

Integrating and transitioning the project front-end and project initiation phases in South African electrical engineering industrial projects

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Abstract

Purpose – The objective of this research is to explore integration and transition activities in large industrial projects. The purpose is to (a) obtain a better understanding of the integration and transition activities between the project front-end (FE) and project initiation phases (PIPs), (b) explore what, how and when these integrations and transitions occur, and (c) explore what the integration and transition activities mean to project practitioners.

Design/methodology/approach – A qualitative research design methodology is followed, based on interviews using open-ended questions. An expert panel is used to provide responses to questions pertaining to the integration and transition between the project FE and PIP. The research is focused on managing large projects in the South African electrical engineering industrial projects industry. A literature review combined with empirical analysis reflects the importance of integrating and transitioning in project business.

Findings – The findings provide guidance to researchers and practitioners on integration and transition mechanisms, how and when these occur. It highlights the benefits of integration and transition activities. Important lessons for researchers and practitioners are provided together with areas for future research.

Originality/value – This is an interpretative analysis of expert opinion. Expert panel members are experienced at senior decision-making level, and their expertise was accessed based on experience, education and knowledge. This extensive experience is shared in this paper providing insights into their opinions, experiences, success and failures. These inputs together with the literature review provide interesting implications for both a theoretical foundation as well as practical implications for practitioners.

Keywords Integration, Transitioning, Project business

Paper type Research paper

1. Introduction

Project management (PM) consists of at least two phases, the sales and marketing front end (FE), also known as the (acquisition) phase and the project execution (PE) phase (Blanchard and Fabrycky, 2006). The project FE is where the initial analyses of problems, needs, and customer and stakeholder requirements are conducted, which leads to the initial solution

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alternatives and choices (Samset and Volden, 2016; Williams *et al.*, 2019). FE is where the business case, target benefits and their realization are set out (Siriram, 2022). It includes the activities which are performed before the start of the project (Cooper and Budd, 2007; Nobelius and Trygg, 2002). The FE includes the entire business case inclusive of the project concept phase, all the various organizations, and the various mechanisms and arrangements involved in the inter-organizational relationships (Miller and Hobbs, 2009).

Figure 1 gives a graphical representation of these two phases. The project initiation phase (PIP) is the “start of the project from an execution perspective; it is the first phase of the project life cycle (PLC). The PIP is when the project manager and project team take over accountability and responsibility from the sales and business development team” (Siriram, 2022). The PLC commences at the start of the PIP and extends until project closure (Siriram, 2022). The FE is not seen to be within the domain of the PLC phases, i.e. the PE phases is also outside the domain of the project manager and the PE team (Cova and Salle, 2005; Momeni and Martinsuo, 2019; Samset and Volden, 2016). The FE phase occurs before the PLC phases. Samset and Volden (2016) cited Morris (2016) where it is emphasized that by only focussing on the PLC, the critical FE part of the project is missed, and both these phases need to be integrated for successful project outcomes (Cooper and Budd, 2007). Integration means that not only are the FE and PE teams jointly involved in the FE phases of the project, but the sales FE team is also involved in the PE phases as well, with gradual reduction in sales effort as the project progress through the PLC (Nobelius and Trygg, 2002; Storbacka, 2011; Turkulainen *et al.*, 2013).

The project manager is responsible for the successful delivery of the project (Cova and Salle, 2005), which only includes the PE phase. Momeni and Martinsuo (2019) argue that this view is not fully acknowledging the importance of the sales and marketing activities, which are crucial for successful delivery but have not been the focus historically. The FE is where the project sponsors, owners and champions are identified, and where the responsibilities of the project owner and project manager are initially laid out. These roles are central to the project (Bryde, 2008; Pinto and Patanakul, 2015; Samset and Volden, 2016; Suprpto *et al.*, 2015). Therefore, neglecting the FE is taking a narrow view of PM. The traditional approach to PM focuses on vertical issues like standardization of processes and management procedures to ensure detail planning in the PE phase (Morris *et al.*, 2006); this may be viewed as more systematic. Turkulainen *et al.* (2013) argued that while these issues are essential, they are inadequate to fully manage the integration. The focus should be in the wider view, incorporating the project scope, schedule and resources throughout the system life cycle (Levitt, 2011) because these activities are already committed in the FE (Cooper and Budd, 2007; Nobelius and Trygg, 2002), and a more systemic view is required (Asif *et al.*, 2010).

Integration refers to the coordination of activities (Demirkesen and Ozorhon, 2017), and transition refers to how well the handover between the two phases takes place (Siriram, 2022).

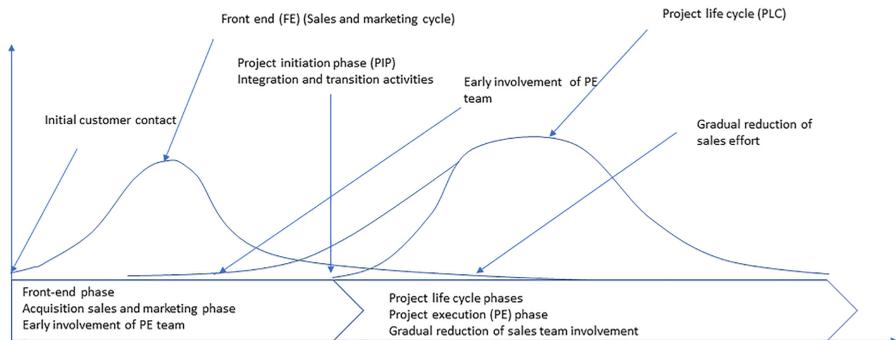


Figure 1.
The interface between
the acquisition and
execution phases in
project management

Transition refers to change before and after an event or the change among project participants (Lundin and Söderholm, 1995). In this paper, transition refers to the change from the FE sales and marketing phase to the PE phase. Transition is a signal that indicates actionable steps needed to be taken when there is a shift from one phase to the next (Jacobsson *et al.*, 2013). The transition also focuses attention on how to move from the present state to the next state (Lundin and Söderholm, 1995). These actionable steps in the context of this paper mean a shift or transformation from the sales and marketing FE to PE.

PM is not restricted to a single functional unit, thus successful project completion requires proper management of the integration (Cooper and Budd, 2007; Turkulainen *et al.*, 2013) coordination (Demirkesen and Ozorhon, 2017) and transitioning (Van de Ende and Van Marrewijk, 2014) activities. The interface between the project FE (which is mainly seen as a sales and marketing initiative) and PE is the most critical interface for project success and therefore requires special managerial attention (Cooper and Budd, 2007; Williams *et al.*, 2019; Turkulainen *et al.* (2013). Williams *et al.* (2019) highlighted that the FE phase is not well understood even though it has been shown to be critical to the strategic success of the project. "I (i)n spite of acknowledging the importance of the FE phase of projects there is little empirical studies exploring how the FE management of projects can be improved" (Momeni and Martinsuo (2019, p. 956). The FE is hurdled with many challenges, and efforts should be made to overcome these (Flyvbjerg, 2017; Saukko *et al.*, 2020; Cova and Salle, 2005).

Researchers have highlighted that the transition between the FE and PE is understudied (Larsen *et al.*, 2021; Van den Ende and Van Marrewijk, 2014; Willumsen *et al.*, 2019). Zwikael and Meredith (2019) emphasized the importance of effective organizational practises in the FE due to its strategic nature, shorter timeline and smaller teams, because this is where the FE project participants play a significant role in engaging with stakeholders to obtain support for the project (Flyvbjerg *et al.*, 2018; Gil and Pinto, 2018).

Turkulainen *et al.* (2013) highlighted that future research should be directed to empirically assessing the use of integration mechanisms in projects and whether the integration mechanisms are really implemented. Bergmann and Karwowski (2018) positioned that empirical research combined with a theoretical foundation challenges current PM practises, and Geraldi and Soderlund (2018) called for practised oriented research. Therefore, this research will address this gap by providing further empirical research into the integration and transition in the PIP between the FE and PE phases.

Given the limited attention in PM literature to the FE and the link to the PE (Cova and Salle, 2005; Larsen *et al.*, 2021; Momeni and Martinsuo, 2019; Samset and Volden, 2016; Van de Ende and Van Marrewijk, 2014; Willumsen *et al.*, 2019), this research focuses on the integration and transition in the PIP between the FE and PE phases. This enables the organization to develop offerings that create customer value (Shapiro, 1977; Turkulainen *et al.*, 2013).

The following research questions are posed: (a) What integration and transition mechanisms can be discerned in the PIP between the FE and PE phases (b) How and (c) when are they practiced and (d) What do they mean for project participants?

The objectives of this research are as follows:

- RO1. To obtain a better understanding of the integration and transition activities in the PIP between the FE and PE phases.
- RO2. To understand the challenges associated with integration and transition as well to understand the opportunities from integration and transition.

The paper makes a contribution by providing empirical evidence through interpretative analysis of interviews with a panel of experts emphasizing the importance of the PIP, moreover the importance of integrating and transitioning between the project FE and PE phases. The rest of the paper is structured as follows: first, a theoretical foundation is

established through a literature review, next follows the research methodology, followed by the research results, discussion of results, and finally the conclusions, limitations and further research areas are provided.

2. Theoretical foundation of the FE phase, the integration and transition to the PIP

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2.1 *The concept of the front end: the sales and marketing phase*

Kirsilä *et al.* (2007) observed that integration involves two dimensions, namely (a) technical integration and (b) social integration. Technical integration focuses on the technical requirements; social integration focuses on the complex relationships between different stakeholders. Social integration is inclusive of the customer and suppliers, which has managerial implications for the different stakeholders. Davies *et al.* (2003) emphasized the importance of the customer and sales team relationship as a starting point for integration across the PLC. The FE is where the design principles of the technical solution and the customer needs are analysed, and solutions are provided, which make commitments in terms of cost, schedule and price (Artto *et al.*, 2016). Kirsilä *et al.* (2007), who pointed out that integration is not limited to certain parts of the project but applies across the PLC. While the importance of integrating across the PLC is well researched in PM literature, the integration of the FE with the PLC seems to have been neglected (Cooper and Budd, 2007; Cova *et al.*, 1996; Larsen *et al.*, 2021; Morgan, 1987; Nobelius and Trygg, 2002; Momeni and Martinsuo, 2019; Samset and Volden, 2016; Turkulainen *et al.*, 2013; Van den Ende and Van Marrewijk, 2014; Williams *et al.*, 2019).

Both units must participate in the FE and PE phases, defining the project scope, schedule and contract terms (Turkulainen *et al.*, 2013). Otherwise, things get “thrown over the wall”: the final contract is handed over to the project team for execution with little mutual discussion or actual face-to-face contact, and such an approach is detrimental to the project and the success thereof (Goold and Campbell, 2002; Turkulainen *et al.*, 2013).

