Additional follow-up interviews had also been conducted between the second and third workshops. During this time, the original CIM manager left the company to work for a consultancy, and his former assistant manager took over the responsibilities as the new CIM group manager.

The scoring of the three projects was plotted into spreadsheets for each project, compared in bar charts (Figure 2), and depicted in radar diagrams (Figures 3-5). The detailed material with post-project criteria and project reviews was distributed before the workshop.

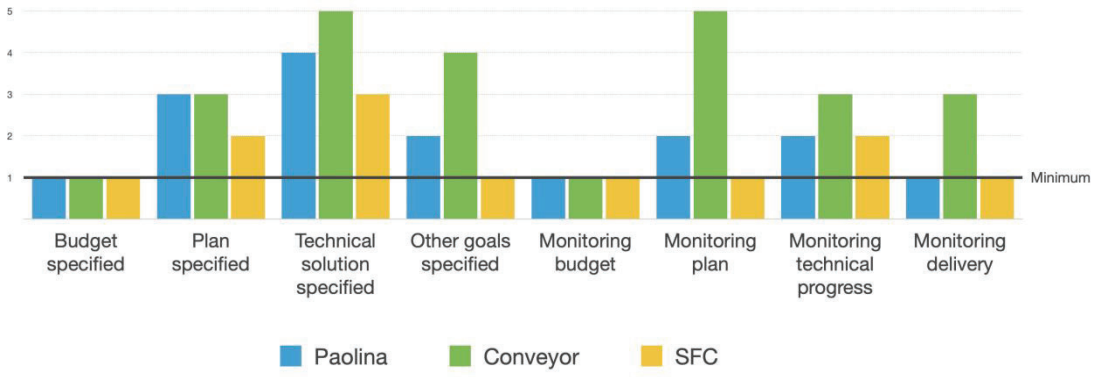

Figure 2: Comparison of the CIM projects based on post review criteria on project objectives and monitoring of these.

Figure 2 shows the scoring of the eight criteria regarding project objectives that are part of the 38 criteria indicated in table seven here. The scoring is based upon the data

obtained from employees and debates on the workshops - and uses the coding scheme developed in the project and indicated in table four here. Although researchers initially provided some suggestions, it is essential to remember that the selection of criteria was agreed upon in the forum with employees and managers before used. The scoring here indicates that none of the three projects had specified a budget and hence did not monitor it. The *Conveyor* project is scoring the highest of the three. That project had a rudimentary project plan, but a very detailed technical solution plan and other goals specified and did monitor progress according to these plans and the technical progress - to some degree, as also with the delivery to users from the project. The *Paolina* project did some planning and had some specifications regarding the technical expectations but did limited monitoring of these. The *SFC* project did rudimentary planning of the technical solution.

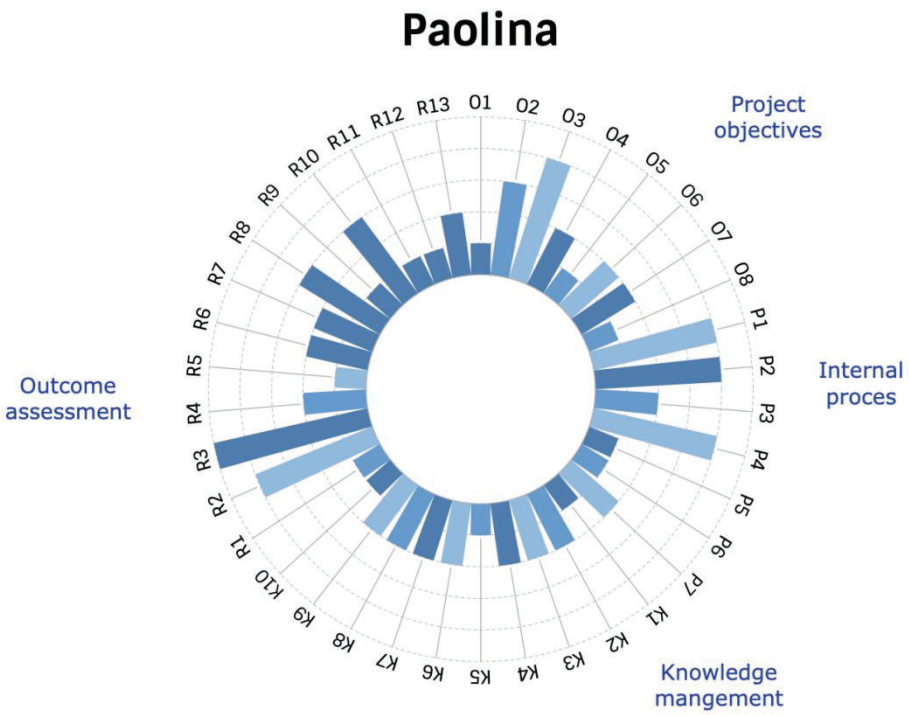

Figure 3: The Paolina post-project assessment.

