Doctoral Education in Context

Perspectives from Africa

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CHAPTER 9

Project management as an enabler of doctoral completion

Isabel Meyer

South Africa has a population of 62 million. The country has 26 public universities with a total enrolment of 1.1 million students. Doctoral enrolments in South Africa have increased from 9 994 in 2008 to 23 588 in 2020 (CHE, Vitalstats). During the period 2000-2018, a total of 32 025 doctoral students graduated at South African universities. Annual doctoral graduates increased from 972 in 2000 to 3 339 in 2019 (SciSTIP, Tracer Study).

Stellenbosch University became an independent university in 1918, tracing its origins to the Theological Seminary of the Dutch Reformed Church (est. 1859) and Stellenbosch College (est. 1880). The university has ten faculties located on four campuses (in Stellenbosch, Bellville, Cape Town and Saldanha). In 2021 it had 1 400 academic staff members and 32 471 students, including 1 611 doctoral candidates, and 310 doctoral degrees were awarded. The first doctoral degree was awarded by Stellenbosch University in 1923, in physics.

The **Council for Scientific and Industrial Research (CSIR)** is a national research and development organisation in South Africa, established in 1945. The CSIR undertakes directed, multidisciplinary research and technological innovation that contributes to the improved quality of life of South Africans. The CSIR's shareholder is the South African Parliament, held in proxy by the Minister of Higher Education, Science and Innovation.

1. Introduction: The pressure to comp(l)ete

The pressure on the national ability to deliver PhD graduates is multidimensional. At the institutional level, the pressure to complete doctoral studies is

driven by a focus on resource optimisation and efficiency, the financial benefits of completion, and the costs of non-completion (Backlund, 2017). At the individual level, the implications on the student's wellbeing, as well as the financial, psychological, and opportunity costs of non-completion are relevant (Backlund, 2017; Herman, 2011).

In a broader national context, a link appears to exist between the need to develop PhD graduates and the state of economic development. In the African context, the need for increased higher education enrolment rates and increased completion rates of high-quality PhDs is motivated from the perspective of higher education as an enabler of economic development (Mohamedbhai, 2018; Mouton, 2010; Nakwenya, 2018). In contrast to the economic development pressure experienced in developing contexts, the developed world seems in some instances to be grappling with an 'excess' PhD students, who are 'abused' at the hands of supervisors as cheap, competent labour to bolster the personal research output of accomplished researchers (*The Economist*, 2016). In other cases, supervisors are pressured to improve their PhD delivery rates to retain their own positions in an increasingly competitive labour market (Carter, 2017). Research on PhD completion rates confirms relatively high dropout rates in the African context (e.g. Mouton, 2010; Herman, 2011), and as such supports the need to develop a systemic ability to consistently deliver doctoral graduates *of good quality* (Mouton, 2010). However, the reasons for high dropout rates are poorly researched and not well understood (Herman, 2011).

Regardless of the reason for increased pressure on completion rates, it is accepted that this pressure is changing both the focus of PhD studies and the quality of learning (Khosa, 2019). The spectrum of needs for PhD development across developing and developed economies, as well as the personal and institutional-level pressures on PhD completion, begs the question of what the desired outcome should be for increased PhD delivery rates and, hence, what mechanisms are appropriate to facilitate such increased delivery. By focusing on supporting PhD completion for the mere sake of completion, participating in the academic pipeline, or preparing candidates for contributions to industry would position the role of project management in different ways.

This chapter is based on the assumptions that PhDs in Africa are indeed a necessary enabler of economic development, that the capacity of the continent for sustainable delivery of PhDs should be bolstered, and that mechanisms are required to achieve this. It explores the role of project management as a tool to enhance African education systems' PhD throughput rate while also developing the capability to deliver high quality research in support of economic development.

The assertion is that, by incorporating rigorous project management approaches in the PhD journey, the student should not only complete the PhD in time for the sake of attaining the degree and for managing institutional pressures, but also develop a valuable skillset for the delivery of high-quality research that adds value in either academic or industry contexts. The skillset required to manage the PhD research project competently has the potential of developing a workforce that is better able to manage high-quality research in industry and academia and in so doing can contribute to improved economic development.

This chapter is exploratory in nature. It provides a brief overview of current perspectives on project management as an enabler of PhD completion (section 2) and reflects on potential value addition to the doctoral journey through project management (section 3). Finally, some concluding remarks and recommendations for future research are made (section 4).

