

FACILIS DESCENSUS AVERNO*
OR
INTERACTIONS OF DOCTORAL RESEARCH PROJECTS
WITH UNIVERSITY'S OTHER PROJECTS

Cezar Scarlat

*Professor Emeritus, Doctoral School of Entrepreneurship, Business Engineering and Management,
National University of Science and Technology POLITEHNICA Bucharest (Romania)*

Abstract

This piece of work is focused on higher education research, in particular PhD research projects in a large university, aiming to analyze the effects of interactions between doctoral research projects and other organizational (university's) projects. Assuming that objectives of doctoral research projects are aligned to the organization (university's) strategic objectives, there were a few research questions, specific to this pilot, explorative study: How could the effects of interactions be measured? Are the effects of interactions always positive? If the effects of interactions are negative, then which might be the reasons behind them? Ultimately, are there any solutions to avoid the negatives or, at least, to mitigate them? As methodology, the study includes both secondary research (literature survey) and primary research. Since the literature on this topic is rather scarce, this study relies mainly on primary research methods: directly observed and personally experienced doctoral projects in a Romanian university environment under scrutiny, completed with semi-structured interviews with doctoral students. Besides the approach of this narrow research area and associated methodology, this piece of work reveals novel types of inter-project conflicts within higher education institutions. The results are not definitive; however, they allow the formulation of several concrete, core-recommendations centred on better coordination between PhD research projects and other projects run by the university, mainly at the strategic level. The findings are *critically important to doctoral schools and PhD supervisors in particular* as well as to major stakeholders: higher education leaders and strategists, policy and decision makers, administrators and research managers.

Keywords: *PhD project interactions, doctoral research projects, higher education and research, organization versus project, organization management versus project management.*

1. Introduction

Universities experience “chronic disruption and crises” (Ling and Livingston, 2024) as effect of the tense international relationships between the global powers because of their efforts for supremacy as well as associated complex processes. The international trade is influenced accordingly, softly turning from the free trade-based globalization to protectionism (WB, 2023), which is visible in the acts issued by both the US and Chinese governments (Weightman, 2018) as well as other large economies as European Union, Canada, Australia (Barr, 2023). In addition to successive sanction packages against Russia, the US-China trade war is producing global effects (Fajgelbaum et al., 2023) not only in international trade flows and commercial supply chains (Bobek et al., 2023) but also in research and development (R&D) investments and resource allocation across industries. Amid rapid technology advance and increasing R&D investment, the invested amounts are not uniformly distributed (neither by industries nor by countries). Thus, some industries and research areas (e.g., IT, genetics, materials, etc.) enjoy larger shares of the R&D invested amounts. A proper illustration is the defence industry: in five years (2019–2023) the budget of the US Department of Defence for improving ‘energetics’ (i.e. explosives, propellants and pyrotechnics) increased from \$20m to “more than \$250m” (Economist, 2024a, p.68). The larger and more developed countries are spending more. However, even among them, the R&D investments are uneven.

* *Facilis descensus Averno* (Latin): *The path to ‘underworld’ is easy* (Virgil, Aeneis, Book VI, line 126, 29–19 BC).

In general, the dynamic of scientific publications follows the general trend of technology development and associated R&D investment. *The Economist* (2024b, p. 62) shows that higher-education institutions across the world employ 15 million researchers that “produce five times the number of papers each year. [...] In theory, therefore, universities should be an excellent source of productivity growth. In practice, however, the great expansion of higher education has coincided with a productivity slowdown.” Arora et al. (2023, p. 38) argue that “sluggish growth in productivity over the last three decades or more in the face of sustained growth in scientific output” happened because abstract ideas (i.e., generated by PhD research in universities) are difficult to use. Then the firms “appear to lack the absorptive capacity to use externally supplied ideas unless they are embodied in human capital and inventions” (*Ibidem*, p. 39).

However, amid the general trend that features booming volume of publications, (Economist, 2023) highlights that *publications related to significant scientific advances are not progressing at similar pace; moreover, their proportion is going down*. Even more alarmingly, Park, Leahey and Funk (2023, p. 138) declare: “slowing rates of disruption may reflect a fundamental shift in the nature of science and technology.” *This state of facts and affaires invites to careful examination*.

Getting different results than thought and planned is an old story (mostly in R&D process). The old Latin dictum *facilis descensus Averno* (attributed to the Roman poet Publius Vergilius Maro), which has circulated in the Christian era as *the road to hell is paved with good intentions*, has the same meaning in English (Collis and Risso, 1992; Kalman, 2010) as well as in many other languages (Ray, 1670; 1768; Mawr, 1885; Scarlat, 2019). Its profound meaning (in terms of how the wonder-plans may turn into not-so-wonderful reality) is explained by scholars (Powers, Koestner and Topciu, 2005; Gollwitzer and Sheeran, 2006) using the modern instruments of social psychology. Scarlat (2019, pp. 179-202) also provided evidences of proverbs that illustrate such behaviours along project life cycle or abstract principles of project management (Scarlat, 2022).

