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# IN PURSUIT OF RADICAL INNOVATION: TRANSFORMATIVE COMPETENCIES AND COMPLEX ISSUES APPROACH

## Introduction

Radical innovations (RI) create opportunities to change or generate new markets and significantly increase firms' profits [Tiberius et al., 2021; Rubera, Kirca, 2012; Slater et al., 2014]. Previous studies showed that firms engaged in developing RI face more barriers than firms engaged in incremental innovation [Sandberg, Aarikka-Stenroos, 2014], and one of these barriers is knowledge management [Berends et al., 2007], which affects how team members deal with innovation projects.

Some scholars [Brunswicker et al., 2016; Almirall, 2010; Nickerson, Zenger, 2004] have identified complexity and uncertainty as the most essential attributes of innovation projects. Previous studies have also focused on key competencies required to deal with such complex projects, suggesting innovation team leaders which competencies are worth investing in and training, and these are knowledge transfer and absorptive capacity [Foss et al., 2011; Lakemond et al., 2016; Markovic, Bagherzadeh, 2018; Bagherzadeh et al., 2019; Daghfous, 2004; Graca et al., 2005; Huang, Rice 2009; Bogers et al., 2018]. Previous studies have also suggested links between competencies and the outcomes of innovation projects. For example, Ritala and Hurmelinna-Laukkanen [2013] found that absorptive capacity has a positive effect in the pursuit of incremental innovations, and that the potential absorptive capacity is positively associated with the creation of radical innovations, especially

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when there are high levels of protection for innovations and core knowledge against imitation. Knowledge [Zhou, Li, 2012] and capabilities [Chang et al., 2012] are key resources for RI. Measuring the capabilities, including the ability to search (openness capability), plan (strategic integration capability), tolerate (autonomy capability), and commercialize (experimentation capability) [Chang et al., 2012] makes them established, inter-contextual, and abstract. However the nature of capabilities required for RI needs further exploration [Tiberius et al., 2021]. Our study aims to fill this gap.

Despite their insights, previous studies on innovation projects' complexities obscure the complexities of issues these projects deal with. By "issues", we mean the problems framed for the team to solve in an innovation project. We believe the perspective of complex issues is particularly useful in studies on innovation projects and their radical outcomes, as it highlights the question of radical changes, which are new solutions inspired by new benchmarks of values [Lindberg et al., 2009; Lindberg et al., 2012; Thienen et al., 2014]. Obtaining such radical outputs from innovation projects requires relevant competencies, which we believe vary from the established set of competencies suggested by scholars, namely discovery, incubation, and acceleration [O'Connor, Ayers, 2005]. We found no links between innovation projects and complex issues in the domain of innovation projects [Bagherzadeh et al., 2019] nor in literature reviews on innovative ecosystems [Granstrand, Holgersson, 2020; Klimas, Czakon, 2021]. Given this lack of a complex issues perspective in the innovation projects domain, we used the literature on complex issues from outside of the domain to derive some consequences for studying innovation projects.

In this paper, we explore the questions: What are the consequences of adopting the concept of complex issues in studies on innovation projects in terms of capabilities required? How do innovation projects deal with complex issues, what competencies arise during this process, and what are the outcomes?

This study is conceptual. We start with an overview of previous studies on complexity in innovation. Then we explore two complexity perspectives: project vs. issue, teams' critical competencies in both perspectives, and integrate these findings with the innovation performance, resulting in either incremental or radical innovations. The complex issues perspective brings novel insights into innovation efforts. It highlights which teams' competencies need to be studied, trained, and developed to expect radical innovations as an outcome of innovation projects. Our findings show that using metaphors enables the transformative competency (TC) of challenging the status quo project brief and inspires teams to create options driven by new benchmarks of value not formulated in the brief. The latter enables radical changes in the outputs of the teamwork in the projects. Heracleous and Jacobs [2008] have studied the complexity of developing a company's strategy and suggested that using metaphor enhances communication in the team. Seidel and O'Mahony [2014] have

explored how metaphors facilitate concept coherence and coordination of design tasks in product innovation projects. However, to our knowledge, there is no research on using metaphors in teams in other projects, especially RI projects.

# 1. Theoretical background

## Radical innovation

The majority of studies on RI conceptualize them through the technological lenses as the significant changes in products and technologies [Bouncken, Fredrich, 2012; Bouncken et al., 2018], significant progress from existing technology or products [Li et al., 2017; Bouncken et al., 2018] and with the potential to substantially change the technological trajectory [Strese et al., 2018].