2.2 *A review of concepts: integration and transition*

Kirsilä *et al.* (2007, p. 715) see integration as the “bringing or joining together several distinct things so that they move, operate and function as a harmonious, optimal unit”. Project integration ensures the project’s various phases are well coordinated (Demirkenen and Ozorhon, 2017). Asif *et al.* (2010) view integration as a systemic approach to developing a governance structure for managing key stakeholders. Eisner *et al.* (1993) define integration as a major element of systems engineering, incorporating the main elements of scheduling, budgeting and costing. Therefore, integration is about linking activities systematically (Asif *et al.*, 2010) and systematically (Morris *et al.*, 2006).

The importance of transitions was reinforced by Van den Ende and Van Marrewijk (2014), where they presented evidence of transitions being celebrated in PLC through transition rituals. Van den Ende and Van Marrewijk (2014) see transition rituals as social and symbolic events celebrating a transition from one project phase to the next. While there is some literature evidence supporting transition rituals (Cova and Salle, 2000; Eskerod and Blichfeldt, 2005; Löfgren, 2007), it has not received wide attention in PM research. Turner (1969) defined transition as a ceremonial event that marks the passage from one phase to another, as when a milestone has been reached. Ritual transitions, therefore, mark important transitions and milestones in the PLC (Bennet, 2003; Van den Ende and Van Marrewijk, 2014). While transitions are emphasized through rituals, there is no guarantee that information flow and knowledge transfer occur between different phases (Van der Ende and Van Marrewijk, 2014). Rituals are mechanisms to celebrate success, however, one must safeguard against

“throwing it over the wall”, for example, when sales and marketing teams handover to the project teams with no proper mechanism to ensure the necessary continuity (Goold and Campbell, 2002; Turkulainen *et al.*, 2013).

Information flow and knowledge transfer are necessary for a successful transition (Stähle *et al.*, 2019). Knowledge can only be generated and understood by people who live or work in similar settings (Hatch and Cunliffe, 2006). This view of knowledge generation and transfer has also been emphasized in the field of organizational learning (Lane and Lubatkin, 1998). This is especially important because the settings and objectives of the FE and PE teams are different, and they also have different tasks and responsibilities (Turkulainen *et al.*, 2013). The FE and PE teams operate in different functional areas, organizational barriers often exist between such areas, and these barriers hinder integration and collaboration (Artto *et al.*, 2015; Stähle *et al.*, 2019). The organizational objectives at a strategic level are the same: delivering customer value (Davies, 2004), through longer-term considerations like sustainability, relevance and effectiveness through the system life cycle from conception to disposal (Samset and Volden, 2016). This requires a shift in thinking from short-term to longer-term challenges, which require PM to not only focus on time, budget and quality but also on broader systemic issues like social, environmental and economic impact (Sabini *et al.*, 2019; Siriram, 2017). This will contribute to the long-term performance of the organization (Zwikael *et al.*, 2018) and a wider strategic view incorporating the delivery of innovative and unique solutions (Brady *et al.*, 2005; Davies, 2004; Hobday, 2000).

Given that the most critical decisions are made in the FE (Haji-Kazemi *et al.*, 2013; Williams *et al.*, 2019), and limited amounts of integration and coordination take place between the FE and PE phases (Momeni and Martinsuo, 2019; Samset and Volden, 2016; Turkulainen *et al.*, 2013), it is prudent that more effective PM practises are implemented. This includes sequencing, prioritization and proper staffing to govern the integration and transition between the FE and the PE and such planning is the responsibility of the FE team (Nobelius and Trygg, 2002). The FE team, however, need to be a cross-functional team and could, for example, include the forthcoming project manager, financial managers, key engineers, sales and marketing, as well as other functions such as product development, operations and finance, which may all be necessary to ensure a proper transition (Nobelius and Trygg, 2002; Storbacka 2011).

Integration and collaboration can offer several advantages such as frequency of communication and resource flexibility (Galbraith *et al.*, 2001), well-coordinated activities (Barki and Pinsonneault, 2005), increased customer value (Davies, 2004), competitive advantage (Barki and Pinsonneault, 2005) and improved performance (Barki and Pinsonneault, 2005; Turkulainen and Ketokivi, 2012). However, potential disadvantages can include organizational uncertainty, conflicts and increased costs (Enberg *et al.*, 2010; Engwall, 2003; Galbraith *et al.*, 2001). Such disadvantages are because of the challenges of integration and transition, which include, for example, differences in personalities, backgrounds, locations and responsibilities, lack of support and proper organizational structures (Griffin and Hauser, 1996; Song *et al.*, 1996). Such dynamics should be appropriately managed and could lead to further conflict if not handled well (Artto *et al.*, 2015). It could also seriously hamper the development of customer relationships (Artto *et al.*, 2015).

Organizational boundaries divide the entity into different functional areas, each with their own responsibilities and tasks, resulting in the need to link these functional areas through integration (Artto *et al.*, 2015; Cooper and Budd, 2007; Dietrich, 2006; Stähle *et al.*, 2019). Transition activities are required to ensure that project participants adhere to defined integration processes (Larsen *et al.*, 2021; Van den Ende and Van Marrewijk, 2014; Willumsen *et al.*, 2019). The FE should also focus more on building trust and mutual understanding (Imam and Zaheer, 2021; Merschbrock *et al.*, 2018), this is just as important as complex

structural dimensions (Winch and Cha, 2020), and a higher level of trust increases collaboration, reduces uncertainty and ultimately increases project success (Bond-Barnard *et al.*, 2018; Stephens and Carmeli, 2016).

Integration may be categorized into two groups: vertical (integration within a single unit through centralization, standardization, formation and vertical information systems) and lateral (integration across units, through cross-functional units and job rotation) (Turkulainen *et al.*, 2013). When the level of uncertainty is high, the use of cross-functional integration is preferred (Gemser and Leenders, 2011), and in such cases, organizations use more informal and interpersonal options (Adler, 1995). Informal interactions have the potential to bring different stakeholders closer and may facilitate communication, which is crucial in complex environments (Kokkonen and Vaagaasar, 2018).

Having completed the literature review, it is prudent to reinforce the central research questions and to provide some linkage to the literature discussion. For the *first research question*, (a) What integration and transition mechanisms can be discerned between the FE and PE? Integration is the coordination of activities (Demirkesen and Ozorhon, 2017), and transition refers to change before and after an event or the change among project participants (Lundin and Söderholm, 1995). Integration is about linking activities in a systemic (Asif *et al.*, 2010) and systematic manner (Morris *et al.*, 2006). Transition refers to the change in accountability and responsibility from the sales FE to PE (Jacobsson *et al.*, 2013). Transitions are seen as symbolic events celebrating a transition from one phase to the next (Turner, 1969; Van den Ende and Van Marrewijk, 2014). Van den Ende and Van Marrewijk (2014) also recognize transition activities as including the signing of contracts, project kick-offs and project milestones. For the *second research question*, (b) How are these integration and transition activities performed? Some of the mechanisms indicating how these activities are performed involve quality control mechanisms through stage-gate processes as well as cross-functional team involvement (Samset and Volden, 2016). For the *third research question*, (c) When are integration and transition activities performed? A project network diagram or stage-gate process can also be used to indicate when activities take place (Samset and Volden, 2016). There is also support for triggering transition activities specific to time, duration and structuring (Furst *et al.*, 2004; Lundin and Steinhórsson, 2003; Winch, 2014). For the *fourth research question*, (d) What do they mean for project participants: integration and transition activities can help reduce friction between the sales FE and PE teams. This will ensure a smoother and seamless transition (Arto *et al.*, 2015). Integrating the FE phases also means that resources are not over-committed, and promises made at the sales and marketing FE are achievable (Cooper and Budd, 2007). It also ensures that the organization can develop offerings that create customer value (Shapiro, 1977; Turkulainen *et al.*, 2013).

3. Research methodology

3.1 Research design

This research follows a qualitative research design methodology, based on interviews using open-ended questions. An expert panel is used to provide responses to questions related to the integration and transition between the FE and PIP in the South African Electrical Engineering Industrial projects industry. Focused interviews were used, the expert panel participants were interviewed and interviews ranged from 1.15 h to 1.65 h (Table 1 in section 3.1 indicates the duration per interview). The interviews were open-ended and of a conversational nature (Yin, 2003). An interview guideline was used; the main purpose of the interviews was to seek the respondents' opinions and insights based on their experiences (Yin, 2003). The interview guideline was derived from the literature review and structured

Participant #	Role and expertise	Date and duration of interview
1	Project's director, worked in an international electrical engineering heavy industrial environment, more than 35 years' experience, financial background	25 August 2021 1.55 h
2	General manager projects, worked in an international electrical engineering heavy industrial environment, more than 35 years' experience, engineering background	26 August 2021 1.21 h
3	Senior sales manager projects, worked in an international electrical engineering heavy industrial environment, more than 35 years' experience, engineering background	27 August 2021 1.35 h
4	Senior business development manager projects, worked in an international electrical engineering heavy industrial environment, more than 20 years' experience, engineering background	28 August 2021 1.25 h
5	Senior business development manager projects, worked in an international electrical engineering heavy industrial environment, more than 20 years' experience, engineering background	28 August 2021 1.15 h
6	General manager project sales, worked in an international electrical engineering heavy industrial environment, more than 30 years' experience, engineering background	29 August 2021 1.35 h
7	Director tendering and estimating, worked in an international electrical engineering heavy industrial environment, more than 35 years' experience, engineering background	30 August 2021 1.65 h
8	General manager projects, worked in an international electrical engineering heavy industrial environment, more than 35 years' experience, engineering background	31 August 2021 1.45 h
9	Projects director, worked in an international electrical engineering heavy industrial environment, more than 35 years' experience, engineering background	1 September 2021 1.25 h
10	General manager projects, worked in an international electrical engineering heavy industrial environment, more than 35 years' experience, engineering background	1 September 2021 1.35 h

Table 1.
Profile of interview
participants

toward obtaining the respondents' inputs regarding the integration and transition between the FE and PIP. Other researchers have also used interviews to obtain data (Mason, 2018; Willumsen *et al.*, 2019; Zerjav *et al.*, 2021).

The expert panel participants were selected based on four criteria. Three criteria are selected from Momeni and Martinsuo (2019). First, the participants had to be experts in industrial projects based on experience, education and knowledge. Second, they had to be involved or have extensive experience in either the project FE and/or extensive experience in PE. Third, they were willing to participate in the research and allow the researcher to conduct in-depth interviews, and they were willing to share their opinions, experiences, successes and failures regarding the integration and transition between the FE and the PE phases. The fourth criterion was chosen from Zerjav *et al.* (2021): participants were required to have senior decision-making experience in industrial-type projects. This approach was also used by Siriram (2018, 2019). In this paper, we follow the multiple projects approach like Zerjav *et al.* (2021), where the researchers followed a phenomenon-based research approach using interviews in transportation infrastructure. This paper investigates the heavy electrical engineering industrial project environment in South Africa. This is because electrical power generation and distribution in South Africa is a major constraint and subject to many challenges (Baker and Phillips, 2019). Therefore, any further insight into how to better manage these types of projects will have much economic benefit.