2. From the literature: Some perspectives and practices

A brief literature review was undertaken to assess views on project management approaches in doctoral supervision. In line with the purpose of outlining the landscape of available literature on the topic, a scoping review approach was adopted (Arksey & O'Malley, 2005; Grant & Booth, 2009). On the ProQuest Educational Database, the current author searched literature published since 2015 featuring the full search terms (doctoral supervision) AND (project management) in the abstract, and located only 2 articles of relevance (Backlund, 2016; Katz, 2018). A broader search identified some (but not a significant number) additional work that addresses project management (as part of broader investigations, rather than as sole focus). This low article identification rate indicated a gap in research that explicitly addresses the role of project management in doctoral supervision. However, some empirical work was identified that provides insight into the current practices and perceptions of supervisors and students on the role of project management in doctoral supervision, as well as the role of project management from an institutional perspective. It is notable that the role of project management in African PhD studies is not widely addressed in the literature. Some general observations are reported here. The purpose and role of project management, the perceptions of supervisors and students, and the relevant elements are summarised.

2.1 To what end and in what role?

Studies cite the following as reasons for adopting project management practices in doctoral supervision:

- increased pressure on academic institutions to deliver, and the increased complexity of managing multiple doctoral candidates (Backlund, 2017).
- a need to alleviate supervisory pressure, improve efficiency, and provide support for the delivery of quality work in environments of increased job insecurity (Carter, 2017); and
- a high workload (Roets, 2017).

Project management is identified as a key challenge in doctoral supervision, in both STEM and non-STEM disciplines (Carter, 2017).

Other motivations in support of project management approaches extend beyond these institutional pressures. For example, some authors position project management as a precondition for and enabler of collaborative supervision across academic–industry collaborations, where a lack of formal process between more than one supervisor for a single student has been identified as a supervisory gap (Maguire, 2018). At a personal development level, Schulze (2012) argues that students' ownership of their projects would facilitate power and self-transformation. The latter two focus areas point to a role for project management in PhD supervision that extends beyond alleviation of immediate institutional pressures.

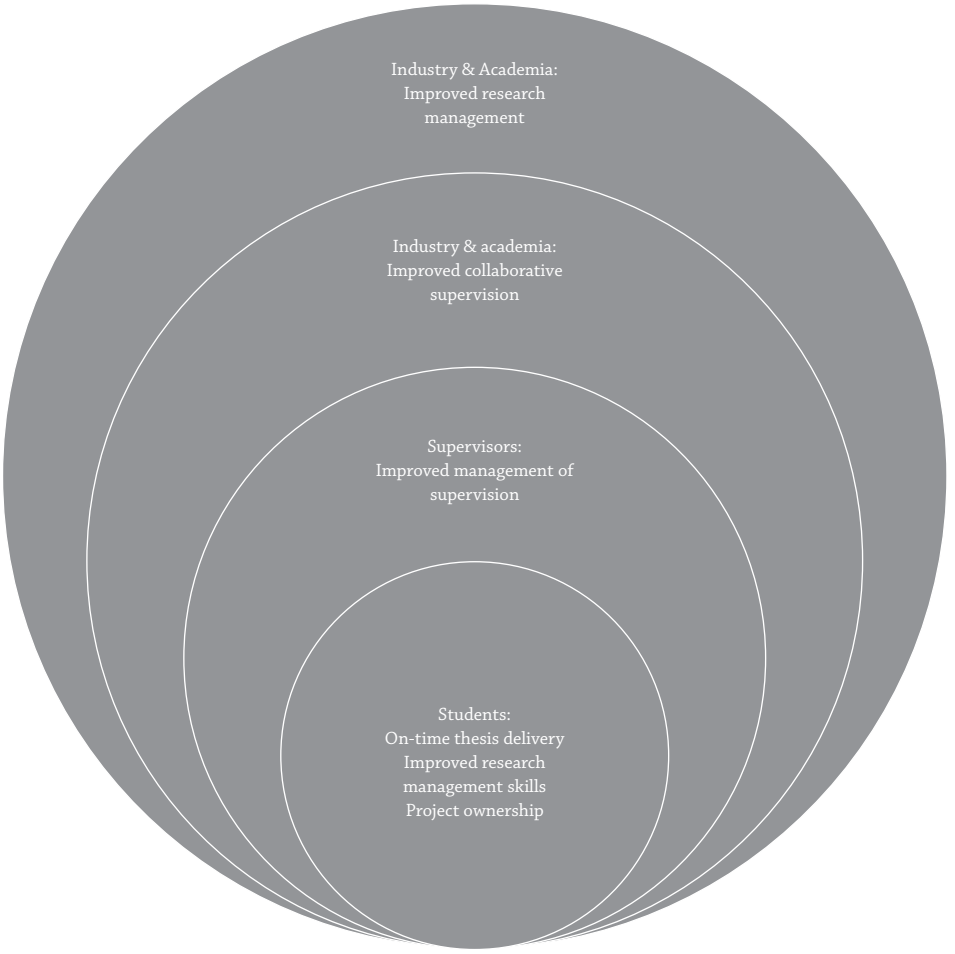
Project management as a skill for future research management is rarely addressed in literature, except Katz (2016), who points out that academia lags relative to (high tech) industry in the adoption of project management methods for research project management. Similarly, Buckland (2016) refers to an inertia in the uptake of project management skills in the highly individualised academic world.