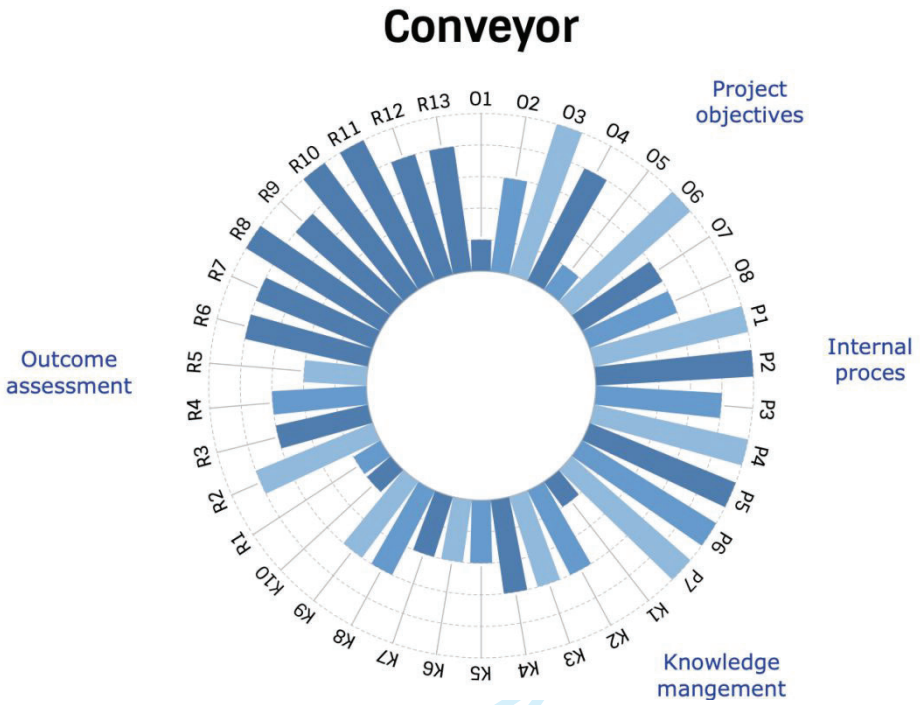

Figure 4: The Conveyor post-project assessment.

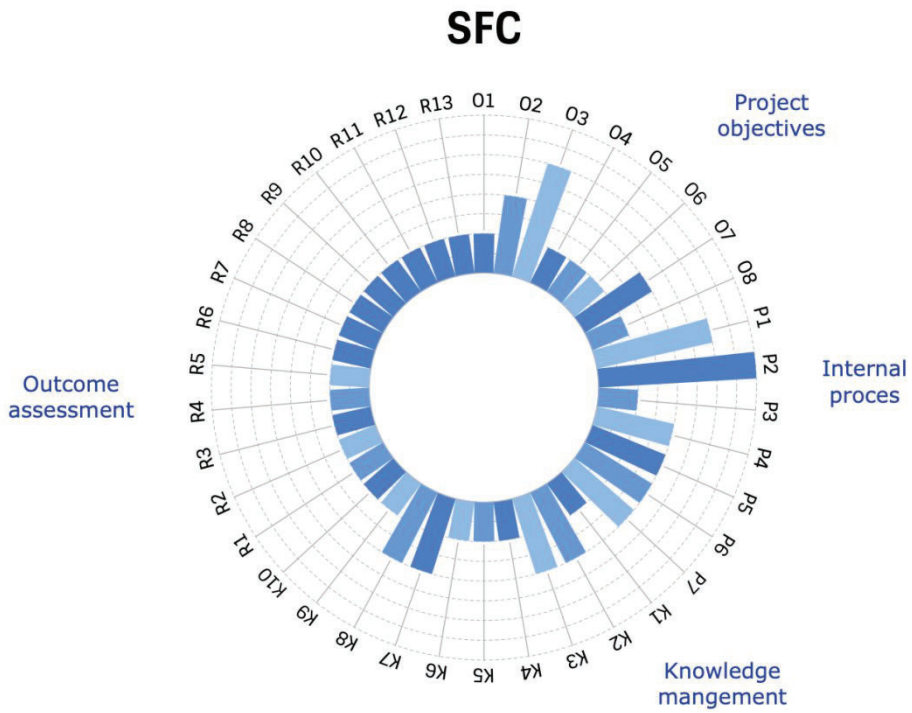

Figure 5: The SFC post-project assessment.

The results shown in figure 3-5 here are interesting because they were based on the interviews and inputs from participants, entered into the developed frameworks and debated on the workshops, indicating the engagement and energy put into the action learning project from the company. As the figures 3-5 shows, these indicate clear differences between the projects. However, managers and employees were reluctant to draw conclusions.

The researchers felt well prepared for the third workshop with additional data collection and projects scoring double-cheeked, having a comprehensive presentation and handouts ready for an intensive debate on how to relate the project processes to the outcomes. However, this did not happen. The researchers presented the ex-post evaluations—the condensed scoring—for each project and the different types of comparisons in tables and radar diagrams. However, employees' comment was fewer than expected. The individual scoring on the criteria and projects were briefly commented, and a few minor adjustments were suggested. However, the discussion did not focus on the relationship between project objectives, processes (behaviors), and outcomes, as had been expected. Still, even with this scoring, based on the interactive processes and the full assessment on the 38 criteria that the researchers could construct and present in figure 3-5 below here, the employees and managers where reluctant in drawing any conclusions.

Instead, new explanations and narratives emerged, led by the (new) CIM group manager, with some active supporters who joined the conversation or nodded along in the last hour of the workshop. This moved the debate from an analysis of the potential relationships between processes and outcomes to a discussion about the need to scrutinize the data and evaluations—again—and how the developed evaluation framework could be used. It became clear that the CIM manager did not want to push the ex-post reviews too hard. The main conclusion of the meeting was that the present study should be concluded in the form of a paper-based and online leaflet presenting the criteria as a checklist of things for project managers and employees to consider and for use for company training courses. The research team had to accept this conclusion and, after some adjustments and preparations two months later, mailed the material for the checklist with the ex-post review material to the CIM manager.

With that, the process faded out, the results were distilled into a modest checklist, and the much expected organizational learning from the ex-post project review did not occur. The researchers were left wondering: what happened?

5. Reflections on learning from the ambiguous past

The clinical research project started with great enthusiasm, and the level of collaboration was ideal. The company provided data, time, and attention towards the project and was engaged in the process. Then, something strange happened: the enthusiasm over time seemed nearly inversely related to the development and application of the evaluation framework. Objections arose about the possibilities of getting the right data and getting enough data, and the employees became increasingly concerned about the interpretation of the data. Condensing the employer's statements would be like: 'We wanted a framework because we thought it would be useful, but now we are in doubt. What we hoped for is not what we need!' Their reactions seem similar to what Harrison and March (1984) describe as a post-decision surprise where projects are supported with great enthusiasm until users and customers get disappointed about the meager outcomes that are far from the dreams that sold the project. However, there might be more in the events than disappointments.