However, this 'technology determinism' [Ringberg et al., 2019] is supplemented by complimentary or alternative views on what a RI is. Some scholars expand the theorizing on RI beyond the technological realm. For example, Markides [2006] links RI with business model innovation, which is based on a redefinition of existing products and services and how they are delivered. Verganti [2008] relates RI with the innovation of meaning, a radical change of the emotional and symbolic content of products, inspired by insights into broader shifts in technology, society and culture. Rindberg et al. [2019] highlight the radical mindset innovation that results from managers' sensemaking of new business models and the creative use of existing artifacts, with technology being just one of them. Our study follows the latter approach. By RI, we understand the solutions that challenge the status quo of the brief rather than disruptive technology application solely. We relate the possibility of achieving RI to how the innovation leader formulates the task for the team and how the team approaches the task.

Previous studies have highlighted a set of competencies required for radical innovation (RI), which includes discovery, incubation, and acceleration, noting that firms rarely excel all three types of these competencies [O'Connor, Ayers, 2005]. Other scholars note that firms have limited capabilities to design RI internally and that such innovation requires establishing relationships, networks, and coopetition [Czakon et al., 2020; Story et al., 2011]. Scholars also link competencies needed for innovation with a category of project complexity [Bagherzadeh et al., 2019]. In this section, we first briefly overview complex projects perspective, and then provide an alternative view on complexity in innovation studies and practice.

## Competences and complex projects

Previous studies relate innovation with complexity and indicate key competencies of a team when dealing with complexity in innovation projects. The dominant relationship between complexity and innovation, which is typically articulated by the innovation management literature, rests on the assumption that complexity is a feature of a project [Bagherzadeh et al., 2019], involving many stakeholders. Key competencies of a team in such contexts rely on knowledge transfer and absorptive capacity [Foss et al., 2011, Lakemond et al., 2016, Markovic, Bagherzadeh, 2018; Bagherzadeh et al., 2019; Daghfous, 2004; Graca et al., 2005; Huang, Rice, 2009].

There is a growing number of studies on innovation in particular projects as a unit of analysis [Du et al., 2014]. Scholars investigate individual-level openness and idea generation in R&D [Salter et al., 2014, 2015], boundary spanners [Dahlander et al., 2016; Hustad, 2017; Harvey et al., 2014], the role of CEOs in facilitating open innovation, and the relationship between leadership, openness, and innovation performance [Ahn et al., 2017; Rangus, Černe, 2019].

Some scholars have argued that innovation projects with different attributes require different innovation mechanisms [Brunswicker et al., 2016] and have showed that the same firm may use different levels of collaboration process formalization in different collaborative innovation projects [Felin, Zenger, 2014; Faems et al., 2008]. Others [Brunswicker et al., 2016; Almirall, 2010; Nickerson, Zenger, 2004] have identified project complexity and uncertainty as the most essential attributes. Bagherzadeh et al. [2019] found that project complexity and project uncertainty are positively related to (1) the project's openness level, (2) the set of external partners' choice, (3) open innovation mechanism choice, (4) collaboration process formalization; and (5) internal firm practices (establishing communication channels between project members and reward systems for sharing and acquiring knowledge) that enable firms to better explore, assimilate, and exploit external knowledge, which is critical in any innovation process [Zobel, 2017]. Consequently, scholars suggested that the project managers should collaborate with a more diverse set of external partners when the project complexity (measured by the number of different and unplanned tasks) increases. The project complexity perspective also highlights key teams' competencies required to deal with such projects: knowledge transfer [Bogers et al., 2018] and absorptive capacity [Bagherzadeh et al., 2019].

## Competences and complex issues

In this section, we critically review the complexed-projects approach, discuss its limitations, and offer a complementary view that complexity is not just a project feature but also relates to the team's problem-solving efforts. The complex issues perspective significantly changes the view on critical competencies of innovation teams.

Despite their insights, previous research on innovation projects' complexities obscures the complexities of issues the projects deal with. Complex issues are defined as emerging from interactions of the stakeholders with diversified and changing interests, where there is no clear stopping rule for when the issue is resolved [Rittel, Weber, 1973; Keneddy, 2015]. New solutions addressing complex issues tend to bring about changes that present unexpected consequences and involve new stakeholders [Rittel, Weber, 1973; Kennedy, 2015; Kennedy et al., 2017; Thienen et al., 2014]. Another term for complex issues found in management literature is wicked problems [Rittel, Webber, 1972]. These are ill-defined problems that usually arise from the clash between various stakeholders, their values, and practices. The complex issues perspective is essential in innovation studies and practice because it highlights the question of radical changes – new solutions that are introduced together with new benchmarks of values [Lindberg et al., 2009; Lindberg et al., 2012; Thienen et al., 2014] – as outputs of innovation projects and the relevant competencies to get them. Many researchers have focused their studies on education and training devoted to approaching complex issues [Biggs, Tang, 2007; Filho, Nesbit, 2016; Whyte, Thompson, 2012; Wrigley, Straker, 2017].