The potential outcomes of an increased focus on the role of project management in PhD supervision is summarised in Figure 1.

2.2 Perspectives on project management in supervision

Bøgelund (2015) highlights three perspectives on knowledge production, namely academic, market, and changing society perspectives, and indicates through empirical work that supervisors who take an academic perspective do not consider project management to be important.

Figure 1: Some potential outcomes of improved project management



Source: Author

Work by Katz (2016) indicates that the majority of doctoral candidates have neither training nor expertise in research project management. In a study of 1 470 Israeli and Western European candidates, most participants (in excess of 55%) considered doctoral research as a project, while 95% of them had not had any training in research project management (Katz, 2016). More than 30% considered their supervisor a good manager. Backlund (2016) indicated that, in cases where students did have project management experience, they found it difficult to translate this to the research management environment. Further,

students expect supervisors to provide structure and facilitate the project management of their research, including time management (Khosa, 2019).

In a study of more than 1 000 Spanish students, González-Ocampo and Castelló (2019) collected positive and negative experiences of doctoral supervision from students. In their study, the following experiences were categorised as aspects of project management: funding and resources, guaranteeing quality, guidance, and giving career advice. Students did not rank project management as a significant contributor to their overall supervisory experience.

Similarly, Saleem (2018) identified project management as the least satisfactory of six supervisory skills, as perceived by students, in a survey of the experiences of 422 supervisees from 12 Pakistani universities.

Despite the relatively low project management skills and abilities of PhD students as indicated above, work by Buckland concluded that supervisors and students "have a common desire to learn about project management" (Buckland, 2016, p. 918).

2.3 Elements of project management

Project management, in its broadest form, aims to define, schedule, and coordinate a number of different activities towards a predefined goal. A research project fits the definition of a project, since it is concerned with a task that has a definite start and end point, works towards a goal, and has constrained resources (Katz, 2016). In studies that investigate project management as an element of doctoral supervision, the definitions of project management are not necessarily clearly defined. The diverse concepts that are identified as elements of project management in doctoral supervision, as highlighted by this brief literature review, are summarised below:

Table 1: Elements of research project management as identified in the literature

Reference	Focus	Elements of project management (concepts as listed in the article)
Backlund (2016)	How doctoral students experience a project perspective on doctoral studies, with the aim of improving effectiveness and efficiency	• Project control • Project organisation • Project methods and tools • Goal-setting • Stakeholder and uncertainty management

Reference	Focus	Elements of project management (concepts as listed in the article)
Carter et al. (2017)	Exploration of supervisors' experiences of project management, communication, and writing	*Outcomes of project management for supervisors:* • Learning about the topic • Increased passion for the discipline • Satisfaction of launching the career of an emerging researcher • Overseeing a challenging research design • A satisfying aspect of academic work
González-Ocampo & Castelló (2019)	Analyse students' significant supervisory experiences and relate them to coping strategies	• Funding and resources • Guaranteeing quality • Guidance • Giving career advice
Katz (2018)	Empirical assessment of the project challenges and management skills of doctoral candidates	• Meeting constraints of quality, time, scope, and budget • Planning and environmental control • Stakeholder analysis and understanding • Uncertainty and risk reduction
Keller et al. (2018)	Conceptual underpinnings of a PhD in health sciences, based on translation of European guidelines for enhanced quality of PhD education	• Planning and structuring of research • Organisation of infrastructure and logistics • Quality assurance
Manathunga	Intercultural supervision	• Transaction-based • Mitigates power imbalances • Focused on logical, sequential steps • Goal-focused