Phase	**Dominant discourse**
Initial (Month 0)	Facilitating a review of past projects and learning from processes and their outcomes
The first workshop (Month 3)	Confirming the collaboration objectives and collecting comments on the initial framework
The second workshop (Month 6)	Confirming the study objective Addressing participant requests for more focus on the outcome (results side) of the framework Exploring questions about the completed portion of the evaluation—is it correct? Can it be correct?
The third workshop (Month 9)	Confirming that the process has been interesting, but that scoring is complicated, and that inspiration for future projects is now the objective
Delivery (Month 11)	Transforming the framework into a checklist

Table 8: Condensed overview of the clinical action research project discourses.

The focus of the discussions in the clinical action research project moved from the identification of causality to questions about contingencies and the 'right' version of the past. The clinical project proved that it is notoriously tricky to freeze one version of the past; interpretations of history are never frozen but change over time and have great flexibility (March, 2010:110). Moreover, the performance indicators and ex-post reviews seemed to spur a series of discussions instead of ending in a conclusion. The meticulously crafted, debated, tested, and presented framework and scoring system suddenly seemed very fragile, and without many friends (Akrich *et al.,* 2002). As the truth seemed to be obscured (March, 2010:65), and various individuals did not share the same understanding of the evaluated projects or was unsure about what version of the past to rely on, the researchers hope for a collective sensemaking process (Weick, 1995) did not happen. There were dialogical exchanges, but as pointed out, a productive dialogue that can produce new distinctions requires that participants engage in relational engagement with each other to take joint responsibility for the task at hand (Tsoukas, 2009), but that was challenged by the ambiguity about the past. Instead, dialogue remained what Tsoukas labels 'unproductive' as it failed to ”spark a new shared understanding” and continued as “talk in parallel conversations, "never finding a common language" (Argyris 2002:7)“ (Tsoukas, 2009:944).

Initially, the past was regarded as an essential source of knowledge. Subsequently, questions about the reliability of the knowledge constructs were raised, followed by concerns about whether knowledge about the past was reliable and whether additional aspects should be included. This process raises some interesting issues about the nature of ex-post project reviews.

Reflections on the clinical action research project

First, the evaluation framework was constructed around effects that can be quantified. Criteria need narratives. It is noteworthy that the participants got what they initially wanted but became surprised about their creation (Harrison and March, 1984). Two things happened: they could not agree on the narratives produced, and they did not want

to stop the debates, agree on one version and black-box (Callon and Latour, 1981) the past. Besides, the research-based knowledge about the causal structure of organizational performance—and, thus, project performance—is, at best, incomplete (March, 2010:54). The present study shows that effects are not too difficult to imagine, and it is always possible to extend the range of dimensions. However, it is much more challenging to imagine causality (Sarasvathy, 2001). Specifically, it is difficult to imagine how actions may alter the effects, and, when participants refer to some sort of narrative, they do so to link performance to possibilities for interventions. As Ryle (2000) pointed out, there is a space between an action and an outcome. Actions may be fathomable as such, but, given that people always react in situations with unacknowledged conditions and unintended effects, it is difficult to assume that prediction is a logical and causal effect of action. Learning from experience becomes difficult when "what happened is unclear, and in which the causality of events is difficult to untangle" (March and Olsen 1982:55). The initial requirement from the CIM manager to try to compare approaches with the outcome to determine effects was proven impossible as participants in the workshops were reluctant to try to establish any causal relationships. When researchers tested some possible relationships, disagreements on how to evaluate past experiences (March, 1994) were outspoken. March (1994) explains that there is a complex social construction behind any notion of success or failure, as context, relations, and past experiences influence the interpretations.

Second, an evaluation might not only involve applying a global framework but may also entail searching for meaning in new and existing criteria (Kreiner, 2014). Evaluation criteria simplify the world irrespective of how many there are. However, criteria are always one-dimensional, and even the presence of many one-dimensional criteria does not mean that they will add up to a multidimensional mode of evaluation. Yes, there are many dimensions, but they represent choices and simplifications. If two projects were evaluated as identical based on the criteria, the evaluators would need to find new criteria to differentiate the projects.

Is it possible to establish relevant evaluation criteria in order to review a project and compare those criteria? We should not confuse models of reality with reality itself as "the map is not the territory" (Korzybski, 2000:58). It is impossible to make a map that accurately represents the world or a project since it would require having another

copy of the world at hand (Eco, 1998). Maps—and evaluation criteria—help determine what is relevant for the task at hand; (most) other things are removed so that the map can be drawn. The features and the criteria represent the outcomes of negotiations and sensemaking (Weick, 1995), which, as a social artifact, represent the processes and those involved. According to Korzybski (2000:xvii), "every map is at least, whatever else it may claim to map, a map of the map-maker: her/his assumptions, skills, worldview, etc." One explanation could be that the CIM group was reluctant to reduce their complex world to create a simpler world (March, 2010:113-4).

Third, evaluation and reviews do not fill out the future. As the different versions of the past show, it is possible—and likely—that projects turn out in surprising ways. Rather than taking the criteria and reviews done at face value, the employees spoke about forgetting and forgiving instead of about abandoning criteria (Mouritsen and Kreiner, 2016). Project reviews provide a cathartic function and shares similarities with religious rituals (Nocentini, 1985). It is an act of purification and a chance of admitting one's sins, getting absolution, and granted permission to continue. The CIM employees ended up asking for not having to tight—if any—project objectives in the review framework! This is surprising as they initially suggested that as one of the criteria needed, adhering to classical project management recommendations (Müller and Jugdev, 2012). However, it is essential that the organizational climate allows that promises can be forgotten if realities and conditions turn out to be different from those that were assumed and if actions may have unintended consequences that others would have to bear. Therefore, perhaps the point is not so much to apply the criteria and conduct the project reviews but to make sure that the evaluations can be taken seriously enough for them to be forgettable if conditions change and that actions that have consequences for others can be forgiven if the complexity or difficulties are higher than expected.