We argue that the absorptive capacity and knowledge transfer are insufficient to explain how radical innovations result from innovation projects and that another set of teams' key competencies is required to obtain radical innovations. In a strategy as a practice study, Heracleous and Jacobs [2008] suggest that teamwork in a company's strategy is complex when specialists from different fields, using different professional languages and standards for formulating and solving problems, participate in the team. The way to deal with this complexity is to intervene in the strategic analysis process and set strategic goals using metaphors. Encouraging team members to formulate their understanding of the diagnosis and goals helps to agree on the languages and communication in the teams developing the strategies. These authors also suggest that competences in organizing strategy development are necessary and worth focusing on. Similar findings were reported by Seidel and O'Mahony [2014], who showed how metaphors facilitate concept coherence and coordination of design tasks in product innovation projects. However, to our knowledge, previous studies have not focused on metaphors as devices for training particular competencies, resulting in RI outcomes of innovation projects.

## Consequences of both approaches for innovation

We argue that the complexity perspective in innovation defines how the innovation projects are organized and how teams' key competencies are defined. The project complexity perspective [Bagherzadeh et al., 2019; Brunswicker et al., 2017] explains how the entrepreneurs and managers (1) deal with knowledge transfers and

assimilations and (2) coordinate better profit-seeking decisions in the projects and focus on during-the-project-risks. However, the knowledge absorption and transfers for profit do not implicate RI. Consequently, complex project studies often place their ability to result in RIs into a black box, as RIs are an outcome of dealing with issue complexity rather than project complexity. The complex project perspective is "agnostic about the nature of the ideas that are generated – disruptive or incremental – but generally promotes incremental innovations" [O'Reilly, Binns, 2019].

The project complexity perspective evaluates project performances through actions, their durations, and costs vs. their outputs measured by return on investment and payback time. The complex issues perspective, on the other hand, looks at how the projects get RI that are generally crucial for a firm's long-term competitiveness [Gemünden et al., 2007]. Highlighting the complex issues perspective enables a more critical analysis of the innovation projects.

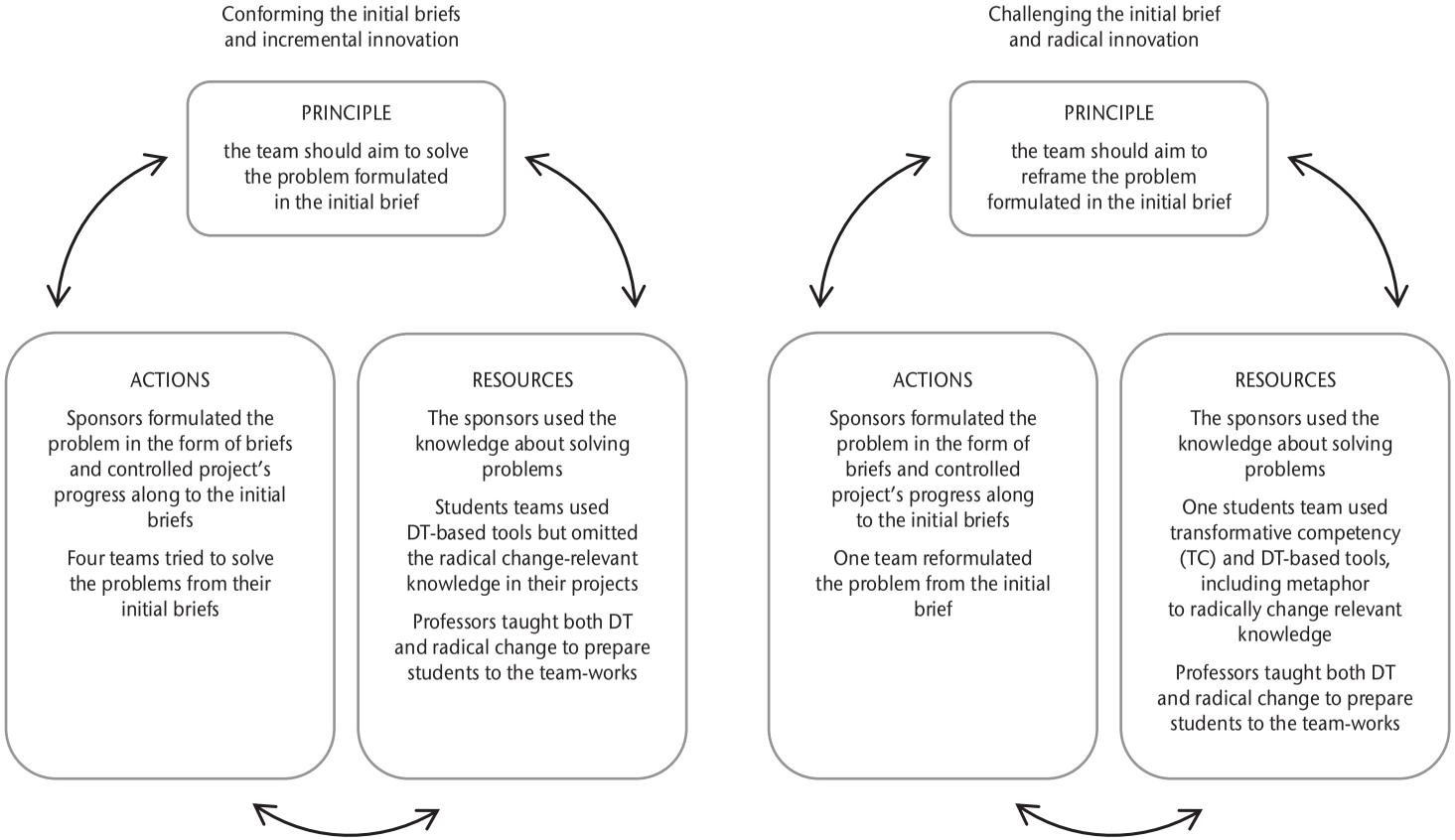
Using project complexity lenses, previous studies have focused on absorptive capacity and how it affects innovation performance. Much previous empirical research has emphasized the importance of (1) establishing communication channels between project members and reward systems for sharing and acquiring knowledge [Foss et al., 2011; Lakemond et al., 2016; Markovic, Bagherzadeh, 2018; Bagherzadeh et al., 2019] and (2) training [e.g., Daghfous, 2004; Graca et al., 2005; Huang, Rice, 2009] as a significant driver for absorptive capacity. However, the questions of relations between teams' key competencies and the differences in innovation performance in incremental vs. radical innovations remain unanswered.