3.2 Data collection and analysis

The research approach is an interpretive analysis (Sandberg, 2005) consisting of interviews with participants of the expert panel (Aguinis and Solarino, 2019; Mikecz, 2012; Harvey, 2011; Siriram, 2018, 2019). Taking this approach, the expert panel participants bring together experience across a diverse range of industrial projects over at least the past three decades (Zerjav *et al.*, 2021). The expert panel participants were chosen specifically for their experiences in both the FE and PE phases of industrial projects. They were chosen from different organizational settings and have experience in the private sector. The profile of the participants is shown in Table 1. The interviews are conducted from a project delivery perspective.

The participants were chosen from the private sector because, in the private sector, the goal is to improve profitability through improvements in the organization's competitiveness (Samset and Volden, 2016). PM is a core resource in the private sector, specifically in project-based firms; therefore, improvements in PM link directly to the organization's success, and the private sector is where the researcher's interest lies. Like Zerjav *et al.* (2021), as the interviews progressed and data were collected, this information led to further questions that helped develop further insights. A purposive sampling approach was adopted to select the expert panel participants. In total, 10 expert participants were interviewed.

In terms of validity, the approach of Zerjav *et al.* (2021) was followed for communicative, pragmatic and transgressive validity. For communicative validity, the interviews were documented and then returned to the relevant participant to ensure that the documented interview was a true reflection of the face-to-face interview (Momeni and Martinsuo, 2019). Similarly, pragmatic validity was ensured by asking follow-up questions where the responses from the participants were more generic. Finally, transgressive validity was achieved by seeking contradictions and tensions during the interview process. Like Zerjav *et al.* (2021), after the interview, the notes between different interviews were compared to assess the comprehensiveness of the findings. However, the aim was not to achieve convergence but to identify emerging trends and disparities that follow-up interviews could clarify. Further, to ensure credibility, close collaboration with the expert panel participants was maintained throughout the research, and the previous experiences of the researcher in conducting similar research in these industries also reinforced the credibility of the data (Momeni and Martinsuo, 2019).

To ensure dependability, interview transcripts and data logs were stored systematically, and the confidentiality of the participants was protected (Momeni and Martinsuo, 2019; Zerjav *et al.*, 2021). To ensure confirmability, the interview transcript was shared with the expert panel participant to ensure it was an accurate representation of the interview (Momeni and Martinsuo, 2019).

Affinity diagrams were used to identify first-order codes, second-order themes and aggregated dimensions (Gioia *et al.*, 2013; Willumsen *et al.*, 2019). Similarly, like Zerjav *et al.* (2021), the approach by Gioia *et al.* (2013) is followed; the intention is not to follow a formal grounded theory approach but to use the method as an analytical device for data coding for the interpretive study. Figure 2 provides an example of the first-order codes, second-order themes and aggregated dimensions. Note that the questions are used as the aggregated dimension.

Keywords were identified and coded (Appendix Table A1), and the codes were then grouped into second-order themes. Figure 2 and Appendix (Tables A1 and A2) provide an example of the coding and theme structure using participant 1 and question 4: "Based on your experience and knowledge, what are some of the mechanisms project-based firms use to integrate the sales front-end and project execution phases specifically the project initiation phase"? As an example, consider the response to this question reflected in Figure 2 and Appendix (Table A2), provided here for convenience. The first response in row one is

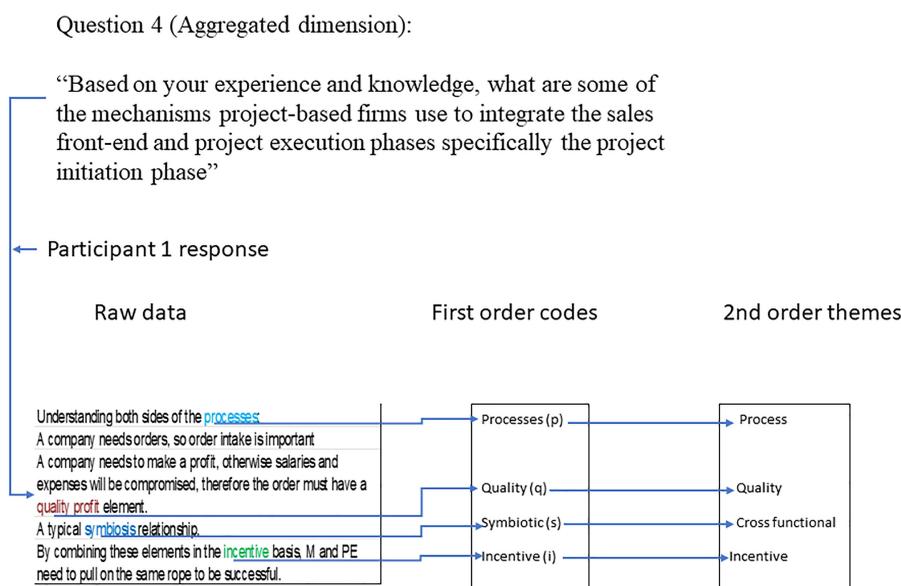


Figure 2. First-order codes, second-order themes and aggregated dimensions

“Understanding both sides of the *processes*. A company needs orders to make a profit, otherwise, salaries and expenses will be compromised; therefore, the order must have an adequate *quality profit* element”. From this response keywords for, e.g. “*process*” were coded as “p”, and “*quality profit*” as “q”. These first-order codes were then grouped into the second-order theme. These themes are “*process*” and “*quality*”, and a “1” is recorded in [Appendix \(Table A2\)](#) under the themes “*process*” and “*quality*”, indicating these keywords appeared once.

Similarly, for the second point to question 4: “A typical *symbiosis* relationship”. From this response, the keyword “*symbiosis*” was coded as “s” and then aggregated to the second-order theme “*cross functional*” teams, [Appendix \(Table A2\)](#).

The third point to question 4: “By combining these elements in the *incentive* basis, M and PE need to pull on the same rope to be successful”. From this response, the keyword “*incentive*” is coded as “i” and then aggregated to the second-order theme “*incentive*”, [Appendix \(Table A2\)](#). Furthermore, the frequency of second-order themes is summated, and the total percentage for each second-order theme is calculated for all participants. The calculated percentage is the frequency of occurrence of the second-order theme and additionally indicating its ranking.

Atlas.ti was used to find linkages between the different second-order themes and the research questions. This was done by transferring the interview transcripts into Atlas.ti. The interview transcripts were coded (first-order), and themes (second-order) were generated in Atlas.ti. The research questions were used as the aggregated dimension.

4. Research results

Through the analysis of the interview data, distinct themes were found; the findings are presented through answering key questions relating to integration and transition and are discussed in [Sections 4.1 to 4.4](#). The results are reported anonymously to maintain confidentiality. The comments received verbatim from the participants are provided in

quotation marks. In [section 4.1](#), [Table 2](#) is used to show how the illustrative quotes link to the first-order codes and second-order themes. In [Section 4.2 to 4.4](#), a narrative approach is used instead of a table format; this enhances the readability of the document and gives a logical flow to the discussion process.

4.1 What mechanisms can be used to improve the integration and transition between the project front-end and project initiation phase?

Fifty-seven *in vivo* comments were grouped into 14 first-order codes and then categorized into 10 second-order themes; the top four themes constitute 70% of the *in vivo* comments. *Processes and documentation* was the dominant theme at 26%, *Cross-functional involvement* at 19%, *risk* at 14%, and *Common workshops* (meetings) at 11%.

[Figure 3](#) depicts the perpendicular relationships between the second-order themes (referred to as code groups in Atlas.ti). D4 refers to mechanisms (i.e. What mechanisms can be used to improve the integration and transition between the project FE and PE?). [Table 2](#) shows the links between the illustrative quotes and discussions, second-order themes and aggregated dimensions. [Figure 3](#) reflects that mechanisms can be used to improve the integration between the sales FE and PE phases are linked. The foundational requirement is one of processes and documentation (i.e. processes and documentation guides cross-functional involvement). Cross-functional involvement is, therefore, a part of process. Similarly, common workshops are a part of cross-functional workshops (i.e. cross-functional involvement sets the basis for conducting common workshops). Finally, risk mitigation is a part of cross-functional involvement (i.e. risk can be mitigated through cross-functional involvement, and risk can also be mitigated through knowledge sharing, which can be achieved through cross-functional involvement). Risk mitigation is also a part of processes and documentation, and therefore, process and documentation will guide risk mitigation processes.

4.2 How are the transitions between the FE and PIP performed?

Regarding how the transitions are performed, 43 *in vivo* comments were grouped into 13 first-order codes, which were then categorized into 7 second-order themes. The top three themes constituted 82% of the *in vivo* comments. *Processes and documentation* were at 40%, *cross-functional collaboration and teamwork* at 23% and *communication and feedback* at 19%. [Figure 4](#) depicts the graphical representation from Atlas.ti between the different themes indicating how transitions are performed between the FE and PE phases. D5 refers to transitions (i.e. how are transitions between the FE and PIP performed). The basis for transitions is processes and documentation (i.e. processes and documentation is the basis for how transitions are performed). Cross-functional collaboration stems from processes and documentation. Therefore, cross-functional collaboration is associated with processes and documentation. This implies that cross-functional collaboration is guided through processes and documentation. Communication and feedback are a part of processes and documentation because processes must include feedback and processes will guide communication and feedback. Communication and feedback are also associated with cross-functional collaboration because processes and documentation will indicate how communication and feedback should occur.

Some of the comments from the expert panel include the following:

Participant 3 “*A formal handover from Sales to the Project team is required*”; Participant 1 also emphasized the interpretation of the process “*Leave nothing to interpretation*”. The handover process, however, is intricately linked to the second-order theme: cross-functional collaboration and teamwork, which ensures two-way communication (second-order theme three) as articulated by participant 8 “*a formal project handover meeting between sales and the*

Question 4 (aggregated dimension): What mechanisms can be used to improve the integration and transition between the project front-end and project initiation phase?