Source: Author

The summary points to the diverse perspectives on elements of project management in doctoral supervision. From his review of the application of project management in doctoral supervision, Backlund (2016) points out that project management seems to be interpreted rather simplistically, without clear definition of concepts, incomplete adoption of formal project management principles, and an over-focus on roles. Further, Katz indicates that their work did not encounter any references to the use of a holistic project management framework in doctoral research management (Katz, 2016).

3. Value addition through project management

The previous sections briefly highlighted the current state of limited use of formal project management principles in doctoral research supervision, and summarised potential positive outcomes of adopting project management principles for the individual, supervisor, academia, and industry. However, a focus

on research project management is positioned by some researchers as a negative practice in the generative and creative context of doctoral studies.

The author is of the opinion that, for project management to add value to the doctoral process, it should be positioned relative to, and customised for, the broader supervisory context. Some thoughts in the debate between project management as either an enabler of delivery, or enabler of a creative process, are explored here, as well as its role in enabling improved supervision.

3.1 Delivery vs. creative research

A key theme centres on an overly task- and output-focused approach to doctoral supervision at the cost of a high-quality research product — in other words, the tension between product and process.

Kandiko and Kinchen (2014), in their exploration of the focus of doctoral supervision on product vs. process, highlight the five supervisory strategies of Lee (2008), namely, functional, enculturation, critical thinking, emancipation, and developing a quality relationship. The functional supervisory style resembles traditional project management and is positioned as having a task focus with low personal support (Lee, 2008; Kyrö et al., 2019). It is depicted as an environment that academics are comfortable with, since it clearly reflects their functional responsibilities (Goede, 2017). Further, it is considered optimal in achieving timely completions of research output and is favoured by both supervisors and students — as found in a study of New Zealand and Australian accounting students (Khosa, 2019).

Kandiko and Kinchen (2014) proceed to warn that pressure for increased output rates leads to an overfocus on a functional approach to the detriment of a more holistic supervisory strategy. The concern is echoed by Manathunga (2015, p. 3), who emphasises that an (almost transaction-based) project management approach "excludes the unpredictable, creative or surprising outcomes and obstacles possible in research".

The call for balance between process and product is extended somewhat in empirical work by Löfström and Pyhältö (2015), who indicate that different expectations of doctoral supervision pose an ethical dilemma in which supervisors approach ethics from a project management perspective, whereas students expect concern at a personal and work-related level.

Bastalich (2015) argues that a perception exists among supervisors that lending too much help would undermine aspects such as a candidate's autonomy and originality of work; this leads to supervision taking on a project management rather than a critical engagement role (Bastalich, 2015). This further

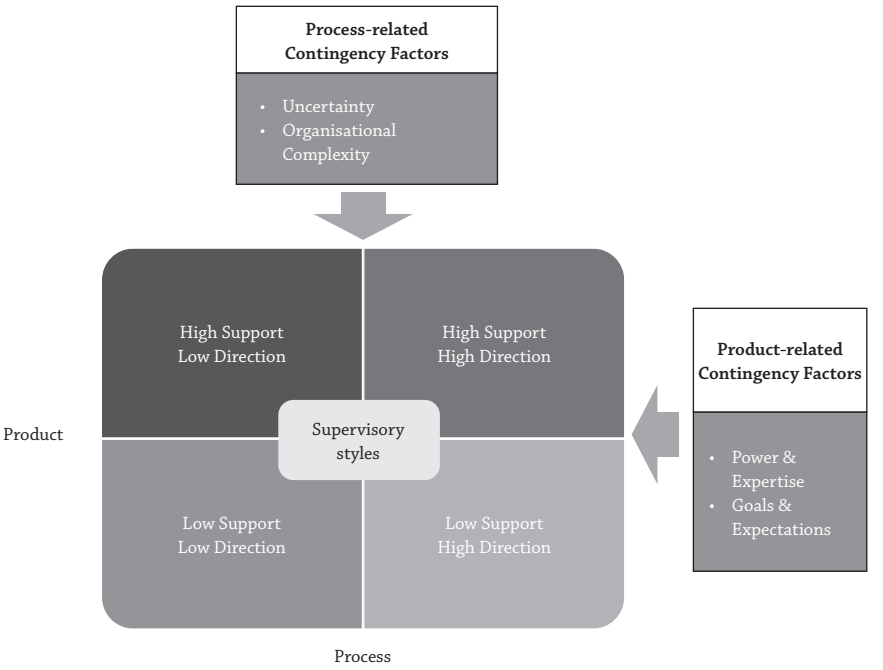
supports the view of project management as a rigid, non-creative endeavour in a research undertaking.