This study looks at a less explored, narrow research environment, at a micro-level: *PhD research projects conducted in a doctoral school from a relatively large science and technology university*. More specifically, this paper opens a window for discussions on the influence that other university projects (all aligned to the university R&D strategy, theoretically) may have on the doctoral research projects.

2. Methodology: scope of work, research circumstances, objectives and method

For the purpose of this study, the (PhD project) interaction is defined as active involvement of the PhD student in another project of the university, for a limited period during their doctoral studies (in this study, interactions were from 1 to 15 months). The effects of interactions are scrutinized from the doctoral projects’ standpoint; yet from both doctoral supervisors’ and PhD students’ (researchers’) perspectives (Lee and Bongaardt, 2021). The effects are: positive if they facilitate the doctoral project progress; negative in the opposite case; or neutral if no effect is reported.

Assuming that objectives of all university projects (and, implicitly, objectives of doctoral research projects) are aligned to the university strategy (and its strategic objectives), the specific research questions in this pilot explorative study are essentially qualitative: (i) How could the effects of interactions be measured? (ii) Are all the effects of interactions always positive? (iii) If there are negative effects of interactions, then which are the reasons behind them? (iv) Are there any solutions to avoid the negatives or, at least, to mitigate them? Hence, the main objectives of this study.

The study includes both primary and secondary research (literature survey), which is rather scarce (Ling and Livingston, 2024). Thus this study relies on primary research methods mainly: directly observed and personally experienced doctoral projects in a Romanian university environment, completed with semi-structured interviews with doctoral students. An interview map (guide) was developed for this purpose. The collected data are processed, then results are discussed, and implications are highlighted.

3. A pilot study on PhD research projects

During the period under scrutiny (18 months: 1 October 2022–31 March 2024), 15 doctoral students (enrolled to pursue a PhD degree in engineering sciences) were engaged in different phases of their PhD projects. From this pool, 7 doctoral students were identified as subjects of interactions (as defined in this study), and their projects were anonymized: PhD1–to–PhD7. The PhD projects interacted with four other research projects of their University as follows: one international-level project (marked I), two national-level projects (marked N1 and N2), and a single university-level project (U).

By duration, there are two categories of interactions: short-term (one month) and longer-term interactions (over one year, 12/15 months). *Table 1* depicts these interactions, by project types, including durations of the corresponding interactions.

Table 1. Seven cases of interactions between PhD projects and other university projects, and respective durations.

PhD Projects	Planned duration [from-to/extended]	Estimated durations of interaction with other university projects			
		I	N1	N2	U
PhD1	01.10.18–30.09.21/extended '23		12 months		
PhD2	01.10.19–30.09.22/extended '24	15 months			
PhD3	01.10.20–30.09.23/extended '24	1 month			
PhD4	01.10.20–30.09.23		12 months		
PhD5	01.10.21–30.09.24	1 month			
PhD6	01.10.22–30.09.25			15 months	
PhD7	01.10.22–30.09.25				1 month

In general, one-month interactions were international exchange visits and study tours, excepting U project, which was organization and participation at a local promotion event (research fair). Longer-term (12 months) interactions meant participation in many routine project activities as meetings and events as well as workshops and training sessions (e.g., developing entrepreneurship and pedagogical skills). N2 interaction involved secondary research (literature survey) and production of research reports, which are fairly related and may be useful to the doctoral project.

Qualitative by nature, this study is balanced in that respect of measuring the effect of each interaction: from both perspectives: PhD student and PhD supervisor.

From *PhD candidate's standpoint*, the assessment is descriptive and qualitative (answers to open questions during interviews), and expectedly favourable – viewed through the lens of personal career development (for most of them it is a novel experience). However, in order to have an overall quantitative measure of satisfaction as a result of interaction, the doctoral students also provided an overall score, subjectively, as a quantitative measure of their level of satisfaction on a scale going from positive to negative feelings (3=highly positive, 2, 1; 0=neutral; -1, -2, -3=highly negative).

From *PhD supervisor's perspective*, the effects are primary quantitative, in terms of the doctoral project deliverables: deadlines research progress reports and scientific production (i.e. conference proceedings, journal articles, etc.) against the research plan of each PhD student. The results (Table 2) answer to the **first research question (i)**.

The examination of Table 2 also provides the short answer to the second **research question (ii)**: no, the effects of the interactions are not overall positive. A more detailed answer is even divisive. PhD students' assessment is definitely positive (despite having a negative scale available) although gradual (1-to-3). Oppositely, the PhD supervisor assessed the interactions' negative effects: hard delays (overdue deadline for thesis defense), which required extension procedures (in three cases), as well as failures in scientific production and dissemination of the research results (five cases, with different intensities, measured in number of papers that missed the submission deadlines, or failed completely).