#	Theme contribution	Theme	Illustrative quote and discussion
1	27% obtained from Appendix	Processes	Participant 3 <i>"A formal handover from Sales to the Project team"</i> ; Participant 4 <i>"Best practice firms have a clear process and handover procedures"</i> ; participant 1 highlighted the importance of the understanding of process from both the sales and PE teams; Participant 8 <i>"A proper handover process inclusive of a fully consolidated and comprehensive documentation pack that is handed over to the PE team"</i> ; Participant 9 <i>"A defined handover process which is regularly audited to ensure adherence to the process. Having a process that is not adhered to adds no value; project participants must adhere to process"</i>
2	19% obtained from Appendix	Cross-functional collaboration	Participant 1 called for a <i>"symbiotic relationship"</i> ; Participant 7 <i>"Joint involvement of both sales and PE in estimating, in face-to-face discussions with the client in the front-end"</i> ; Participant 8 <i>"Joint sign off by the project manager and the sales lead at the sales stage ensures both sales and PE are held jointly accountable for project deliverables"</i>
3	14% obtained from Appendix	Risk	While incentives did not appear as a significant theme, it did appear in terms of joint accountability as iterated by participant 10 who also linked joint accountable to the third theme: risk <i>"An incentive scheme that has a weighting system holding both the sales and PE teams jointly accountable for the project deliverables will ensure the project is subjected to lower risk and this will go a long way in ensuring that the project has a greater chance of meeting the project deliverables"</i> . Incentives as a mechanism for joint accountability was also supported by participant 8 <i>"An incentive scheme that has a weighting system holding both the sales and PE teams jointly accountable for the solution sales as well as the project deliverables"</i> . Further support for risk management was provided by participant 9 <i>"A risk list with risk mitigation factors needs to be compiled early on in the sales process and the risk list is continually updated throughout the project life cycle"</i>
4	11% obtained from Appendix	Meetings and workshops	Collaborative involvement in the FE was also supported by participant 4 who linked joint involvement to the fourth theme: face-to-face meetings: <i>"Joint involvement of both sales and PE in estimating, in face-to-face discussions with the client in the front-end"</i> ; Participant 7 also further linked cross functional involvement to the third theme: risk: <i>"Pricing finalization needs to be a joint effort between sales and PE. While the project manager and PE teams are risk adverse, they need to be realistic and simply including mechanisms to eliminate all or reduce risk will over price and over constrain the solution, resulting in the solution being rejected by the customer, leading to order failure"</i> . Participant 10 referred to a formal project handover meeting as a mechanism to ensure continuity: <i>"A formally defined project handover meeting between the sales and PE team will ensure that there is continuity from the sales team to the PE team"</i>

Table 2.
Illustrative quotes and discussions linked to themes

PE teams. This must be a two-way communication mechanism where the sales and PE teams engage in active discussions to ensure that there is good continuity between the sales and PE teams. This session is a collaborative effort to ensure that the PE team is fully briefed on the project deliverables and commitments made to the customer". Moreover, the importance of collaboration was highlighted: the idea of linking the process, documentation and cross-functional collaboration was further reinforced by participant 9 "A formal project handover meeting which is inclusive of a full set of comprehensive project documentation which is formally handed over to the PE team. The documentation is to compliment to an already defined set of process and documentation standards. Any missing information must be documented so that this information can be provided to the PE team. The handover process must be a collaborative session to ensure that the PE team is brought up to speed, so there are no surprises in the later phases of the project". Participant 10 also highlighted that if the FE is integrated at the outset, then the transition is easier "Transition stems from the integration and collaboration at the FE; when there is evidence of good integration and cross-functional collaboration in the FE between sales and PE teams, transition becomes a formality. Beyond process and documentation, transition requires communication, trust, and teamwork. Notwithstanding the importance of process and documentation, trust, rapport, and teamwork is critical for the transition between sales and the PE team".

Figure 3. Mechanisms to improve the integration between the sales FE and PE phases

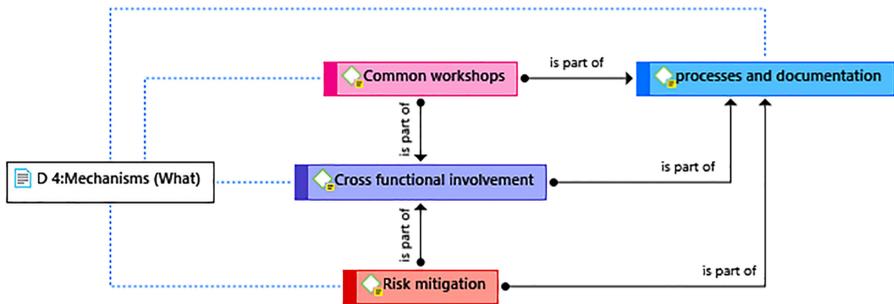
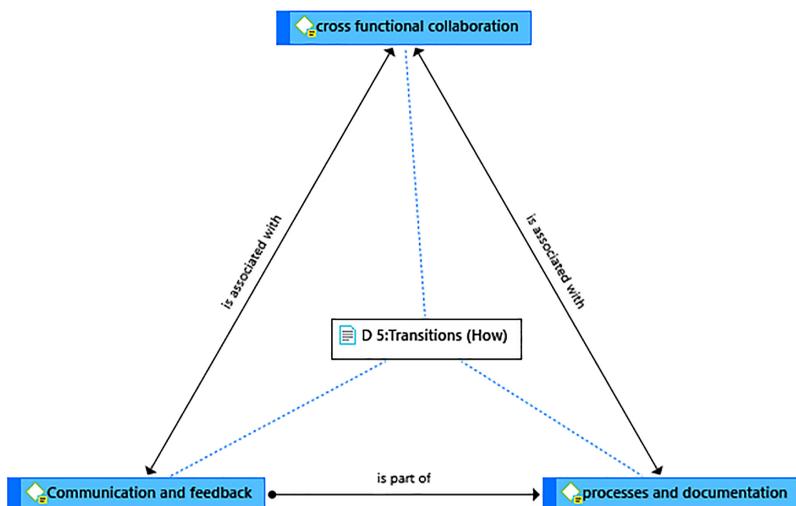


Figure 4. The transitional linkages indicating how transitions are performed



4.3 When do the project transitions between the FE and PIP take place?

Regarding when the transitions should occur, 27 *in vivo* comments were grouped into 8 first-order codes, which were then categorized into 5 second-order themes. The top three themes constituted 89% of the *in vivo* comments, *contract award* at 48%, *process* at 22% and *informal means* at 19%. Figure 5 gives a graphical representation from Atlas.ti of the linkages between the different second-order themes. D6 refers to when transitions between the FE and PE take place.

Contract award is the basis of when to perform transitions. Contract award dictates when transitions should occur. Due process is thereafter followed as process is associated with the contract award. Informal means are also used. Informal means is a part of process because process can allow for informal means of communication. Informal means are also a part of contract award. Informal mechanisms are used when there is a high probability of contract award. PE teams should start getting involved in transition activities, and these are informal discussions to get an early start.

Some of the comments from the expert panel include the following:

Contract award was the dominant one; when to trigger transition activities, participant 3 articulated “On the award of the contract by the customer, with the following having been performed; the contract, including the scope, the price, the T&C’s, having been signed by the client and the contract”. Other participants indicated that in some instances, a notification to proceed might also indicate when the transitions should occur, namely, participant 8 stated, “In some instances the customer may issue a notification to proceed while the terms and conditions are being negotiated. In such cases the notification to proceed is used to trigger the transition between the sales and PE teams”. Processes also indicate when transitions should occur, participant 10 stated, “A formally defined process (stage-gate) will indicate when the transition process should commence; normally this is on contract award or on notification to proceed. The organizational process should clearly indicate when the transition should occur and any process deviation must be communicated and agreed to by the organization’s executive management’, especially in large complex projects”. Other participants also indicated that on some occasions, informal mechanisms could be used to trigger transitions. Participant 7 stated, “Before the order is received, but at that phase where it is known that there is a high probability of success, PE should start getting involved, asking early questions to get more clarity. These are more informal discussions to get early alignment; this will help the planning process. This will enable PE to get an early start”. This view was also echoed by participant 9 “Informally, initiatives to accelerate the transition may occur between the sales and PE teams when there is a high probability that the project will be awarded. Both the sales teams and PE teams may engage informally to get an early start on the transition because in large complex projects, the transition process can consume a lot of time and any time saving will be beneficial”.

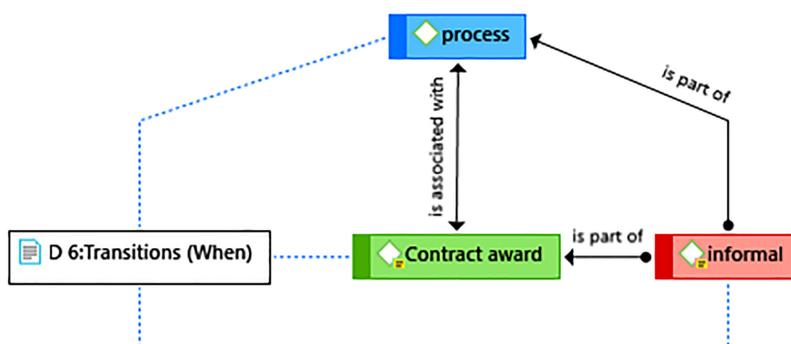


Figure 5.
Transitional linkages
indicating when
transitions are
performed

4.4 What do the transitions between the FE and PIP mean for project practitioners?

Fifty-eight *in vivo* comments were grouped into 15 first-order codes, which were then categorized into 9 second-order themes. The top four themes constitute 78% of the *in vivo* comments. *Milestones measurements and project deliverables* at 28%, *knowledge sharing* at 19%, *teams and team responsibilities* at 17% and *risk* 14%. Figure 6 gives a graphical representation of the linkages from Atlas.ti between the different second-order themes. D7 refers to transitions (i.e. What do the transitions between the FE and PE mean for project practitioners?). From Figure 6, milestones measurements and project deliverables trigger transition activities. Knowledge sharing is a part of milestones measurements and project deliverables because milestones measurements and project deliverables rest on knowledge sharing. Teams and team responsibilities are a part of milestones measurements and project deliverables, because milestone measurements and project deliverables trigger teams and team responsibilities as these are resources required to deliver the project. Teams and team responsibilities are also associated with knowledge sharing because teams can only function effectively through knowledge sharing. Risk is a function of milestone measurements and project deliverables because non-adherence to project milestones measurements and project deliverables can lead to risk. Risk is associated with teams and team responsibilities. Risk is a function of knowledge sharing because poor knowledge sharing practices increase risk, and good knowledge sharing practices reduce risk.