3.2 Project management as an enabler of improved supervision

In addition to facilitating delivery, the role of project management in facilitating improved supervision is worth exploring.

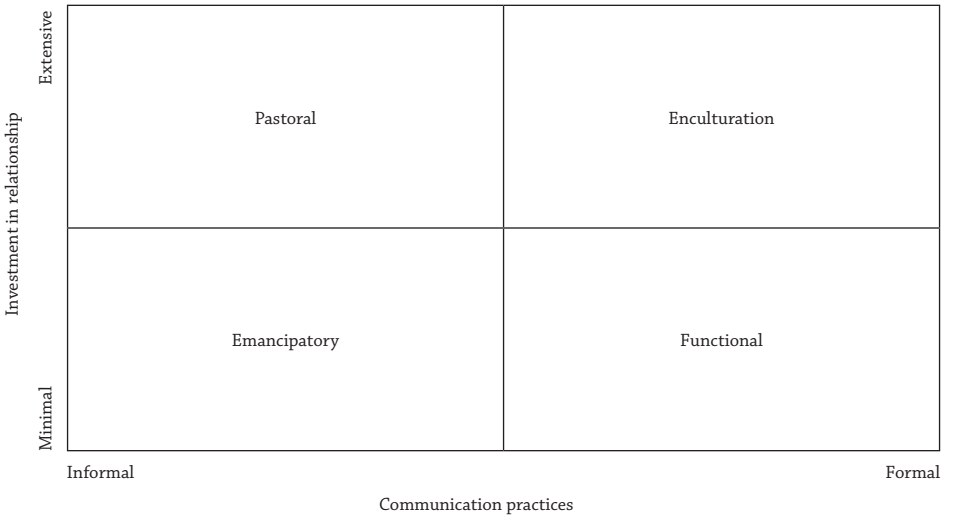
Boehe (2016) positions the quest for scientific originality as being in conflict with structured, controlled project management, and defines appropriate supervisory styles for environments of differing process and product-related contingency factors (see Figure 2). This model provides a basis for linking the process component of the research to appropriate project management styles on a spectrum, from a dominant controller to an equal collaborator (Boehe, 2016).

Figure 2: Supervisory styles and contingency factors (Boehe, 2016)



A similar presentation is that of Riikka (2019), who relates different supervisory styles to different communication practices and levels of personal investment (see Figure 3).

Figure 3: The link between supervisory praktice and communication/relationship building (Source: Kurö et al., 2019)



This important approach of linking supervisory styles to the process nature of doctoral supervision succeeds in contextualizing project management as not merely a mechanical action, but as an interactive process that can be influenced by supervisory style, and that hence has the potential to support doctoral research as a creative process.

A further effort to link project management to supervisory approaches is provided by Mayeza (2018), who considers enculturation as a supervisory approach that should include pedagogical strategies to enable project management.

Lin (2018) builds on the work of Manathunga (2011, 2014) in highlighting that supervisors find the project managementapproaches recommended by academic institutions as inadequate in addressing the complex environment of intercultural supervision. Further, Khosa (2019) found that a supervisory approach such as enculturation has the potential to deliver on-time research, include group supervision to reduce supervisory pressures, and develop performance outcomes for supervisors and students. By implication, these approaches have the potential to deliver on what the functional approach is trying to achieve, but with more flexibility and support for creative endeavours. Saleem (2018) argues for the development of candidates' understanding of the research process, in addition to knowledge development, in a PhD programme, and argues that a static supervisory framework will lead to missed deadlines and higher dropout rates.