We argue that the transformative competencies (TC) enhance RI as an outcome of innovation projects, and we elaborate this view in the next section.

## 2. Conceptual development

To better highlight the challenges in dealing with complex issues in innovation projects, we begin with an illustrative example of a didactic project conducted at Wroclaw University of Economics and Business in 2019–2020 [Kłeczek et al., 2020]. It was the second edition of a project called 'Market Innovations – Design and Implementation', and its unique feature was that it was created and delivered through the cooperation of the university faculty and five technology start-ups from the Lower Silesian Technology Park: the designer and producer of industrial light-emitting diode (LED) systems; the designer and producer of scanning systems based on space technology; the SaaS provider of body leasing solutions for IT industry; the lab providing tests of antibodies, inhibitors, and molecular probes; and the fifth business entity in the project was the technology park itself.

Figure 1. Transformative competency and radical innovation output – a case of students' projects in company-based settings




Source: own study.

The assumptions of the project were as follows: (1) the whole project comprised two semesters of studying innovations and was based on design thinking logic, which means that teachers provided students with the models, methods, and tools relevant to particular elements of the design process, including the problem reframing; (2) the project was carried out with the cooperation of start-ups who supplied the project challenges (the project briefs) to be solved by students over the two semesters; (3) students collected and analyzed information about the businesses at their sites, and they presented the results to the businesses and received feedback.

Five teams of students were formed, and the teams were free to choose the project challenge. As the teaching process was built on a design thinking logic, all teams were required to work on two main stages of the project: the problem space and the solution space, following the double-diamond design logic [Norman, 2013]. All teams were supplied with tools and techniques relevant to each stage of the design process. Four student teams were tied to solve the initial problems according to their area of expertise (i.e., marketing); they did not challenge the initially formulated problems in their final solutions. Despite using various design thinking techniques by teachers, these teams did not significantly reframe the initial problems. As a result, these teams provided incremental solutions to the problems given. Only one student team challenged the original brief (*how to redesign our facilities to increase satisfaction of our customers*). It reframed the initial problem, using the metaphor tool (*how to redesign our processes to be less like amt and more like a call center*). Based on reframing the initial task, this project resulted in a RI, and the student who led the team got the position in a start-up that provided the brief.

Figure 1 summarizes the identified differences in competencies and outcomes.

## 3. Discussion

The findings from our illustrative example align with previous studies and observations made by Martins et al. [2015], who show how managers can become radically innovative by using analogies and transferring approaches from other industries, for example, when Tesla framed its business idea as "Apple on wheels". These scholars call such process generative cognition, which includes proactive schema change, analogical reasoning, and conceptual combination. Additionally, Ringberg et al. [2019] highlight that a particular type of cognition is required to generate a new conceptual framework to evaluate a given market context. While cognitive models focus on mental processes, our proposal concerns the interaction between the task giver (author of the project brief) and the team carrying out the task.