Some of the comments from the expert panel members include the following:

Transitions imply benefits in project deliverables as articulated by participant 1 “A well-integrated and transitioned project results in higher margin quality as well as lower risk in PE. This also improves team morale as generally; staff work better on a project knowing there is upstream potential to improve on the project deliverables. This is a lot better than trying to recover a project with high risk which is often the case in projects that are not well integrated and transitioned”. There are also implications for teamwork as pointed out by participant 3 “Both the sales and the project teams are on the same page which results in reduced risk and less conflict in the later stages of the project. The responsibilities have also changed from sales to PE”. Transition also implies that the project has also officially commenced as per the contract conditions, which was eloquently stated by participant 4 “The clock has started ticking from a

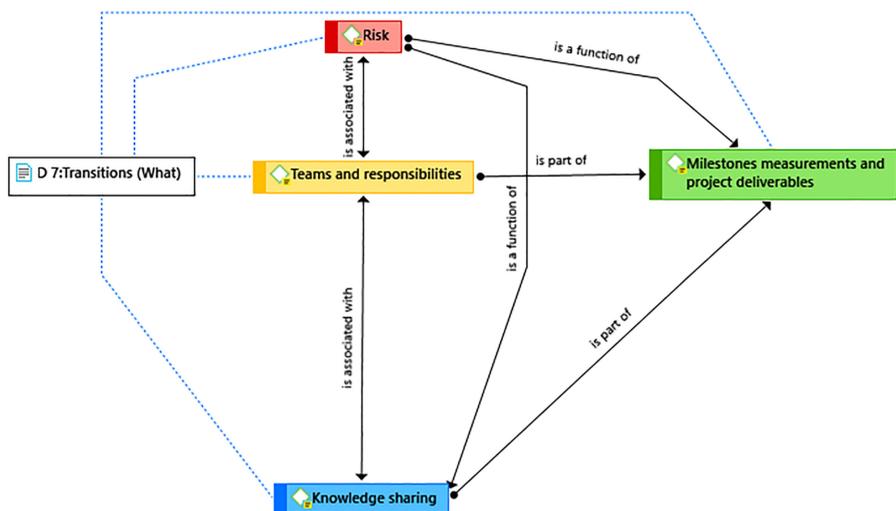


Figure 6. Transitional linkages indicating what transitions mean for project practitioners

project schedule perspective, the milestones and measurements now need to be regularly tracked to ensure adherence to the project budget, schedule and specifications which have been committed during the sales phase”; this view was also supported by participant 8 “The responsibilities have shifted from the sales team to the PE team. The project has now commenced in terms of the project start date and the milestones and measurements need to be tracked and measured against the project baseline which was submitted and committed to the customer”.

Transitions also imply “*knowledge sharing and continuity*”, as pointed out by participant 2; however, participant 10 highlighted the importance of tacit knowledge transfer: “*Knowledge has been shared between the sales and PE teams. However, one must caution against ensuring that tacit knowledge which has not been documented be transferred across to the PE team. This is possible through the gradual reduction of the sales team involvement which will ensure knowledge transfer and continuity*”. In line with continuity and knowledge transfer, participant 7 highlighted the importance thereof: “*As the project evolves, sales team involvement is reduced, however it is not a hard stop from sales, the transition is a process of knowledge sharing and continuity and gradual reduction in sales involvement*”. From a project risk perspective, it is important to ensure that the project scope and limitations are properly understood and managed: Participant 9 “*It is important that the scope is correctly managed by the PE team and any deviations need to follow due process otherwise the project will be hampered by scope creep which could lead to cost, schedule and specification deviations which will be detrimental to the project*”. Participant 10 also highlighted the implications from a risk perspective: “*The project scope and limitations must be understood and adhered to as per the contractual documentation and the risk management needs to be a continuous process throughout the project life cycle*”.

5. Discussion of results

For the “What” question, what integration and transition mechanisms can be linked to project success? It is important to understand that projects are undertaken by organizations to create value (Davies, 2004; Shapiro, 1977; Turkulainen *et al.*, 2013), and deliver benefits to both the organization and the client. The findings from this research revealed that *processes and documentation, cross-functional involvement, risk management, common workshops* (meetings) are the essential mechanisms to ensure integration and transition (Section 4.1). Processes and documentation between the FE team and the PE teams need to be in place, a process that is followed and respected; not just a physical set of documents which people do not adhere to. This view was also supported by Samset and Volden (2016). The handover process needs to include a fully comprehensive document encompassing all relevant information pertaining to the FE phase. Research also supports the flow of customer information from the FE to the PE phase (Stähle *et al.*, 2019). This was also supported by the expert panel, where it was found that continuity between the FE and PE team is a critical factor for project success. This aligns with the findings from Willumsen *et al.* (2019) where standardization is seen as a way to facilitate communication within the project team and enable collaboration. There was support for a proper stage-gate process which is a requirement for the project to move from one gate onto the next, where certain criteria need to be met; this concept is also supported by literature evidence (Samset and Volden, 2016).

From a cross-functional involvement perspective, close alignment between the FE and the PE team is paramount, and this is the most critical aspect of managing a project (Samset and Volden, 2016). It is also important to build a trust relationship between the FE team and the PE; this is one of the foundational requirements for integration and transition. Only through this trust relationship can alignment be achieved (Imam and Zaheer, 2021). Joint initiatives between FE and PE teams are required to create alignment and trust; these should include

joint face-to-face meetings with the customers, representing a single front with the customer's interests at heart. A closer relationship between the two teams is needed, with a more symbiotic relationship facilitating a collaborative approach to the integration and transition in line with literature evidence (Imam and Zaheer, 2021). This can be facilitated through common workshops and meetings. There was also support for FE team involvement in PE execution as an oversight function, where FE teams also attend project meetings and perform site visits to ensure that the promises that have been made are adhered to; this point was related to tacit knowledge transfer and continuity (Nobelius and Trygg, 2002; Storbacka, 2011; Turkulainen *et al.*, 2013). Risk management with timeous actions is seen as an area that is to be addressed early in the FE and common workshops can be the vehicle to generate risks and identify early actions to mitigate risk. Risk management as an activity is well published and researched (Willumsen *et al.*, 2019).

For the "How" part of the central question, how are the integration and transition mechanisms practised? *Process and documentation, cross-functional collaboration and teamwork, and communication and feedback* were the top three dominant second-order themes (Section 4.2). Process and a documented handover process between the FE and PE team are key, with a strong focus on careful interface management and documentation, with involvement of quality control to ensure adherence to process. The handover process must include a full documentation pack of all the relevant FE documentation used. Research evidence also supports the involvement of quality control mechanisms through stage-gate processes (Samset and Volden, 2016). Cross-functional involvement and teamwork to improve the quality of the FE work is the area where there is more uncertainty (Samset and Volden, 2016). Research evidence pointed out that the FE is under-resourced, and far too few resources are spent on the FE (Samset and Volden, 2016). Indications of resources which should be spent in the FE range from 15% up to 35% (Miller and Lessard, 2009) as cited by Samset and Volden (2016). Communication was recognized as an element for effective integration and transition. However, the focus needs to be on continuous integrated communication throughout the FE phase and communicating throughout the PLC (Galbraith *et al.*, 2001). The more information that is shared, the more transparent the process will be. While there is recognition for more involvement in the FE, there is also a requirement for FE involvement in the execution phases to ensure continuity and transparency. This also includes feedback from the PE team to be well documented to avoid mistakes in future projects: this is a key factor in ensuring lessons learnt. This also includes a post-mortem on completed projects, which will provide another opportunity for lessons learnt. Cognisant with literature research, ex-post evaluation is an essential element in any project governance scheme (Samset and Volden, 2016).

Regarding the "When" question, when are integration and transition activities practiced? The findings from this research revealed that the top three focus areas are *contract award, processes and informal means* (Section 4.3). There was strong support for transition activities to be triggered on contract award or in some instances when the customer issues a notification to proceed. A well-documented process will indicate when integration activities are to take place. Transition takes place on contract award when a signed contract between the customer and the service provider is concluded. A project network diagram or stage-gate process (Samset and Volden, 2016) can also be used to indicate when certain activities should take place, as well as indicating who is responsible and what resources are required, however, the project network diagram must be regularly updated to reflect reality. Research evidence also supports processes that can be used to trigger transition activities that are specific to time, duration and structuring (Furst *et al.*, 2004; Lundin and Steinhórsson, 2003; Winch, 2014). There is also evidence that an early informal engagement between the FE and PE teams should occur. This is before the contract is awarded, when there is a high probability of the award, as this will give the PE team an early start in terms of project alignment. These

informal means can be used to facilitate information flow and knowledge transfer for successful transition (Stähle *et al.*, 2019). This is important because the settings of the FE and PE teams are different, they have different tasks and responsibilities (Turkulainen *et al.*, 2013), and organizational barriers exist between them which hinder integration and collaboration (Artto *et al.*, 2015; Stähle *et al.*, 2019), and informal means may provide the opportunity to improve information flow and knowledge transfer.

For the “What” question, what does the integration and transition mean for project practitioners? The findings from this research revealed that there was strong support for *milestones, measurements and project deliverables, knowledge sharing, teams and team responsibilities, and risk management* (Section 4.4). The expert panel indicated that integration and transition activities show that the project has officially commenced, and the clock has started ticking regarding measurements, milestones and project deliverables. Integration refers to the coordination of activities (Demirkesen and Ozorhon, 2017), whereas, transition refers to a change before and after an event or among participants (Lundin and Söderholm, 1995). There is a change in accountability from the sales FE to PE (Jacobson *et al.*, 2013). Transition activities include the signing of contracts, project kick-offs and project milestones (Van den Ende and Van Marrewijk, 2014). From literature evidence, there is also a requirement for milestones measurements and project deliverables specific to time, duration and structuring (Furst *et al.*, 2004; Lundin and Steinhórsson, 2003; Winch, 2014). This can be achieved through a proper stage-gate process (Samset and Volden, 2016).

Better integration and transition can also help reduce tensions between the two teams and the two phases; this will ensure a smoother and seamless transition (Artto *et al.*, 2015). This will enable better assignment of teams and team responsibilities. Integrating the two phases also means resources are not over-committed, and promises made during the sales and marketing phases are achievable (Cooper and Budd, 2007). This will enable better knowledge transfer from both an explicit and tacit knowledge perspective, thus developing a better understanding of the project scope and limitations and a mutual understanding of the expectations. This is important because organizational barriers exist between the sales FE and PE phases resulting in the need to link these two functional areas through integration (Artto *et al.*, 2015; Cooper and Budd, 2007; Dietrich, 2006; Stähle *et al.*, 2019). However, a transition is an evolving process: it is not a one-shot or a hard stop. As the project evolves, the FE team’s involvement is reduced, and integration and transition should be well planned and coordinated as per defined processes to ensure the project’s future success and not merely throw it over the wall from the FE to PE. A well-integrated and transitioned project also implies higher profit margins, higher quality and lower risk. Reduced risk also leads to lower conflict in the later stages of the project. Conflict within the PE phases can lead to risk, which can affect the project’s success. Such conflict, if not handled well (Artto *et al.*, 2015), can also seriously hamper the development of customer relationships (Artto *et al.*, 2015). A well-integrated and transitioned project can also allow for better risk sharing between the FE sales and marketing phases and the PE phases.

6. Conclusions, limitations and areas for further research

The work here contributes to empirical research done in the project FE and PE phases. It enhances our knowledge about effective integration and transition between these project phases. Current literature highlights that the FE is not seen as within the domain of PM, and therefore the need exists for better integration and transition between the FE and PE phases for project success, and it consequently requires managerial attention. Current literature also highlights that the FE is not fully understood even though it is critical for project success. It also emphasises that the FE is hurdled with many challenges; hence, more research in this

area is required. This research contributes to the debate on the integration and transition mechanisms required to improve project outcomes.