Fourth, reviews and interactive clinical research projects might be understood as more than a rational, calculative exercise. James March (1991) offers an alternative understanding of behavior from a non-instrumental point of view, which is relevant when decision processes might be about other things than making decisions and reviews. March (1991:110) noted that a choice process (e.g., a workshop meeting) is an opportunity in several ways:

- An opportunity to define virtue and interpreting what is—or has—happened.

- Distributing glory and blame and reaffirming relationships.
- Socializing and educating the young.
- Having a good time and enjoying the pleasure of taking part in a decision situation.

So the discussions and workshops meetings do not need to come to closure as we usually expect. The list even explains why we need more meetings in the future.

Fifth, could other research approaches have been used? Choices need to consider objectives and the client's needs, ambitions, resources, and commitment. Furthermore, the present application of clinical action research has been based on a situation-specific adaptation of action research with its model, as called for by Zuber-Skerritt (2003) and thus contributing to the field of action research. After careful negotiations and investigations, the present research project settled an agreement with the involved company and the managers of the researched organizational unit in focus, the CIM group, to apply the clinical research methodology. As we have already mentioned, there are many variations and adaptations of action research (Marshall, 2011), as traditional action research (Reason and Bradbury, 2002), where the ambition is to engage the employer/client to become researchers of their own issues. This is sometimes carried out as participatory action research where the core of the action research is "liberation" of the individuals (Nyemba and Mayer, 2018), and others have developed approaches like collaborative improvement focusing on learning (Coghlan and Coughlan, 2018). However, the client here did explicitly want the assistance from researchers to help to provide suggestions and process assistance, so the clinical approach (Schein, 2002) was considered appropriate.

Implications from the observations for ex-post project reviews

Research into the use of ex-post project reviews indicates several limitations, such as a lack of data (Busby, 1999), the non-linear nature of the knowledge generation process (de Weerd-Nederhof *et al.,* 2002), the difficulty of extracting tacit knowledge (Goffin and Koners, 2011), and the difficulty of identifying relevant knowledge (Newell *et al.,* 2004). The literature remains positive overall about the possibilities of learning from project evaluations (Anbari et al, 2008; von Zedtwitz, 2003; Haas and Guzman, 2019).

Many authors are optimistic about the reviews, as discussed in the introduction here, while there is also skeptical voices, who warn that any framework should be fitted to project needs (Anbari et al, 2008) and against general frameworks: "We argue for the unfeasibility of a general framework for project evaluation. Instead, we contend for an adaptive approach..." (Haass and Guzman, 2019). Hence, the ambition with the present action research project, was never to develop a global or universal framework, but one that departed from the identified needs of the organization. Knowledge creation, however, means that different actors agree on what is dependable knowledge:

> A reliable learning process is one by which an organization develops common understandings of its experience and makes its interpretations public, stable, and shared. A valid learning process is one by which an organization is able to understand, predict, and control its environment (March*, et al.,* 1991:6).

The idea of learning from the past assumes there is one specific version of history that is truer than other versions. Rather than extracting hidden or tacit knowledge (Goffin and Koners, 2011), we should consider how organizations struggle to produce experience (March, 2010). In the present study, the ex-post review presentations became occasions to discuss the projects but a conclusion was not reached. Ambiguities about past projects allowed multiple, open-ended interpretations. As March*, et al.* (1991:6) stated, "[m]eaning is not self-evident but must be constructed and shared. Many different interpretations are both supportable and refutable."

As pointed out by Dawson and Buchanan (2005), organizations have competing narratives, and the winning one depends on the outcome of political processes and who owns—or receives—the right to edit the narrative. Narratives might be based on individual experience, which can be the product of a transactional relationship between the subject and the environment, which mutually constitute each other as our understanding is influenced by the feedback we get (Roth and Jornet, 2014). Therefore, organizational experience becomes the outcome of multiple, complex construction processes (March, 2010). In the present study, no 'winner' was declared. Different constituents can represent various preferences, have different opinions on means-ends, and produce controversies; however, in the present study, the controversies remained

open and unsolved or could be used as springboards for new explorations (Christiansen and Gasparin, 2016).

Are ex-post project reviews interpretations that can be considered as boundary objects bridging different worlds (Christiansen and Varnes, 2007)—the past, the present, and the future—or do they become actors, which are acted upon and supported or opposed? Prior research on organizational learning through PPRs in R&D (Koners and Goffin, 2005) included an awareness of different barriers. However, they were regarded as obstacles that sound policies, practices, and approaches could overcome in the quest to generate general abstract knowledge (Von Zedtwitz, 2002: 262). Koners and Goffin (2005) proposed metaphors, which allowed freer associations; however, the desire to identify and extract knowledge that is somewhat hidden from the actors themselves (Polanyi, 1958), not yet formalized (Nonaka and Takeuchi 1995) and 'unfathomable' (Bartley, 1990:32) is not only tricky and has political implications but also overlooks problems with the past that are not easily solved. Building on Bartley (1990), one could say that the ambitions of those who are in favor of PPRs are to construct knowledge that is independent of those who have constructed it. However, this also means—as Bartley points out (Bartley, 1990: 33)—that such unfathomable knowledge is filled with unsolved problems and arguments.

Learning from the past is inherently fraught with ambiguity (March and Olsen, 1975), and temporal heterogeneous project settings might offer few samples from which to learn (March *et al.,* 1991). Experiences from previous projects may be envisioned as a stable reservoir of the past, and some might argue that post evaluations are ”based on factual results” (Haass and Guzman, 2019: 9). However, they hardly are as “it is not clear what happened or why it happened. Ambiguity may be inherent in the events or be caused by the difficulties participants have in observing” (March and Olsen, 1982:154).

