UNIVERSITY OF TARTU

Faculty of Social Sciences

School of Economics and Business Administration

Narmin Babayeva

PERCEIVED INNOVATION COMPETENCE DEVELOPMENT FOR WORKING LIFE: STUDENT PERSPECTIVES FROM THE INNOVATION AND TECHNOLOGY MANAGEMENT MASTER'S PROGRAM AT THE UNIVERSITY OF TARTU

Master's Thesis

Supervisor: MBA Kaire Valge,

Co-supervisor: PhD Liina Joller-Vahter

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I have written this Master Thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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Introduction

Rapid technological change, digitalization and the transition towards knowledge-intensive economies have fundamentally altered what employers expect from university graduates. Organizations increasingly require employees who can not only apply disciplinary knowledge but also contribute to continuous renewal, solve complex problems and collaborate with diverse stakeholders in dynamic work environments (Abelha et al. 2020; OECD 2025). In this context, innovation competence understood as the combination of knowledge, skills, attitudes and behaviors that enables individuals to participate effectively in innovation processes, has become a core working-life competence that higher education is increasingly expected to develop (Hero, Lindfors, and Taatila 2017; Konst (e. Penttilä) and Kairisto-Mertanen 2020).

Despite growing recognition of the importance of innovation competence, previous research suggests that the relationship between teaching methods, competence development, and working-life preparation is not automatic. Active and experiential teaching methods may be designed with competence development in mind, but students do not always clearly perceive their purpose or developmental value, especially when the rationale behind these methods is not made explicit (Deslauriers et al. 2019; Ovbiagbonhia, Kollöffel, and Den Brok 2020). Similarly, individual teaching methods may have limited developmental value if they are not coherently aligned with learning outcomes, assessment, and the wider curriculum (Abejuela, Castillon, and Sigod 2022). A further challenge concerns the connection between higher education and working life, as graduates are increasingly expected to demonstrate critical thinking, problem-solving, initiative, and collaboration in realistic professional contexts (NACE (National Association of Colleges and Employers) 2022; World Economic Forum 2025). Therefore, this thesis uses these issues as conceptual lenses for examining how students perceive the contribution of innovation pedagogy methods to innovation competence development for working life.

The present thesis examines this issue in the context of the Innovation and Technology Management (ITM) master's program at the University of Tartu, Estonia. The ITM program operates at the intersection of business, economics and technology management and employs a range of innovation pedagogy methods including project-based learning, group work, problem-based tasks and collaboration with external partners. Despite this pedagogical orientation, no systematic empirical investigation has examined how ITM students perceive these teaching methods as contributing to innovation competence development.

The aim of this thesis is to examine how ITM master's students perceive the role of innovation pedagogy methods in their innovation competence development and working-life preparation. In line with the theoretical framework, particular attention is given to how students perceive the clarity, coherence, and working-life relevance of these methods.

To achieve this aim, the study is guided by two research questions:

1. How do ITM master's students perceive the pedagogical relevance and authenticity of innovation pedagogy methods used in their studies?
2. How do students interpret the contribution of these methods to their innovation competence development for working life?

The study adopts a qualitative approach based on semi-structured interviews with final-year ITM students. This design is appropriate because the thesis examines students' perceptions and interpretations of competence development rather than objectively measured competence gains (Baartman and Ruijs 2011; Flick 2018).

The thesis is structured as follows. Chapter 1 defines innovation competence and the analytical dimensions used in the study. Chapter 2 discusses innovation pedagogy and related teaching methods. Chapter 3 explains the conceptual link between teaching methods, perceived competence development, and working-life preparation. Chapter 4 presents the methodology. Chapter 5 reports the findings, and Chapter 6 presents the discussion, conclusions, recommendations, and limitations.

Keywords: innovation competence, innovation pedagogy, higher education, working life, qualitative research

CEFR: S190 Management of enterprises. S280 Adult education, lifelong learning.