This paper reports on an in-depth interpretative analysis based on interviews with an expert panel in the empirical setting of South African electrical engineering industrial projects. The findings present an argument about the importance of integration and transition between the FE and PE phases. From this, the following has been identified:

- (a) In terms of what mechanisms are important. Findings revealed *processes* as being the dominant second-order theme followed by *cross-functional involvement, risk management and meetings and workshops* as important mechanisms to improve integration and transition (Section 4.1).
- (b) In terms of how integration and transition mechanisms should be performed, the three areas that require focus include *processes and documentation, cross-functional collaboration* and *teamwork and communication* and *feedback* (Section 4.2).
- (c) In terms of when should transitions occur, the three triggers to effect transitions include *contract award, proper process* indicating when transitions should occur and *other informal means* like collaborative discussions outside formal process, which is built through relationship and trust (Section 4.3).
- (d) In terms of what do transitions mean, the findings reveal that once the project has transitioned from the FE to the PE team, the project is now in the execution phase, and *milestones and project deliverables* are confirmed, it also requires *knowledge sharing* and *teamwork as responsibility* has shifted from the FE sales team to the PE teams and finally *risk* must be closely monitored as risks impact project deliverables (Section 4.4).

These findings enable a better understanding of the integration and transition activities in the PIP between the FE and PE phases. This research has implications for researchers and practitioners. From a research perspective, this research further identifies the need for more research on the integration and transition between the project FE and PE phases. In terms of project practitioners, it emphasises that more attention be devoted to integration and transition between the FE and PE phases. It also identifies several areas that practitioners should focus upon to improve project outcomes; these areas are highlighted in points (a) to (d).

This research highlights that a better understanding and implementation of integration and transition activities lead to better project outcomes and improves customer value. It also emphasises that well-integrated and transitioned projects are fundamental to the future success of the business. Moreover, this research further reinforces the need for more empirical research as empirical research recognizes the importance of obtaining more detailed insights from real life practitioners on their views, experiences and opinions thereby providing insights to guide further research and at the same time proving real life practical examples to guide practitioners in better integrating and transitioning between the project FE and PE phases. The findings also indicate that a more strategic focus be employed in PM initiatives. Practitioners should take a more strategic focus on PM and in doing so, embrace the FE of PM due to the fact that most of the critical decisions are made in the FE phase. Similarly, the FE team should also pay more attention to PE phases, this is critical to ensure promises made in the FE are realized. Naturally, this falls within the scope of the agreed contractual scope and deliverables.

Regarding limitations, the expert panel participants were a South African group of elite individuals, so certain cultural and geographical demographics may be unique to the South African group; hence, the findings of this group cannot be generalized across other geographic locations. A second limitation is that the qualitative study had a limited group of

participants, interviewing 10 experts across one industrial sector: heavy electrical engineering industrial projects. This is mitigated by the narrow geographical location of projects in the one province, Gauteng, and across a single industry.

A further mitigating factor is the data quality which is because of the elite quality of expert panel participants whose in depth knowledge and experience across the project FE and PE and their insights provided confidence in the results. A further confidence factor was the results from the interviews specifically quoted in this paper, reflecting the expert panel's views, opinions and insights, based on a tremendous body of experience. The cumulative experience of the participants was more than 315 years, with an average of 30 years.

Future research areas should focus on different industry sectors and other categories of projects, as in this research, the focus is on heavy electrical engineering industrial projects. Moreover, this research was qualitative in nature and limited in terms of the expert panel participants, future research could also focus more on quantitative studies to explore the linkages between the project FE, PE, and the linkages to overall project performance.

Future studies can also address the dynamics associated with the different behavioural characteristics of the FE and PE teams and how these dynamics affect the integration and transition.

References

- Adler, P.S. (1995), "Interdepartmental interdependence and coordination: the case of the design/manufacturing interface", *Organization Science*, Vol. 6 No. 2, pp. 147-167, doi: [10.1287/orsc.6.2.147](https://doi.org/10.1287/orsc.6.2.147).
- Aguinis, H. and Solarino, A.M. (2019), "Transparency and replicability in qualitative research: the case of interviews with elite informants", *Strategic Management Journal*, Vol. 40 No. 6, pp. 1291-1315, doi: [10.1002/smj.3015](https://doi.org/10.1002/smj.3015).
- Artto, K., Valtakoski, A. and Kärki, H. (2015), "Organizing for solutions: how project-based firms integrate project and service businesses", *Industrial Marketing Management*, Vol. 45, pp. 70-83, doi: [10.1016/j.indmarman.2015.02.021](https://doi.org/10.1016/j.indmarman.2015.02.021).
- Artto, K., Ahola, T. and Vartiainen, V. (2016), "From the front end of projects to the back end of operations: managing projects for value creation throughout the system lifecycle", *International Journal of Project Management*, Vol. 34 No. 2, pp. 258-270, doi: [10.1016/j.ijproman.2015.05.003](https://doi.org/10.1016/j.ijproman.2015.05.003).
- Asif, M., Fisscher, O.A.M., de Bruijn, E.J. and Pagell, M. (2010), "Integration management systems: a methodology of operational excellence and strategic flexibility", *Operations Management Research*, Vol. 3 No. 3, pp. 146-160, doi: [10.1007/s12063-010-0037-z](https://doi.org/10.1007/s12063-010-0037-z).
- Baker, L. and Phillips, J. (2019), "Tensions in the transition: the politics of electricity distribution in South Africa", *Environment and Planning C: Politics and Space*, Vol. 37 No. 1, pp. 177-196, doi: [10.1177/2399654418778590](https://doi.org/10.1177/2399654418778590).
- Barki, H. and Pinsonneault, A. (2005), "A model of organizational integration, implementation effort, and performance", *Organizational Science*, Vol. 16 No. 2, pp. 165-179, doi: [10.1287/orsc.1050.0118](https://doi.org/10.1287/orsc.1050.0118).
- Bennet, F.L. (2003), *The Management of Construction: A Project Life Cycle Approach*, Butterworth Heinemann, Amsterdam.
- Bergmann, T. and Karwowski, W. (2018), "Agile project management and project success: a literature review", in Kantola, J.I., Nazir, S. and Barath, T. (Eds), *AHFE 2018: Advances in Human Factors, Business Management and Society, Advances in Intelligence Systems*, Springer, Cham, Vol. 783, pp. 405-414, doi: [10.1007/978-3-319-94709-9_39](https://doi.org/10.1007/978-3-319-94709-9_39).
- Blanchard, B.S. and Fabrycky, W.J. (2006), *Systems Engineering and Analysis*, 4th ed., Pearson, Prentice Hall international, New Jersey.

- Bond-Barnard, T.J., Fletcher, L. and Steyn, H. (2018), "Linking trust and collaboration in project teams to project management success", *International Journal of Managing Projects in Business*, Vol. 11 No. 2, pp. 432-457, doi: [10.1108/IJMPB-06-2017-0068](https://doi.org/10.1108/IJMPB-06-2017-0068).
- Brady, T., Davies, A. and Gann, D.M. (2005), "Creating value by delivering integrated solutions", *International Journal of Project Management*, Vol. 23 No. 5, pp. 360-365, doi: [10.1016/j.ijproman.2005.01.001](https://doi.org/10.1016/j.ijproman.2005.01.001).
- Bryde, D. (2008), "Perceptions of the impact of project sponsorship practices on project success", *International Journal of Project Management*, Vol. 26 No. 8, pp. 800-809, doi: [10.1016/j.ijproman.2007.12.001](https://doi.org/10.1016/j.ijproman.2007.12.001).
- Cooper, M.J. and Budd, C.S. (2007), "Tying the pieces together: a normative framework for integrating sales and project operations", *Industrial Marketing Management*, Vol. 36 No. 2, pp. 173-182, doi: [10.1016/j.indmarman.2006.03.005](https://doi.org/10.1016/j.indmarman.2006.03.005).
- Cova, B. and Salle, R. (2000), "Rituals in managing extra business relationships in international project marketing: a conceptual framework", *International Business Review*, Vol. 9 No. 6, pp. 669-685.
- Cova, B. and Salle, R. (2005), "Six key points to merge project marketing into project management", *International Journal of Project Management*, Vol. 23 No. 5, pp. 354-359, doi: [10.1016/j.ijproman.2005.01.006](https://doi.org/10.1016/j.ijproman.2005.01.006).
- Cova, B., Mazet, F. and Salle, R. (1996), "Milieu as a pertinent unit of analysis in project marketing", *International Business Review*, Vol. 5 No. 6, pp. 647-664, doi: [10.1016/S0969-5931\(96\)00032-7](https://doi.org/10.1016/S0969-5931(96)00032-7).
- Davies, A. (2004), "Moving base into high-value integrated solutions: a value stream approach", *Industrial and Corporate Change*, Vol. 13 No. 5, pp. 727-756, doi: [10.1093/icc/dth029](https://doi.org/10.1093/icc/dth029).
- Davies, A., Brady, T., Tang, P., Hobday, M., Rush, H. and Gann, D. (2003), *Delivering Integrated Solutions*, SPRU, Falmer, Brighton.
- Demirkesen, S. and Ozorhon, B. (2017), "Impact of integration management on construction project management performance", *International Journal of Project Management*, Vol. 35 No. 8, pp. 1639-1654, doi: [10.1016/j.ijproman.2017.09.008](https://doi.org/10.1016/j.ijproman.2017.09.008).
- Dietrich, P. (2006), "Mechanisms for inter-project integration-empirical analysis in program context", *Project Management Journal*, Vol. 37 No. 3, pp. 49-61, doi: [10.1177/875697280603700306](https://doi.org/10.1177/875697280603700306).
- Eisner, H., McMillan, R., Marciniak, J. and Praguski, W. (1993), "RCASSE: rapid computer-aided system of systems (S2) engineering", *Paper Presented at INCOSE International Journal Symposium*, Vol. 3, pp. 267-273.
- Enberg, C., Lindkvist, L. and Tell, F. (2010), "Knowledge integration at the edge of technology: on teamwork and complexity in new turbine development", *International Journal of Project Management*, Vol. 28 No. 88, pp. 756-765, doi: [10.1016/j.ijproman.2010.05.003](https://doi.org/10.1016/j.ijproman.2010.05.003).
- Engwall, M. (2003), "No project is an island: linking projects to history and context", *Research Policy*, Vol. 32 No. 5, pp. 789-808, doi: [10.1016/S0048-7333\(02\)00088-4](https://doi.org/10.1016/S0048-7333(02)00088-4).
- Eskerod, P. and Blichfeldt, B.S. (2005), "Managing team entries and withdrawals during the project life cycle", *International Journal of Project Management*, Vol. 23 No. 7, pp. 495-503, doi: [10.1016/j.ijproman.2004.12.005](https://doi.org/10.1016/j.ijproman.2004.12.005).
- Flyvbjerg, B. (2017), "Introduction: the iron law of megaproject management", in Flyvbjerg, B. (Ed.), *The Oxford Handbook of Megaproject Management*, Oxford University Press, Oxford, pp. 1-18.
- Flyvbjerg, B., Ansar, A. and Budzier, A. (2018), "Five things you should know about cost overrun", *Transportation Research A: Policy and Practice*, Vol. 118, pp. 174-190, doi: [10.1016/j.tra.2018.07.013](https://doi.org/10.1016/j.tra.2018.07.013).
- Furst, S.A., Reeves, M., Rosen, B. and Blackburn, R.S. (2004), "Managing the life cycle of virtual teams", *Academy of Management Executive*, Vol. 18 No. 2, pp. 6-20, available at: <https://www.jstor.org/stable/4166058>
- Galbraith, J., Downey, D. and Kates, A. (2001), *Designing Dynamic Organizations*, AMACOM, Broadway, New York.