The aim of the present study to construct narratives and analyze and compare three past projects with a simplification (March and Levinthal, 1993) through project review (Haass and Guzman, 2019) hardly became more than a noble ambition. The ambiguity of the past puts more emphasis on approaches focused on interpretation instead of analysis. While the dominant research approach in ex-post project reviews has focused

on analysis, the present study shows that "imagination becomes as least as important as observation" (March, 2010:109). The intended simplification into some form of a calculable project review template produced controversies (Christiansen and Gasparin, 2016). Employees first support the identification of dimensions to do the project reviews but later problematized the constructed narratives and scoring. The original aspirations changed. We can only speculate, but changes in an organization's objectives are not unusual. An agreed on—a codified—version of the past project experiences in project reviews will inevitably promote one version of the past as the 'right one' and eliminate the option to present alternative interpretations (March, 2010).

6. Conclusion

This carefully designed interactive clinical action research project had a noble ambition—and research question—to determine whether it was possible to construct a framework that could help an organization conduct high-quality and trustworthy ex-post project reviews. It was important to anchor the project in the organization and employ close collaboration and interaction, as prior research had pointed to problems with both the quality of ex-post reviews and how employees and managers perceived them. The present study, therefore, was developed in close collaboration with the company and the CMI group, while simultaneously building on prior research on project reviews and organizational effectiveness.

The research presented here contributes to the literature on project management with a new view on ex-post project reviews, addressing the role of the ambiguity of the past when organizations and projects try to construct experiences from the past. This clinical action research study shows how the past was first the inspiration for initiating a learning process to reflect on past processes and outcomes and to learn how to make better and more deliberate choices in the future. Later, the past became a source for the generation of multiple interpretations of the past, which changed the focus of the research project into one with a much more modest ambition.

The interactive research collaboration with the company did not produce the analysis of causal relationships between inputs, approaches, processes, and outcomes that were hoped initially, as the participants moved away from this objective. Instead, the experiment fostered the development of some very individual and local explanations

that were not generalized. The construction of indicators to facilitate post-project reviews thus began the discussion but did not lead to conclusive outcomes.

Did the process produce reviews that were trusted and found useful by the employees and managers involved? The interest and engagement in the process was promising for a positive outcome. However, when confronted with preliminary scorings kept employees and managers to ask for further confirmation. The process stayed open. The ambiguity of the past could not be overcome. So initially, there where confidence in the framework but not in the outcomes. The employees were also enthusiastic about identifying criteria on knowledge sharing and the quality of the internal process, but did later argue, that many explicit constraints (e.g. time, cost, quality) might not be productive for the projects.

This opens for further research to investigate how various approaches and processes to learn from post-project reviews influence the process and outcomes of trying to produce experience from the ambiguous past. The observations here also challenges some of the intentions in action research and never dialogical attempts to facilitate sensemaking and shared understandings.

Among the practical implications is the observation that good intentions and attention cannot produce one version of the past, but that people might produce many narratives. The narratives each offers some insight into the past, but not the whole truth. That remains an elusive ideal, but also provides room for alternative interpretations. However, post-project reviews, the processes around its construction, and the functions of the review seem to have many other potential functions than to provide measurements of the past.

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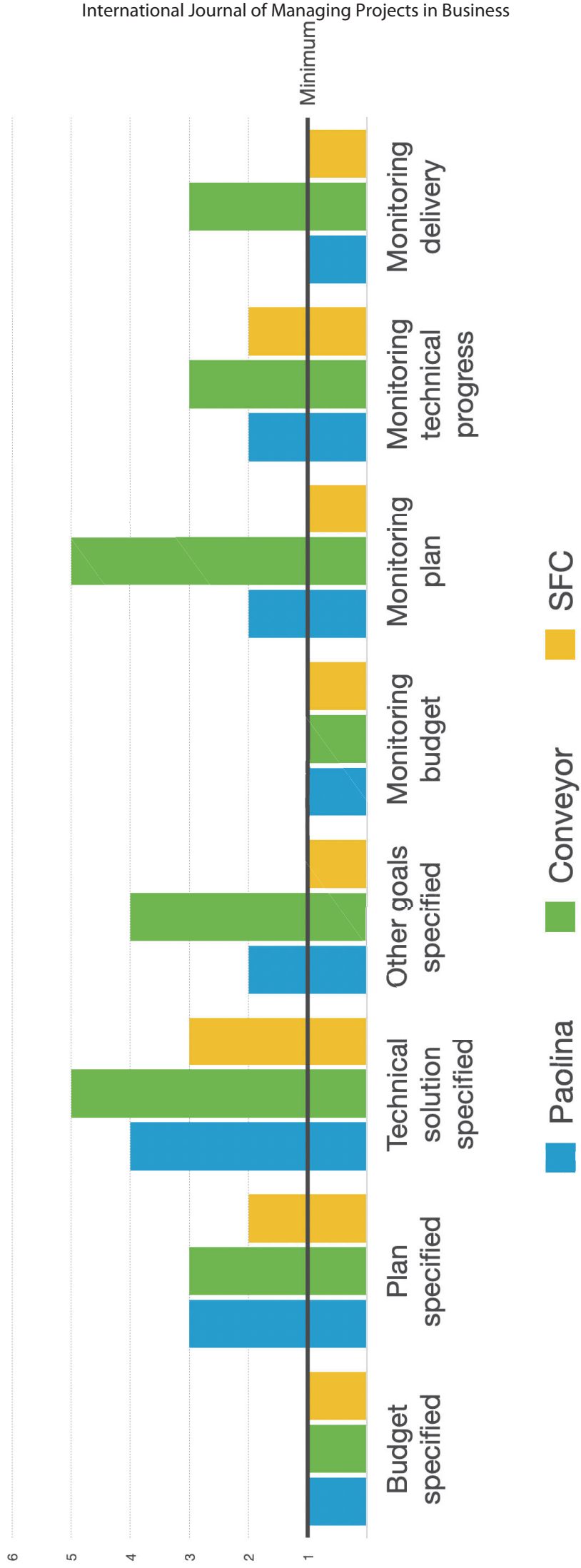