1. Innovation competence concepts and framework

1.1. Defining innovation competence

Innovation competence sits at the intersection of two multi-layered concepts. The Oslo Manual defines innovation as a new or improved product or process made available to potential users, distinguishing it from prior offerings and stressing that implementation, not ideation, is central to the concept (OECD and Eurostat 2018). Competence, in turn, is widely understood as the integrated application of knowledge, skills, and attitudes in authentic, contextually demanding tasks (Hero, Pitkajarvi, and Matinheikki 2021). Innovation competence as a

compound construct, however, is defined differently across literature depending on whether the focus is cognitive, behavioral, or relational.

Three influential definitions illustrate this variation. Hero et al., (2017) defined individual innovation competence as personal characteristics, knowledge, skills, and attitudes that enable someone to create implemented novelties through collaboration foregrounding social process. Ovbiagbonhia et al., (2019) offered a more outcome-oriented formulation: the capacity to generate original, appropriate, and implementable solutions to problems, which centers cognitive performance. Marin-Garcia et al., (2016) adopted a behavioral approach, treating innovation competence as observable action patterns such as critical thinking and networking measurable through concrete indicators in both academic and workplace settings. These three definitions share an emphasis on practical application and go beyond ideation but differ in their unit of focus: the social process, the cognitive outcome, or the behavioral act. For the purpose of this thesis, these definitions are useful but not sufficient on their own, because the study also examines how students perceive the role of teaching methods and learning environments in competence development.

Drawing on these distinctions, this thesis adopts the following working definition: innovation competence is a multi-dimensional combination of knowledge, skills, attitudes, and behaviors that enables individuals to participate effectively in innovation processes, encompassing critical thinking and problem solving, initiative and implementation-oriented action, and collaboration and networking, within educational and working-life contexts (Hero et al. 2021; Keinänen and Kairisto-Mertanen 2019). Innovation competences are understood as learnable and developmental rather than fixed traits. From this perspective, teaching methods and learning environments matter because they shape the conditions under which students perceive competence development to occur (Konst (e. Penttilä) and Kairisto-Mertanen 2020). This definition is preferred over narrower formulations because it integrates cognitive, behavioral, and relational dimensions; it aligns with validated instruments used in European higher education, and it maps directly onto the competence areas most relevant to the ITM program's working-life orientation.

1.2. Theoretical frameworks of innovation competence

Several frameworks have been developed to structure the dimensions of innovation competence for higher education use. Understanding these frameworks is important for this

thesis because they clarify which aspects of innovation competence can be meaningfully analyzed in students' accounts of teaching methods, perceived development, and working-life preparation.

The TUAS three-dimensional model provides a contextual understanding of innovation competence as developing across individual, communal, and network levels (Kairisto-Mertanen et al. 2012). This is useful for interpreting innovation competence as more than an individual attribute, particularly in a program context that emphasizes interdisciplinary learning and working-life relevance (Kairisto-Mertanen et al. 2012; University of Tartu 2021). However, because the present study analyzes students' qualitative perceptions rather than curriculum structures or assessment indicators, the TUAS model is used mainly as a contextual framework rather than as the primary analytical tool. This distinction is also consistent with Keinänen et al., (2018) who emphasize the need for more specific indicators when assessing innovation competences in higher education.

The FINCODA model, by contrast, provides the main analytical basis for the study. It operationalizes individual innovation competence through five dimensions: creativity, critical thinking, initiative, teamwork, and networking (Marin-Garcia et al. 2016). The model has also been empirically examined in higher education contexts, including validation work with Finnish students (Keinänen et al. 2018). In this thesis, FINCODA is not applied as a full assessment instrument, but is used selectively to organize three broad analytical dimensions: critical thinking and problem-solving, initiative and implementation-oriented action, and collaboration and networking. Creativity is treated as indirectly connected to problem-solving and implementation, while teamwork is incorporated into the broader relational category of collaboration and networking. These dimensions were chosen because they connect directly to the thesis aim, interview questions, and empirical focus on students' perceived preparation for working life. They are used as interpretive categories rather than as variables for measuring objective competence development.

Innovation competence can be examined through performance tasks, supervisor assessment, or self-report instruments (Hero et al. 2021; Keinänen et al. 2018). However, this thesis does not measure competence levels objectively. It examines how students perceive the role of teaching methods in their competence development. Perceived development is therefore treated as a meaningful object of study rather than as evidence of actual competence gain.