- Gemser, G. and Leenders, M.A. (2011), "Managing cross-functional cooperation for new product development success", *Long Range Planning*, Vol. 44 No. 1, pp. 26-41, doi: [10.1016/j.lrp.2010.11.001](https://doi.org/10.1016/j.lrp.2010.11.001).
- Geraldi, J. and Soderlund, J. (2018), "Project studies: what it is, where it is going", *International Journal of Project Management*, Vol. 36 No. 1, pp. 55-70, doi: [10.1016/j.ijproman.2017.06.004](https://doi.org/10.1016/j.ijproman.2017.06.004).
- Gil, N. and Pinto, J.K. (2018), "Polycentric organizing and performance: a contingency model and evidence from megaprojects planning in the UK", *Research Policy*, Vol. 47 No. 4, pp. 717-734, doi: [10.1016/j.respol.2018.02.001](https://doi.org/10.1016/j.respol.2018.02.001).
- Gioia, D.A., Corley, K.G. and Hamilton, A.L. (2013), "Seeking qualitative rigor in inductive research: notes on the Gioia methodology", *Organizational Research Methods*, Vol. 16 No. 1, pp. 15-31, doi: [10.1177/1094428112452151](https://doi.org/10.1177/1094428112452151).
- Goold, M. and Campbell, A. (2002), "Do you have a well-designed organization?", *Harvard Business Review*, Vol. 30 No. 3, pp. 117-124.
- Griffin, A. and Hauser, J.R. (1996), "Integrating R&D and marketing: a review and analysis of the literature", *Journal of Product Innovation Management: An International Publication of the Product Development and Management Association*, Vol. 13 No. 3, pp. 191-215, available at: https://www.academia.edu/1761959/Integrating_R_and_D_and_marketing_a_review_and_analysis_of_the_literature (accessed 8 May 2021).
- Haji-Kazemi, S., Andersen, B. and Krane, H.P. (2013), "Identification of early warning signs in the front-end stage of projects: an aid to effective decision making", *Procedia Social and Behavioural Sciences*, Vol. 74, pp. 212-222.
- Harvey, W.S. (2011), "Strategies for conducting elite interviews", *Qualitative Research*, Vol. 11 No. 4, pp. 431-441, doi: [10.1177/1468794111404329](https://doi.org/10.1177/1468794111404329).
- Hatch, M.J. and Cunliffe, A.L. (2006), *Organization Theory: Modern, Symbolic, and Postmodern Perspectives*, Oxford University Press, New York, NY.
- Hobday, M. (2000), "The project-based organisation: an ideal form for managing complex products and systems?", *Research Policy*, Vol. 29 No. 7, pp. 871-893, doi: [10.1016/S0048-7333\(00\)00110-4](https://doi.org/10.1016/S0048-7333(00)00110-4).
- Imam, H. and Zaheer, M.K. (2021), "Shared leadership and project success: the roles of knowledge sharing, cohesion and trust in the team", *International Journal of Project Management*, Vol. 39 No. 5, pp. 463-473, doi: [10.1016/j.ijproman.2021.02.006](https://doi.org/10.1016/j.ijproman.2021.02.006).
- Jacobsson, M., Burström, T. and Wilson, T.L. (2013), "The role of transition in temporary organizations: linking the temporary to the permanent", *International Journal of Managing Projects in Business*, Vol. 6 No. 33, pp. 576-586, doi: [10.1108/IJMPB-12-2011-0081](https://doi.org/10.1108/IJMPB-12-2011-0081).
- Kirsilä, J., Hellström, M. and Wikström, K. (2007), "Integration as a project management concept: a study of the commissioning process in industrial deliveries", *International Journal of Project Management*, Vol. 25 No. 7, pp. 714-721, doi: [10.1016/j.ijproman.2007.02.005](https://doi.org/10.1016/j.ijproman.2007.02.005).
- Kokkonen, A. and Vaagaasar, A.L. (2018), "Managing collaborative space in multi-partner projects", *Construction Management and Economics*, Vol. 36 No. 2, pp. 83-95, doi: [10.1080/01446193.2017.1347268](https://doi.org/10.1080/01446193.2017.1347268).
- Lane, P.J. and Lubatkin, M. (1998), "Relative absorptive capacity and interorganizational learning", *Strategic Management Journal*, Vol. 19 No. 5, pp. 461-477, doi: [10.1002/\(SICI\)1097-0266\(199805\)19:5<3C461::AID-SMJ953%3E3.0.CO;2-L](https://doi.org/10.1002/(SICI)1097-0266(199805)19:5<3C461::AID-SMJ953%3E3.0.CO;2-L).
- Larsen, A.S.A., Karlsen, A.T., Andersen, B. and Olsson, N. (2021), "Exploring collaboration in hospital projects' front-end phase", *International Journal of Project Management*, Vol. 39 No. 5, pp. 557-569, doi: [10.1016/j.ijproman.2021.04.001](https://doi.org/10.1016/j.ijproman.2021.04.001).
- Levitt, R. (2011), "Towards project management 2.0", *Engineering Project Organization Journal*, Vol. 1 No. 3, pp. 197-210, doi: [10.1080/21573727.2011.609558](https://doi.org/10.1080/21573727.2011.609558).
- Löfgren, O. (2007), "Island magic and the making of a transnational region", *Geographical Review*, Vol. 97 No. 2, pp. 244-259, doi: [10.1111/j.1931-0846.2007.tb00401.x](https://doi.org/10.1111/j.1931-0846.2007.tb00401.x).

- Lundin, R.A. and Söderholm, A. (1995), "A theory of the temporary organization", *Scandinavian Journal of Management*, Vol. 11 No. 4, pp. 437-455, doi: [10.1016/0956-5221\(95\)00036-U](https://doi.org/10.1016/0956-5221(95)00036-U).
- Lundin, R.A. and Steinhórnsson, R.S. (2003), "Studying organizations as temporary", *Scandinavian Journal of Management*, Vol. 19 No. 2, pp. 233-250, doi: [10.1016/S0956-5221\(02\)00006-4](https://doi.org/10.1016/S0956-5221(02)00006-4).
- Mason, J. (2018), *Qualitative Researching*, 3rd ed, Sage Publications, London.
- Merschbrock, C., Hosseini, R.M., Martek, I., Arashpour, M. and Mignone, G. (2018), "Collaborative role of sociotechnical components in BIM-based construction networks in two hospitals", *Journal of Management in Engineering*, Vol. 34 No. 4, doi: [10.1061/\(ASCE\)ME.1943-5479.0000605](https://doi.org/10.1061/(ASCE)ME.1943-5479.0000605).
- Mikecz, R. (2012), "Interviewing elites: addressing methodological issues", *Qualitative Inquiry*, Vol. 18 No. 6, pp. 482-493, doi: [10.1177/1077800412442818](https://doi.org/10.1177/1077800412442818).
- Miller, R. and Hobbs, B. (2009), "The complexity of decision-making in large projects with multiple partners: be prepared to change", in Williams, T., Samset, K. and Sunnevåg, K.J. (Eds), *Making Essential Choices with Scant Information*, Palgrave MacMillan, London, pp. 375-389.
- Miller, R. and Lessard, D. (2009), *The Strategic Management of Large Engineering Projects: Shaping, Institutions, Risks and Governance*, Massachusetts Institute of Technology, Cambridge, MA.
- Momeni, K. and Martinsuo (2019), "Integrating solutions into service offerings in the sales work of project-based firms", *International Journal of Project Management*, Vol. 35 No. 8, pp. 956-967, doi: [10.1016/j.ijproman.2019.09.004](https://doi.org/10.1016/j.ijproman.2019.09.004).
- Morgan, B.V. (1987), "Benefits of project management at the front end", *International Journal of Project Management*, Vol. 5 No. 2, pp. 102-119, doi: [10.1016/0263-7863\(87\)90036-6](https://doi.org/10.1016/0263-7863(87)90036-6).
- Morris, P.W.G. (2016), "Reflections", *International Journal of Project Management*, Vol. 34 No. 2, pp. 365-370, doi: [10.1016/j.ijproman.2015.08.001](https://doi.org/10.1016/j.ijproman.2015.08.001).
- Morris, P.W.G., Crawford, D., Hodgson, D., Shepherd, M.M. and Thomas, J. (2006), "Exploring the role of formal bodies of knowledge in defining a profession - the case of project management", *International Journal of Project Management*, Vol. 24 No. 8, pp. 710-721, doi: [10.1016/j.ijproman.2006.09.012](https://doi.org/10.1016/j.ijproman.2006.09.012).
- Nobelius, D. and Trygg, L. (2002), "Stop chasing the front end process—management of the early phases in product development projects", *International Journal of Project Management*, Vol. 20 No. 5, pp. 331-340, doi: [10.1016/S0263-7863\(01\)00030-8](https://doi.org/10.1016/S0263-7863(01)00030-8).
- Pinto, J.K. and Patanakul, P. (2015), "When narcissism drives project champions: a review and research agenda", *International Journal of Project Management*, Vol. 33 No. 5, pp. 1180-1190, doi: [10.1016/j.ijproman.2015.01.013](https://doi.org/10.1016/j.ijproman.2015.01.013).
- Sabini, L., Muzio, D. and Alderman, N. (2019), "25 years of 'sustainable projects'. What we know and what the literature says", *International Journal of Project Management*, Vol. 37 No. 6, pp. 820-838, doi: [10.1016/j.ijproman.2019.05.002](https://doi.org/10.1016/j.ijproman.2019.05.002).
- Samset, K. and Volden, G.H. (2016), "Front-end definition of projects: ten paradoxes and some reflections regarding project management and project governance", *International Journal of Project Management*, Vol. 34 No. 2, pp. 297-313, doi: [10.1016/j.ijproman.2015.01.014](https://doi.org/10.1016/j.ijproman.2015.01.014).
- Sandberg, J. (2005), "How do we justify knowledge produced within interpretive approaches?", *Organizational Research Methods*, Vol. 8 No. 1, pp. 41-68, doi: [10.1177/1094428104272000](https://doi.org/10.1177/1094428104272000).
- Saukko, L., Aaltonen, K. and Haapasalo, H. (2020), "Inter-organizational collaboration challenges and preconditions in industrial engineering projects", *International Journal of Managing Projects in Business*, Vol. 13 No. 5, pp. 999-1023, doi: [10.1108/IJMPB-10-2019-0250](https://doi.org/10.1108/IJMPB-10-2019-0250).
- Shapiro, B.P. (1977), "Can marketing and manufacturing coexist?", *Harvard Business Review*, Vol. 55 No. 6, pp. 104-114.
- Siriram, R. (2017), "A hybrid (soft and hard) systems approach to project management", *SSRG International Journal of Industrial Engineering*, Vol. 4 No. 6, pp. 1-16, doi: [10.14445/23499362/IJIE-V4I6P101](https://doi.org/10.14445/23499362/IJIE-V4I6P101).