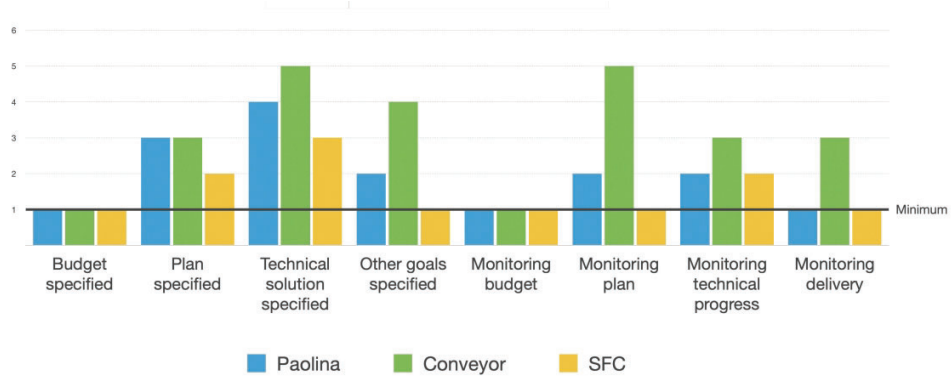
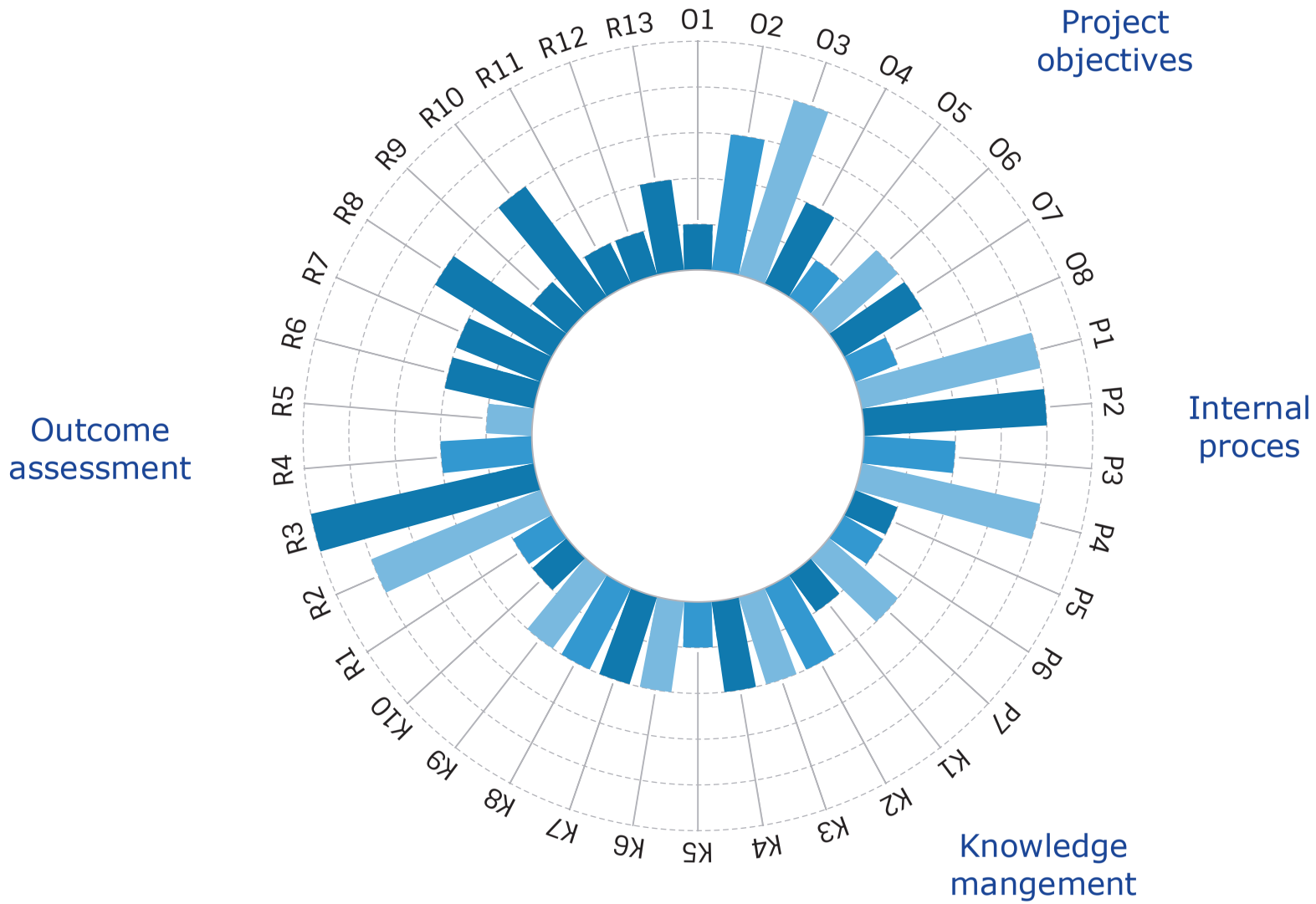


Figure 2: Comparison of the CIM projects based on post review criteria on project objectives and monitoring of these.