Based on the illustrative example and the critical literature review, we have derived two elements of complex issues perspective, which we have used to develop the instrumental principles for research on innovation projects (Table 1).

First, dealing with complex issues is not about how to improve the predefined benchmarks of values. It is not about making the engine five horsepower stronger, reducing emission by 1%, or reducing operation time by 1%. Dealing with complex issues is related to radical changes rather than to "help the industry to make their standard products a little faster, smaller or shinier than before" [Lindberg et al., 2009; Lindberg et al., 2012; Thienen et al., 2014]. New solutions are introduced together with new benchmarks of values [Thienen et al., 2014]. The implementation of a solution tends to bring about a change that involves new stakeholders' interactions [Rittel, Weber, 1973; Kennedy, 2015]. Such consequences and outcomes may not solve the initial problem given to a team but rather change its nature and the efficacy (benchmarks of values) of the new solutions. In our illustrative example, initial problem given to a team was related to redesigning facilities. In contrast, the reframed problem, based on research and synthesis of findings, was related to redesigning the processes and the overall attitude towards customers. The metaphor of a 'call center' was a new benchmark of value introduced by the team, allowing them to generate ideas beyond the frame of the initial project brief. The team acquired a transformative competence (TC), which enabled them to challenge the status quo of the project. Consequently, the studies and designs of innovation projects should include how the team changes the benchmarks of values of what it innovates, rather than improvements of non-contextual ones, such as (1) financial value drivers (sales, operating profit margin, etc.) and (2) the general non-financial value drivers (time of operation, downtimes, reduction of waste, power, speed, emission, etc.). The innovated benchmarks of values are neither beyond nor in conflict with the financial and non-contextual benchmarks; they are beneath them, which is understudied in empirical research. The contextual benchmarks of values should be interpreted (in analyses of the status quo) and proposed in the innovative solutions that radically change the status quo. Innovative projects deal with complex issues even if they are performed without this perspective. The routines of stakeholders interactions are the relevant units of analysis, and transforming (radical changing) them is the relevant problem for both studies and designs of innovation projects. However, using the design techniques and tools does not guarantee reaching RI. Therefore, we suggest that transformative capability (TC) is a team's key competence in projects aimed at radical innovations.

Second, rather than adhering to solving problems, organizations should also allow reframing initial briefs. It makes an organization more flexible and responsive to complex issues [Game et al., 2014]. Consequently, the studies and designs of innovation projects should (1) concern challenging the problems in the briefs, not solving the brief-based problems only, (2) treat solving problems and reframing

briefs as a repertoire of practices that enriches the design teams' ability to deal with complex problems. Söderberg and Liff [2023] and Sanz-Llopis and Ostermann [2020] suggest that reframing is a critical step in the design process concerning complex issues, or even generate of more radical solutions [Raffaelli et al., 2018] but they don't suggest any tools of reframing nor how the reframing enables radical change as the output of the projects.

## Complex issues as a complementary perspective in innovation studies

Team leaders should support the project team's ability to redesign the initial brief (together with its predefined benchmarks of values) while running the project – their support of knowledge transfer and absorption is not enough to deal with complex issues. The concept of complex issues overcomes the limitations of complex project-based explanations and interventions. Table 1 presents the critical elements of complex issues concept and their consequences for studying and designing innovation projects.

Table 1. The complex issues, concepts, and derived consequences for studying and designing the innovation projects

| Complex issues' elements and their descriptions | Instrumental principles for research on innovation projects |
|---|---|
| **Dealing with complex issues**<br>Dealing with complex issues is related to radical changes [Lindberg et al., 2009; Lindberg et al., 2012; Thienen et al., 2014].<br>New solutions are introduced together with new benchmarks of values [Thienen et al., 2014].<br>Implementation of a solution tends to involve new stakeholders [Rittel, Weber, 1973; Kennedy, 2015]. | The studies and designs on innovation projects should also include how the project radically changes the benchmarks of values/efficacy of what it innovates.<br>The contextual benchmarks of values should be interpreted (in analyses of the status quo) and proposed in the innovative solutions that radically change (transform) the status quo.<br>Innovative projects deal with complex issues even if the project starts without this perspective. |
| **Challenging the best practice**<br>Rather than adhering to the best practice, studies into successful innovation should emphasize a willingness to disrupt existing, even the best practices. Rather than rewarding a project for applying some nominal best practice, this approach rewards innovation and diversity of practices. This makes an organization both more flexible and responsive to the surprises that are inevitable in complex systems [Game et al., 2014]. | The studies and designs of innovation projects should concern (1) challenging the status quo (also the best), not solving (reducing or avoiding) problems of not the best practices, and (2) repertoires of practices, not the single practices only, (3) the projects beneficiaries are enriched by differentiation of their practices, allowing them to perform in the context of a defined complex issue, rather than merely performing the single best practice. |
| **Summary**: Leaders of innovation teams should support the project team's ability to redesign the initial brief (together with its predefined benchmarks of values) while running the project. Leaders should, therefore, invest in and train the transformative competencies of a team. | |

Source: own study.