- Siriram, R. (2018), "Project management assessments", *South African Journal of Industrial Engineering*, Vol. 29 No. 1, pp. 108-127, doi: [10.7166/29-1-1675](https://doi.org/10.7166/29-1-1675).
- Siriram, R. (2019), "A project management investigative framework establishing links for better project outcomes", *South African Journal of Industrial Engineering*, Vol. 30 No. 2, pp. 100-114, doi: [10.7166/30-2-2064](https://doi.org/10.7166/30-2-2064).
- Siriram, R. (2022), "Inter-organizational integration, transition, and collaboration in the project front-end and project initiation phase", in Mircea, M. (Ed.), *Project Management New Trends and Applications*, Intechopen, available at: <https://www.intechopen.com/online-first/80457> (accessed 5 April 2022).
- Song, X.M., Neeley, S.M. and Zhao, Y. (1996), "Managing R&D-marketing integration in the new product development process", *Industrial Marketing Management*, Vol. 25 No. 6, pp. 545-553.
- Stähle, M., Ahola, T. and Martinsuo, M. (2019), "Cross-functional integration for managing customer information flows in a project-based firm", *International Journal of Project Management*, Vol. 37 No. 1, pp. 145-160, doi: [10.1016/j.ijproman.2018.11.002](https://doi.org/10.1016/j.ijproman.2018.11.002).
- Stephens, J.P. and Carmeli, A. (2016), "The positive effect of expressing negative emotions on knowledge creation capability and performance of project teams", *International Journal of Project Management*, Vol. 34 No. 5, pp. 862-873, doi: [10.1016/j.ijproman.2016.03.003](https://doi.org/10.1016/j.ijproman.2016.03.003).
- Storbacka, K. (2011), "A solution business model: capabilities and management practices for integrated solutions", *Industrial Marketing Management*, Vol. 40 No. 5, pp. 699-711, doi: [10.1016/j.indmarman.2011.05.003](https://doi.org/10.1016/j.indmarman.2011.05.003).
- Suprpto, M., Bakker, H.L., Mooi, H.G. and Moree, W. (2015), "Sorting out the essence of owner-contractor collaboration in capital project delivery", *International Journal of Project Management*, Vol. 33 No. 3, pp. 664-683, doi: [10.1016/j.ijproman.2014.05.001](https://doi.org/10.1016/j.ijproman.2014.05.001).
- Turkulainen, V. and Ketokivi, M. (2012), "Cross-functional integration and performance: what are the real benefits?", *International Journal of Operations and Production Management*, Vol. 32 No. 4, pp. 447-467, doi: [10.1108/01443571211223095](https://doi.org/10.1108/01443571211223095).
- Turkulainen, V., Kujala, J., Artto, K. and Levitt, R.E. (2013), "Organizing in the context of global project-based firm—the case of sales-operations interface", *Industrial Marketing Management*, Vol. 42 No. 2, pp. 223-233, doi: [10.1016/j.indmarman.2012.08.004](https://doi.org/10.1016/j.indmarman.2012.08.004).
- Turner, V. (1969), *The Ritual Process: Structure and Anti-structure*, Routledge, London.
- Van den Ende, L. and Van Marrewijk, A. (2014), "The ritualization of transitions in the project life cycle: a study of transition rituals in construction projects", *International Journal of Project Management*, Vol. 32 No. 7, pp. 1134-1145, doi: [10.1016/j.ijproman.2014.02.007](https://doi.org/10.1016/j.ijproman.2014.02.007).
- Williams, T., Vo, H., Samset, K. and Edkins, A. (2019), "The front-end of projects: a systematic literature review and structuring", *Production Planning and Control*, Vol. 30 No. 14, pp. 1137-1169, doi: [10.1080/09537287.2019.1594429](https://doi.org/10.1080/09537287.2019.1594429).
- Willumsen, P., Oehmen, J., Stingl, V. and Gerdali, J. (2019), "Value creation through project risk management", *International Journal of Project Management*, Vol. 37 No. 5, pp. 731-749, doi: [10.1016/j.ijproman.2019.01.007](https://doi.org/10.1016/j.ijproman.2019.01.007).
- Winch, G. (2014), "Three domains of project organising", *International Journal of Project Management*, Vol. 32 No. 5, pp. 721-731, doi: [10.1016/j.ijproman.2013.10.012](https://doi.org/10.1016/j.ijproman.2013.10.012).
- Winch, G.M. and Cha, J. (2020), "Owner challenges on major projects: the case of UK government", *International Journal of Project Management*, Vol. 38 No. 3, pp. 177-187, doi: [10.1016/j.ijproman.2020.03.001](https://doi.org/10.1016/j.ijproman.2020.03.001).
- Yin, R.K. (2003), *Case Study Research Design and Methods*, Sage Publications, Thousand Oaks CA, Vol. 5.
- Zerjav, V., McArthur, J. and Edkins, A. (2021), "The multiplicity of value in the front-end of projects: the case of London infrastructure", *Internal Journal of Project Management*, Vol. 39 No. 5, pp. 507-519, doi: [10.1016/j.ijproman.2021.03.004](https://doi.org/10.1016/j.ijproman.2021.03.004).

Zwikael, O. and Meredith, J. (2019), "Effective support practices for setting target benefits in the project front end", *International Journal of Project Management*, Vol. 37 No. 7, pp. 930-939, doi: [10.1016/j.ijproman.2019.08.001](https://doi.org/10.1016/j.ijproman.2019.08.001).

Zwikael, O., Chih, Y. and Meredith, J. (2018), "Project benefit management: setting effective target benefits", *International Journal of Project Management*, Vol. 36 No. 4, pp. 650-658, doi: [10.1016/j.ijproman.2018.01.002](https://doi.org/10.1016/j.ijproman.2018.01.002).

Further reading

Alderman, N., Ivory, C., McLoughlin, I., Vaughan, R. and Thwaites, A. (2005), "Sensemaking as a process within complex service-led projects", *International Journal of Project Management*, Vol. 23 No. 5, pp. 380-385, doi: [10.1016/j.ijproman.2005.01.004](https://doi.org/10.1016/j.ijproman.2005.01.004).

Jalkala, A., Cova, B., Salle, R. and Salminen, R.T. (2010), "Changing project business orientations: towards a new logic of project marketing", *European Management Journal*, Vol. 28 No. 2, pp. 124-138, doi: [10.1016/j.emj.2009.04.005](https://doi.org/10.1016/j.emj.2009.04.005).

Marshall, N.N. and Bresnen, M. (2013), "Where's the action? Challengers of ethnographic research in construction", in Pink, S., Tutt, D. and Dainty, A. (Eds), *Challengers of Ethnographic Research in Construction*, Routledge, New York, Ch 7.

Williams, T. and Samset, K. (2010), "Issues in front-end decision making on projects", *Project Management Journal*, Vol. 41 No. 2, pp. 38-49, doi: [10.1002/pmj.20160](https://doi.org/10.1002/pmj.20160).

Appendix

Keywords	Code
Incentive	i
Symbiosis	s
Margin quality	q
Risk	r
Process	p
Common workshops, meetings	c
Cross-functional joint involvement	v
Project manager	m
Technology and tools	t
Customer/client	u
Post-mortem	m

Table A1.
Codes

#	Q4 Responses	Themes									
		Codes	Incentive	Quality	Risk	Process	Technology And tools	Project manager	Meetings	customer	post-mortem
1.	Understanding both sides of the processes : A company needs orders, so order intake is important A company needs to make a profit, otherwise salaries and expenses will be compromised, therefore the order must have a quality profit element. A typical symbiosis relationship. By combining these elements in the incentive basis, M and PE need to pull on the same rope to be successful.	p q s i	1	1		1					1
2.	Inclusion of the project manager from the outset, but on long lead time projects this may not be possible. Careful risk management and timeous actions Common workshops to generate lists of risks and possible early actions.	m r c			1		1		1		
3.	A formal CRM package A formal handover from Sales to the Project team.	t p				1	1				
4.	Best practice firms have a clear process and handover procedures .	p,p				2					
5.	CRM platforms Gantt charts or excel based project management forms Project review meetings	t t c				1 1		1			
6.	Execution team must be involved in the costing process and signing of on the project cost estimates. Proper project handover process Sales teams involved in project execution as an oversight function, also attending ad-hoc project meetings and visiting site Customer needs are taken into consideration. IT systems like CRM platforms Celebrations/rituals not part of the handover process.	f,p p f c u t,t			1 1		2		1	1	1
7.	Joint involvement both sales and PE in estimating, in face-to-face discussions with the client in the front-end. A post-mortem should be done at the end of the front-end phase, before commencement of the PLC phases, this is at the initiation phase, so that what is missed can be highlighted and proper risk management can be put in place and furthermore these mistakes do not occur again in the future. One consolidated document needs to be part of the handover process . Pricing finalization needs to be a joint effort between sales and PE. While the project manager and PE teams are risk adverse, they need to be realistic and simply including mechanisms to eliminate all or reduce risk will over price and over constrain the solution, resulting in the solution being rejected by the customer . Leading to order failure.	v,c u o r p f m,r r u			1 1 1	1		1	1	1	1
8.	Involvement of the project manager in the solution sign off process will ensure that the PE team is jointly accountable together with the sales team for the project deliverables. A proper handover process inclusive of a fully consolidated and comprehensive documentation pack that is handed over to the PE team An incentive scheme that has a weighting system holding both the sales and PE teams jointly accountable for the solution sales as well as the project deliverables	v,m p,v p i v	1			1	1				1 1
9.	Joint sign off by the project manager and the sales lead at the sales stage ensures both sales and PE are held jointly accountable for project deliverables An risk list with risk mitigation factors needs to be compiled early on in the sales process and the risk list is continually updated throughout the project life cycle A defined handover process which is regularly audited to ensure adherence to the process . Having a process that is not adhered to adds no value, project participants must adhere to process .	v,m v r,r p,r p p,p p		2 1	1		1				1 1

(continued)

Table A2.
Codes and theme
categorization