Notably, *delay in research dissemination is direct result of delays in the research process itself*.

Table 2. Effects of interactions between PhD projects and other university projects.

PhD Project	University project	PhD student perspective [score]	PhD supervisor perspective	
			PhD thesis defence	Scientific production & dissemination
PhD1	N1	fairly positive [1]	1 year overdue	Publication of 2 papers delayed (3, 6 months)
PhD2	I	highly positive [3]	1 yr. 6 mo's overdue	-
PhD3	I	highly positive [3]	6 months overdue	Publication of 1 paper failed
PhD4	N1	fairly positive [1]	-	Publication of 2 papers failed
PhD5	I	positive [2]	-	-
PhD6	N2	positive [2]	-	Publication of 2 papers delayed (9, 12 months)
PhD7	U	fairly positive [1]	-	Publication of 1 paper delayed (6 months)

4. Results discussion

To answer to the third **research question (iii)**, and identify the reasons behind the negative effects of the interactions, a case-by-case discussion is required in this respect. Overall, the result of shared opinions is not surprising, as standpoints are different (individual versus PhD project), assessment frameworks are different and so the assessment criteria, objectives, and metrics are. While PhD students assess the effect of (other) university projects on them (as individuals), the PhD supervisor (under the pressure of observing the milestones) perceives negative effects on the PhD project (in quantitative terms of project management: missed and overdue deadlines and objectives).

Besides different interaction durations and circumstances, interactions have different natures and peculiarities. In addition, besides influence of ‘other projects’ there were other reasons behind the negative effects, which might become significant in each PhD project (topic, student’s interest, experience, family and work environment, etc.).

As opposed to PhD5 that was assessed positively with no negative effects (*Table 2*, marked in blue), the results of PhD2 and PhD3 (both marked in orange)–yet all referring to interactions with ‘project I’–deserve special attention because they display the extreme split between PhD students’ highest score for assessing the project experience (+3) and devastating effect on their PhD work (in terms of both research dissemination and overdue PhD thesis public defence). Hence the inference that *negatives in the doctoral process have nothing to do with the quality of university projects* (evidenced by the positive scores) but the *resources (mostly time) dedicated to university projects were “stolen” from the already planned resources allocated to PhD projects*. Interviewees’ comments converged to same conclusion.

The results are not definitive, but have allowed the formulation of several concrete, core-recommendations *centred on better coordination between PhD research projects and university projects, mainly at the management level*, in order to avoid or mitigate the negative effects (**research question iv**):

- Themes of PhD research projects were already set when doctoral students are invited to join [other] University projects, in many cases just to complete the number of participants (target group). Then: invitation should be selective (restricted to projects with aligned objectives, only).
- This invitation should be made *via* Doctoral School/s; and participation of the PhD student/s in [other] University project/s should have the formal agreement of their PhD supervisor/s.
- Before agreeing, PhD supervisor/s should be informed in advance about the activities their PhD student/s have to complete during respective interaction period.
- A formal communication channel and clear communication protocols between the University’s project manager and PhD supervisor should exist for the duration of interactions, at least.
- PhD supervisor should be informed in a timely manner about activities completed by the PhD student (while the University project advances). *None of these happened in the cases discussed.*

Assumption: basic principles of management in higher education (research included) were respected:

- Objectives of research projects are aligned with University’s strategy and strategic objectives.
- Research objectives of the University are in agreement with the needs of industry.
- A proper constitution of the University is in place, in order to regulate the relationships organization-projects and detect possible conflicts between them in their early stages.

The number of cases analysed is a limitation; yet the findings open further research paths for longitudinal and mainly transversal studies – extending the investigation to other domains of doctoral research – other than *engineering sciences (management and industrial engineering*, in particular) as well as to other universities. In-depth studies, by types of interactions, are also possible.

Possible correlations between interaction durations and their negative effects (as overdue deadlines for doctoral thesis defence and/or dissemination papers) might be topics for further studies.

Notably, the negatives reported are particular instances, among many successful stories (in which interactions with [other] University projects stimulated the progress of doctoral research projects).

5. Conclusions

Besides the approach of this narrow research area and associated methodology, this piece of work reveals novel types of inter-project tensions and conflicts within higher education institutions. The research questions were addressed, and all answers provided, thus research objectives were matched. However, new questions arise, and paper limitations point to further research directions.

The findings (typology and measurement of PhD project interactions; reasons behind the negative effects of interactions–among them) are *critically useful to doctoral schools and PhD supervisors in particular* as well as to major stakeholders: higher education strategists, policy and decision makers, administrators and research managers. The set of recommendations goes to them.

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