# Conclusion

In light of our outline of a new complexity perspective for innovation studies and how it relates to transformative competence and innovative performance, this last section focuses on several themes. First, we expand on how our framework contributes to innovation scholarship. Second, we offer several research, methodological, and practical implications. Last, we suggest some concrete research questions and insights for future studies.

## Contribution to innovation scholarship

Three main contributions result from our study. The first is our conceptualization of the project-team transformative competency (TC) as the ability to redesign the initial project or challenge the initial brief with its benchmarks of values. Previous research conceptualized transformative capacity as one of the dimensions of absorptive capacity and linked it to knowledge transformations in the project without mentioning the benchmarks of values [Flatten et al., 2011; Jiménez-Barrionuevo et al., 2011]. The previous research creates value free theories about the radical innovation projects that change the benchmarks, which creates the paradox.

The second contribution is that we relate TC to radical innovation performance in our model (Figure 1), whereas the previous studies relate radical innovation to the interplay between knowledge acquisition and protection [Ritala, Hurmelinna-Laukkanen, 2013].

The third contribution is that we identify how using metaphors in the teamwork generates ideas beyond the initial project brief. This represents the team's transformative competence (TC), which enabled them to challenge the status quo of the project and facilitated the design of a radical change.

Our illustrative case and findings (Figure 1) show that challenging the initial brief, including its benchmarks of values, created differentiated results even though all five teams had access to the same toolbox and training. We argue that our findings explain how transformative competence (TC) allowed one team to challenge the initial brief.

Our findings (Figure 1) may serve as an initial concept for providing insights into key competencies in innovation performance.

Based on our findings (Table 1), we constructed a framework (Figure 1) suggesting that using metaphors enables the transformative competency of challenging the status quo project brief and consequently inspires teams to create options driven by new benchmarks of value not formulated in the brief. The latter enables radical changes in the outputs of the teamwork in the projects. We believe that metaphor is a tool used by the project leaders that transforms traditional division into project leaders

as sense givers (brief makers in our case) and team members working along to the brief as sense makers [Söderberg, Liff, 2023]. Using metaphors in the project makes all of them sense-makers when including project leaders or sponsors in the team.

## Research implications

Our study requires further investigation through qualitative studies on leading innovation projects. Future studies could explore and explain the relationship between training the TC and the RI outcome in innovation projects. To advance the debate on transformative competence and its relation to innovation outcomes, a better understanding of TC needs to be developed. Future studies focusing on TC could help elaborate a more accurate conceptualization, especially in challenging and changing the benchmarks of values. It would also be valuable to explore internal practices of innovation teams, especially (1) how particular tools and techniques used by team leaders or other stakeholders inspire changes in initial briefs, including their benchmarks of values and emergence (or not) of TC and (2) what are the challenges related to interactive creation of TC, including the measurement of these competencies.

We have reformulated the findings from Table 1 to the procedural steps (Figure 2) that support future innovation studies from complex issues perspective. Our procedural steps tackle the complex issues and the practice-based enrichment of beneficiaries of the innovation projects.

## Methodological contributions

Our work (Figure 2) offers several comprehensive suggestions for a different approach to researching team work concerning radical innovations (RI).

First, we challenge the assumption that team members are "knowledgeable agents" who know what they are trying to do [Gioia et al., 2013] and that their competencies are individual. This assumption results in the belief that these competencies should be invested in, trained, and studied as characteristics of individuals [e.g., Daghfous, 2004; Graca et al., 2005; Huang, Rice, 2009]. We propose to refocus the studies on the transformative competence of the team as a whole and to further explore a metaphor as a means of intervention enabling the development of such competence.