Paolina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Knowledge mangement
Outcome assessment
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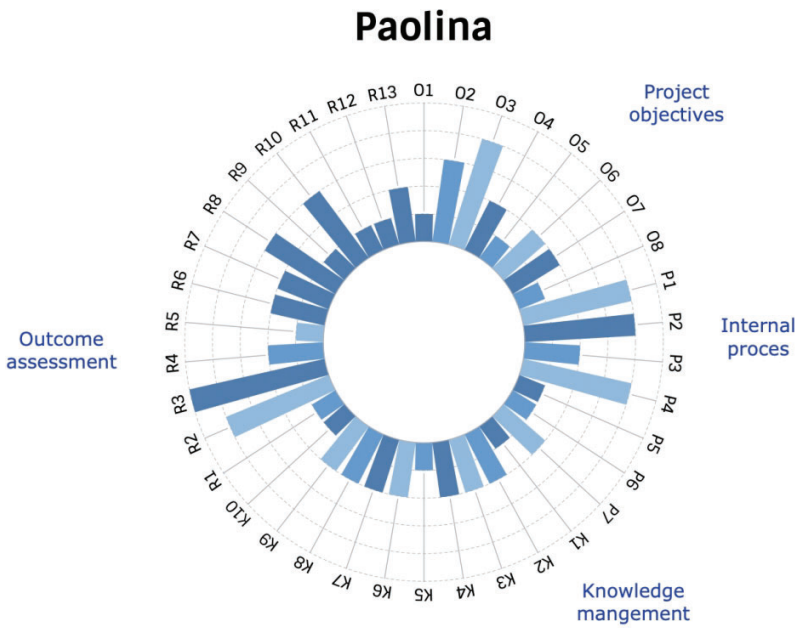
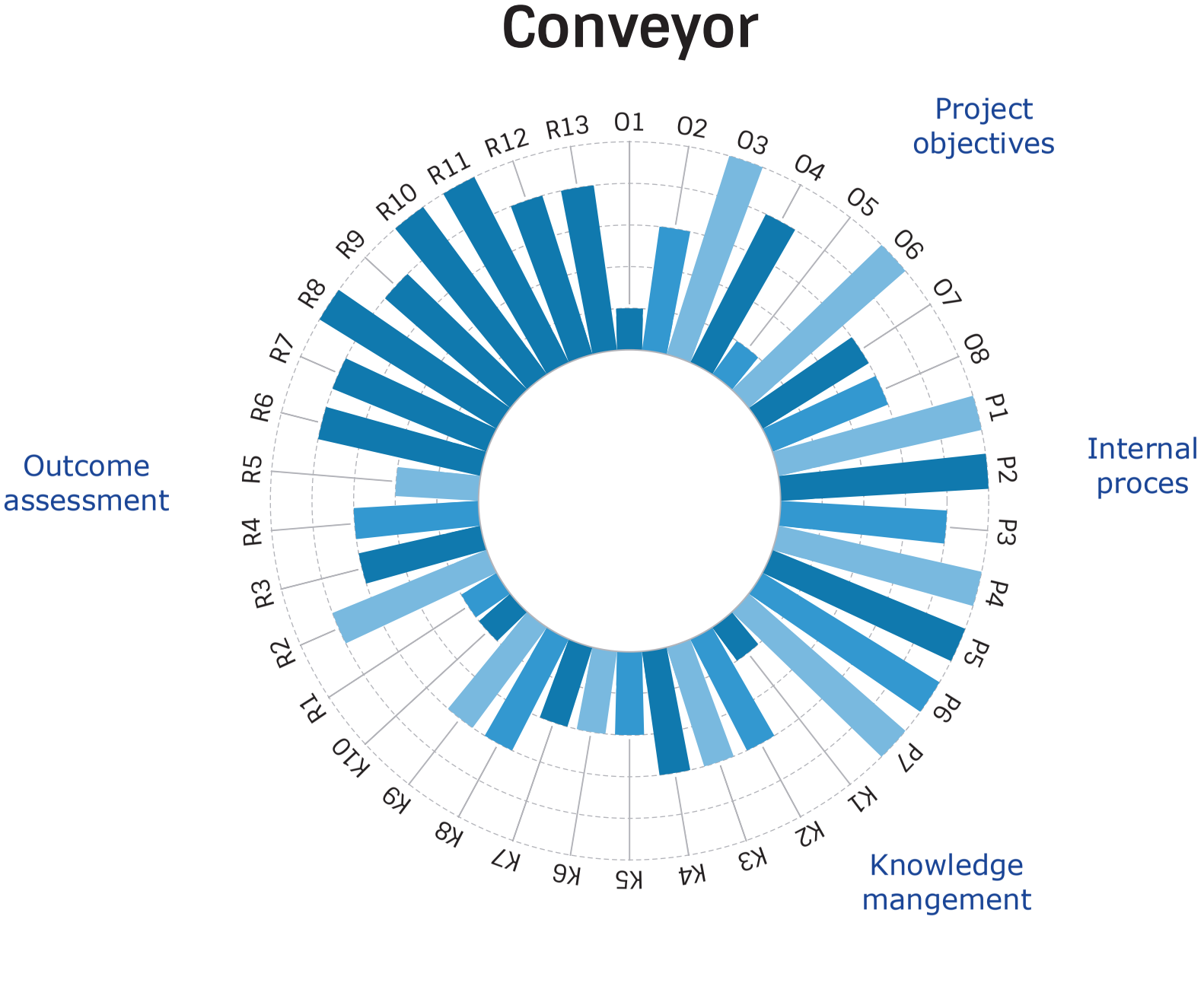


Figure 3: The Paolina post-project assessment.