3.3 Linking project management to supervisory models

Recent work has highlighted the need to better equip supervisors for the supervisory task and identified the following aspects as a means of managing the workload: project management, time management, and additional supervisory styles (Roets, 2017). However, while principles are transferable from traditional project management to research project management, some customisation is required (Buckland, 2018).

In an effort to bring these concepts and recommendations closer to a means of supporting practice, researchers are integrating project management into larger models of doctoral supervision or doctoral programme structures. These could in future be extended to provide a practical means of integrating project management into the broader supervisory context. Some examples are as follows:

Table 2: Models of supervision that integrate project management

Reference	Focus	Programme structure or elements
Keller et al. (2018)	Basel approach for PhD candidates in health sciences	Project management is included in one pillar of three competency areas, as follows: • knowledge and scientific competencies; • organisation and management competencies (including project management); and • leadership and personal competencies
COSTA (2019)	Postgraduate research coaching model	A structured framework of learning and development in postgraduate research, presented as a five-step process (project management not explicitly included, but a strong process focus is present): • Concepts (research language) • Objectives (research proposal) • Situation (literature review) • Tact (methods and presentation) • Assessment of impact (evaluation and defence)
Vilkinas (2005)	Learnings from leadership and management fields for research supervision, presented as the modified Competing Values Framework	The modified competing values framework identifies eight operational roles for the supervisor, each addressing different outcomes in four quadrants, as well as that of integrator: • Human commitment: mentor, facilitator • Expansion, adaptation: innovator, broker, • Maximisation of output: producer, director • Consolidation, continuity: monitor, coordinator • Integrator: delivers across quadrants
Careers Research and Advisory Centre (University of Queensland, 2022)	Vitae Researcher development framework, based on empirical data to identify the characteristics of excellent researchers	Characteristics are expressed as four domains and twelve sub-domains. Domains include the following: Domain A: Engagement, influence, impact Domain B: Personal effectiveness Domain C: Research governance and organisation Domain D: Engagement, influence, and impact

Source: Author

It is notable that the models integrate, or have the potential to integrate, project management skills as part of a broader framework. However, the detailed application of project management principles is not necessarily outlined. Adaptability of these models to different contexts is recommended. For example, it is recommended that limited modules of the Basel model are applied in resource- constrained environments, but that project management remains an essential component (Keller, 2018). A notable coaching, management, and leadership focus is present, while the COSTA model has a strong process focus.

Summary

African economies are under growth pressure and increased doctoral completion rates are seen as a means of strengthening the academic pipeline. However, the capacity for delivering on the increasing demand for doctoral supervision is limited. Mechanisms are sought to enhance doctoral graduation rates, with project management as one potential instrument.

A very brief review of the literature provides preliminary evidence that project management as an enabler of improved doctoral supervision does not receive extensive attention as a research topic, that the definition of project management in doctoral supervision is unclear and can benefit from further exploration, and that supervisors and students do not pursue project management broadly and rigorously as a key enabler of improved supervision.

This review positions project management as an enabler of improved efficiency in thesis delivery, as a means of enabling supervisors to coordinate better across multiple students, and as a means of facilitating academia–industry supervisory collaborations. The ability to manage research projects in a well-founded manner has potential benefits in academic as well as industry settings. While the focus in academia is on improving the capacity to deliver graduates, industry could benefit significantly from research that is well planned, well managed, and delivered in a cost-effective manner. This could especially be beneficial in developing economies. However, while literature makes some reference to the enhanced capacity of doctoral graduates as research managers through project management (e.g. Katz, 2016; Buckland, 2016), this is not a dominant focal point in the debate to introduce project management as a core element of doctoral supervision.

While some interest in project management's role in doctoral supervision is clear from the literature, the definition thereof, and models of research project management, are not abundant. Some studies have linked supervisory styles to elements of project management, and others have expanded on this line of

thought to develop supervisory models including a project management focus. Evidence could not be found of an extensive focus on African-centric models of supervision that include a focus on project management.

Future work could (a) confirm the prevalence and practices of supervisory project management on the African continent; (b) define key elements of supervisory project management that are relevant to the continent's academic and industry research demands; (c) develop appropriate supervisory project management models; and (d) identify skills development needs.

This chapter outlined some preliminary pointers to the current status of project management in doctoral supervision. It is based on a limited review of literature, which should be expanded substantially to confirm the identified pointers.

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