Second, we clarify how using metaphors enhances RI. The metaphors (an amt and a call center in our case) reflect radical changes of values for the new practice and are agnostic as to the particular solutions or things to be designed as the assets inspiring the change. The radical change is in the new benchmarks of valuation for the particular solutions changing practice rather than particular solutions as they are. Old, reused solutions from other industries can inspire a radical change of practice

Figure 2. A procedure for studying and designing the transformations of routines from a complex issues perspective

| | | | | |
|---|---|---|---|---|
| STEPS | 1. Reconstruction of status quo repertoire of practices (including the best ones) that deal with the defined issue | 2. Identifying challenges in the status quo practice(s) or the missing practices in the repertoire to deal with the issue in question | 3. Redesigning the projects while running them. Identifying and agreeing on the new principles of designed/emerging practices and their relevant assets to provide to beneficiaries that improvise with them | 4. Testing the emerging/ designed practices by letting beneficiaries improvise with the new assets in the new designed practice. Deciding on the next iteration of the project. |
| DESCRIPTION | Researchers/team members reconstruct how the stakeholders deal with the complex issues when interactively performing routines along to their contextual benchmarks of values. | Challenging any of the principles of the status quo practice is a starting point to design the new routines to deal with the issue in question. | Formulating the new principles of the new practice is a starting point to design its detailed solutions and assets needed to perform it. | Researchers should reconstruct how the stakeholders deal with the complex issue in question when interactively performing new routines along to their new contextual benchmarks of values, when using available assets and skills. |
| QUESTIONS | How to challenge the status quo repertoire of routines to create and test the new one? | How to challenge status quo routines? Which principle(s) of which routines are challengeable? | Which principle(s) will rule both the new practice and the tasks in the following steps of the project? | As in step 1, how to challenge the new-tested routine to create and test the new one? |
| ASSIGNMENTS | Researchers/team members gather the visual and textual data about stakeholders' interactions and interpret the contextual benchmarks of values (principles) along to which they interact in particular practices in the repertoire. | The research or design team members interpret/formulate alternative benchmarks of values (principles) along to which the stakeholders interactively perform the status quo routines. | Researchers/designers agree the/new benchmarks of values (principles) of the new practice to align their works in the project. The new benchmarks of values are different than the criteria in the initial brief. | As in step 1, researchers/team members gather the visual and textual data about interactions and interpreting the contextual benchmarks of values along to which they interact in the test settings. |

Source: own study.

in question. Studying RI should refocus from RI of things to RI of practices for which the things are designed.

Our procedure (Figure 2) suggests using metaphors in a more general way in comparison to previous studies that suggested more specific ways of usage and outputs. In our procedure (Figure 2) we propose that (1) metaphors can be used in any business project, not just in business strategy development [Heracleous, Jacobs, 2008], and (2) using metaphors can affect RI outputs of the projects and not coordination of design tasks in projects only [Seidel, O'Mahony, 2014].

## Practical implications

Several managerial implications result from our study. The primary practical outcome is our suggestion that project leaders (or other stakeholders, such as project sponsors or project facilitators) should enhance the teams to redesign their initial tasks if they want to inspire radical innovations, and not just better communication in the team only as Heracleous and Jacobs [2008] suggest. We believe it can be achieved in several ways.

First, the team leader should formulate the project briefs in terms of complex issues to be solved, for example, by using open questions framed: "how to deal with…." This approach should inspire the team to redesign the task, possibly by applying metaphors that make the initial task formulation obsolete and propose new benchmarks of values in the project. The use of metaphors is an excellent tool to radicalize projects. Therefore, project team members and the brief makers should be trained in using metaphors.

Second, the leaders should inspire the teams to collect data about the best cases of status quo routines/practices. The more the data generation is focused on negative cases of the status quo, the more teams focus on design tactics of problem reduction or avoidance, resulting in incremental change rather than radical innovation.

Third, the stakeholders who establish the rules for the team (and formulate the initial briefs) should be included in the team and be empowered to change the tasks, along with the valuation benchmark, while running the project. The more the initial brief is kept as the final one, the less it inspires the radical change as the output. We suggest the above-mentioned activities transform teamwork into one in which TC is created.

The main benefit of using our model is that it allows participants of project teams to present problems to be solved based on their own analyses, instead of organizing the teams' work solely to solve problems formulated by the authors of the briefs. This opens up teamwork to RI.

Our model is based on the assumption that team leaders have the required understanding and the willingness to support the project team's ability to redesign

the initial brief (together with its predefined benchmarks of values) while running the project. The main challenge of applying the suggested approach is whether this assumption is always true. Although previous studies showed that reframing can facilitate innovation [Sanz-Llopis, Ostermann, 2020], we believe that various leadership styles can favor the reframing processes to greater or lesser extent [Alblooshi et al., 2021].

## Limitations

Our study has some limitations that need to be addressed in future research.

First, as our paper is conceptual in nature, it lacks empirical data, and the observations were obtained from the illustrative example in the context of students' teams. Future studies could obtain empirical data from in-depth qualitative studies on the team competencies in contexts other than those of the students' teams.

Our illustrative example shows how the project team using metaphor, challenged the project brief and opened options for radically different goals of the project. However, the case does not cover the detailed executions of the goal. Other cases are needed to theorize about the radicality of executions of the radically changed goal.