Conveyor
Project objectives
Internal proces
Knowledge mangement
Outcome assessment
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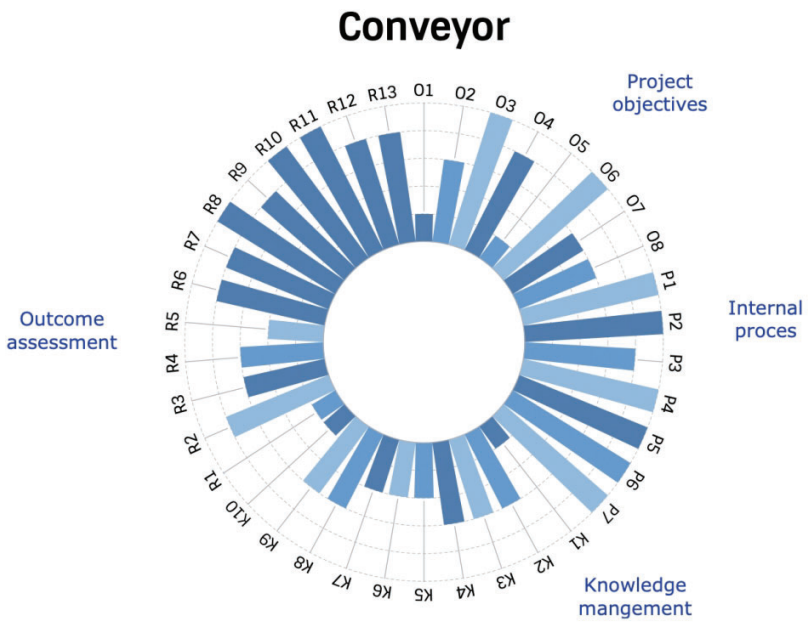
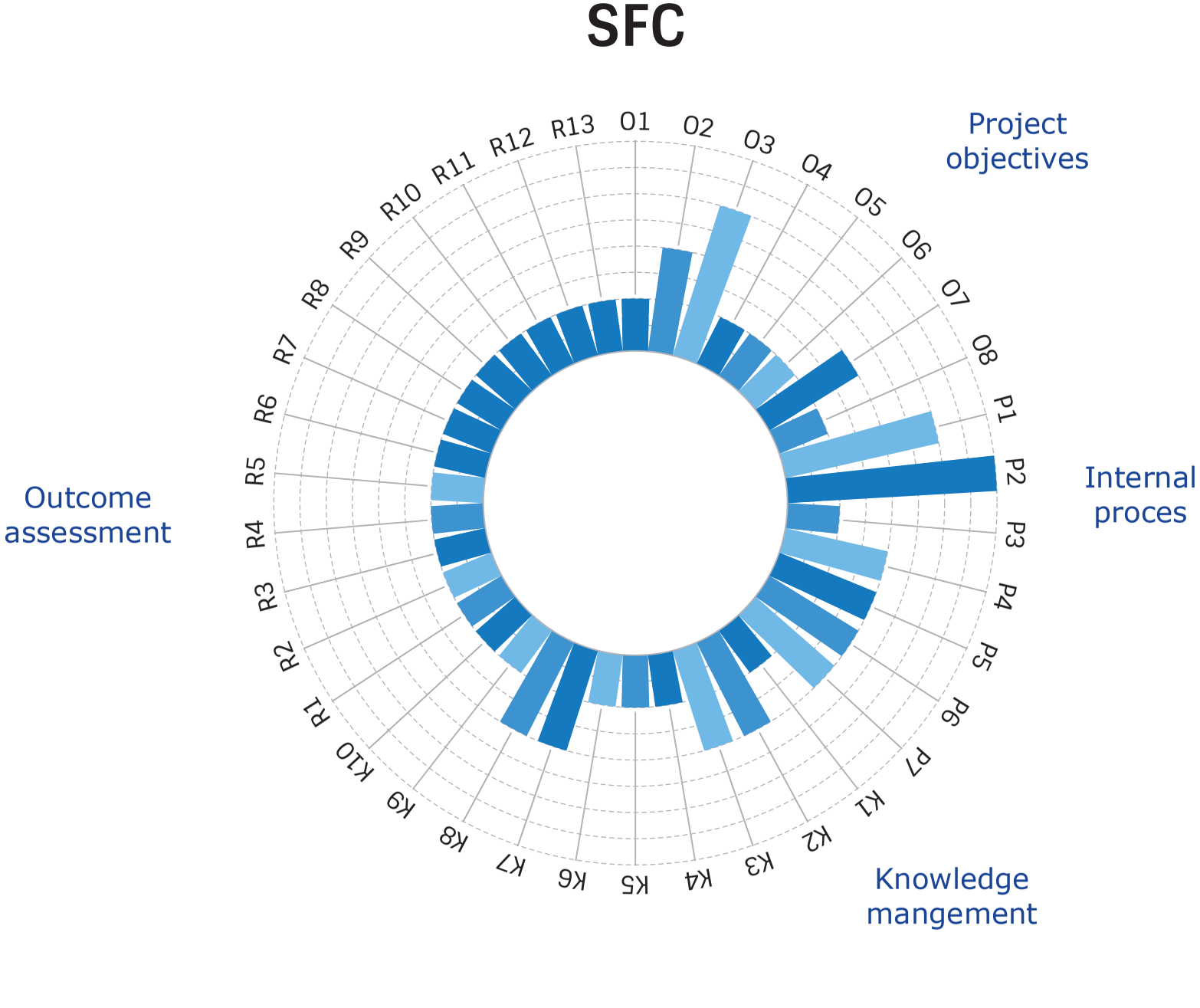


Figure 4: The Conveyor post-project assessment.


SFC
Project objectives
Internal proces
Knowledge mangement
Outcome assessment
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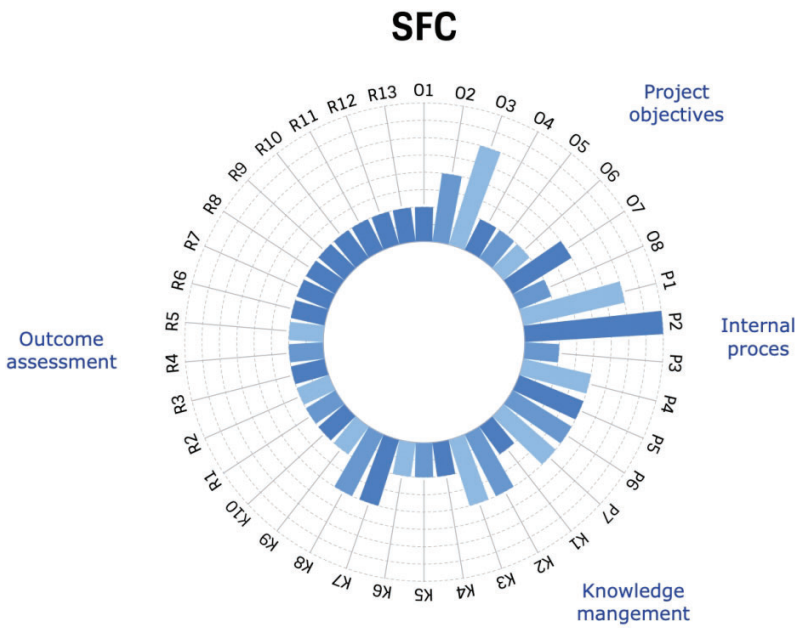

Figure 5: The SFC post-project assessment.