Based on the complex issues literature, we have derived some principles for studying and designing the innovation projects to obtain RI as an outcome. We suggest that the project-team transformative competence increases the ability to redesign the initial brief (together with its benchmarks of values) while running it and inspires the innovation performance by introducing radical changes into the current routines. As for the practical implications, team leaders should support, inspire, motivate, and communicate the need for redesigning projects while running them, rather than focusing solely on knowledge transfer or absorption of external knowledge only. The lack of this support makes teams handicapped in working on radical changes and limits the innovation performance to incremental changes. Projects' beneficiaries are enriched by the differentiation of their practices; they are able to perform in the context of ill-defined complex issues, rather than adhering to the single best practice. Stakeholders are enriched by differentiating their repertoire of practices when dealing with any complex issue. As for the theoretical implications, the complex issues perspective enables the identification of new practices in innovation projects research. Transformative competence and metaphors are good starting points for future studies on other skills and tools that can radicalize innovation projects.

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## IN PURSUIT OF RADICAL INNOVATION: TRANSFORMATIVE COMPETENCIES AND COMPLEX ISSUES APPROACH

### Abstract

The focal point in this paper are the teams' competencies, which differentiate innovation projects' outputs. We are particularly interested in which competencies are worth investing in and training to achieve radical innovation (RI) and we respond to research calls for further exploration of the nature of capabilities required for RI. We believe this issue is not adequately addressed in extant innovation scholarship, as previous studies focus on the complexity of innovation projects as their major quality and not on the complexity of issues the team is required to innovate within a project. We believe dealing with complex projects requires different skillsets than dealing with complex issues, and we elaborate on this argument in our conceptual paper. We derive arguments from established concepts of RI, the complexity of innovation projects, wicked problems literature, and competencies required to achieve RI as an output. We support the conceptual development with empirical insights derived from an illustrative example of five innovation projects, their various performance, and outcomes. Our main finding is that the complex issue perspective highlights transformative competency (TC), understood as the ability of a team to challenge the status quo of an initial task given, as crucial to be invested in and trained in innovation teams if RI is an expected output. Such a perspective extends previous findings, which suggested that the RI skillset consists of discovery, incubation, and acceleration. As a result of our study, we offer several theoretical and methodological implications and future research avenues related to innovation teams performance.

**Keywords: radical innovation, project complexity, complex issues, transformative competence, metaphor**

**JEL Classification Codes: M00, O32, O36**

# W POSZUKIWANIU RADYKALNEJ INNOWACJI: KOMPETENCJE TRANSFORMACYJNE I ZŁOŻONE PROBLEMY

## Streszczenie

W artykule skupiamy się na kompetencjach zespołów, które różnicują rezultaty projektów innowacyjnych; w szczególności interesuje nas, w jakie kompetencje warto inwestować i szkolić, aby osiągnąć radykalną innowację (RI). Kwestia ta nie została odpowiednio poruszona w istniejących badaniach nad innowacjami, ponieważ poprzednie badania skupiały się na złożoności projektów innowacyjnych jako ich głównej cesze, a nie na złożoności problemów, które zespół ma rozwiązać w ramach projektu. Radzenie sobie ze złożonymi projektami wymaga innych umiejętności niż radzenie sobie ze złożonymi problemami; tę argumentację rozwijamy w naszym artykule. Argumenty czerpiemy z wcześniejszych koncepcji RI, złożoności projektów innowacyjnych, literatury dotyczącej skomplikowanych problemów oraz kompetencji wymaganych do osiągnięcia RI jako efektu projektu innowacyjnego. Rozwój koncepcji wspieramy spostrzeżeniami empirycznymi wywodzącymi się z przykładu pięciu innowacyjnych projektów oraz ich różnych wyników. Naszym głównym wnioskiem jest to, że perspektywa problemu złożonego uwypukla kompetencje transformacyjne (TC), rozumiane jako zdolność zespołu do zakwestionowania *status quo* postawionego na początku zadania. Kompetencja ta jest niezbędna do inwestowania i rozwoju w zespołach innowacyjnych, przy oczekiwaniu, że RI ma być wynikiem innowacyjnego projektu. Taka perspektywa rozszerza wcześniejsze badania, które sugerowały, że zestaw umiejętności niezbędnych do osiągnięcia RI składa się z odkrywania, inkubacji i akceleracji. W wyniku naszego badania oferujemy kilka implikacji teoretycznych i metodologicznych oraz przyszłych kierunków badań związanych z wydajnością zespołów innowacyjnych.

**Słowa kluczowe: innowacje radykalne, złożoność projektu, złożoność problemu, kompetencje transformacyjne, metafory**

**Kody Klasifikacji JEL: M00, O32, O36**