2. Innovation pedagogy in higher education

Innovation pedagogy, developed at Turku University of Applied Sciences, is an institutional learning approach that integrates curriculum design, teaching methods, assessment, and working-life cooperation to develop students' innovation competences (Konst (e. Penttilä) and Kairisto-Mertanen 2020). It should not be understood as a single teaching method, but as a broader educational approach realized through practices such as project work, problem-based tasks, group work, case-based learning, and external collaboration (Hero et al. 2017; Kettunen 2011). Since students may not recognize innovation pedagogy as an institutional model, this thesis focuses on the concrete teaching methods and learning situations through which they encounter its principles in practice.

For the purposes of this thesis, the focus is placed on the teaching methods through which innovation pedagogy becomes visible to students in their study experience. This distinction is important because students may not recognize or use the term "innovation pedagogy" itself, whereas they can describe concrete learning situations such as lectures, group work, case studies, project-based assignments, workshops, and collaboration with external partners. Therefore, the empirical analysis does not assess innovation pedagogy as a complete institutional model. Instead, it examines how students experience selected teaching methods associated with innovation pedagogy and how they perceive these methods as supporting innovation competence development relevant for working life.

The theoretical foundation of innovation pedagogy is relevant for this thesis because it explains why students' active participation, collaboration, and engagement with realistic problems are expected to matter for competence development. Innovation pedagogy draws on learning theories that view knowledge as constructed through participation in meaningful social practices rather than passively received (Kettunen 2011; Peschl et al. 2014). From this perspective, teaching methods are meaningful when students can connect disciplinary knowledge with practical problem-solving, responsibility, collaboration, and reflection. This is important for empirical analysis because students' perceptions of teaching methods depend not only on the method itself, but also on whether they experience the learning situation as purposeful, authentic, and relevant to working life.

Project-based and problem-based learning are relevant to this thesis because both place students in active roles where they must respond to open-ended tasks rather than reproduce

predefined answers. Project-based learning usually emphasizes planning, coordination, responsibility, and movement toward a concrete output, while problem-based learning emphasizes analytical reasoning around complex or ill-structured problems (Chen and Yang 2019). For the purposes of this thesis, the distinction is not used to compare the effectiveness of these methods objectively. Rather, it helps interpret why students may perceive some learning tasks as supporting critical thinking, initiative, and implementation more strongly than others.

Case-based learning can connect theoretical concepts with organizational situations and decision-making, although its perceived value depends on whether students experience the case as realistic and applicable to working life (Bonney 2015). External collaboration with companies or public organizations can expose students to real stakeholders, organizational contexts, and practical consequences (Lahdenperä et al. 2022; OECD 2019). Group work and peer learning support the collaborative dimension by requiring students to negotiate, coordinate, and manage shared responsibility (Canavesi and Ravarini 2024; Schürmann, Marquardt, and Bodemer 2024).

The literature reviewed in this section suggests that active and experiential teaching methods can create conditions for innovation competence development, but their developmental value is not automatic (Hero et al. 2021; Konst (e. Penttilä) and Kairisto-Mertanen 2020). For this thesis, the important issue is not whether one method is objectively more effective than another, but how students interpret the relevance, authenticity, clarity, and coherence of the learning situations they encounter. This perception-based focus is important because perceived competence development may differ from objectively measured competence development, and students' interpretations shape how they connect learning experiences with their own professional readiness (Baartman and Ruijs 2011; Ovbiagbonhia et al. 2019). Project work, problem-based tasks, case-based learning, group work, and external collaboration may all support perceived competence development when students experience them as meaningful, practically applicable, and connected to working-life expectations (Bonney 2015; Chen and Yang 2019; Lahdenperä et al. 2022; Schürmann et al. 2024). This provides the interpretive basis for the empirical analysis, which examines how ITM students perceive the relationship between teaching methods, innovation competence development, and working-life preparation.

Overall, innovation pedagogy methods are relevant to this thesis because they create learning situations through which students may perceive competence development to occur. Their empirical importance depends on whether students experience them as clear, authentic,

practically relevant, and connected to working-life expectations. This provides the interpretive bridge to the empirical analysis, where the focus is on students' perceptions rather than objective comparison of pedagogical methods.

3. Conceptual links between innovation pedagogy, perceived competence development, and working-life preparation

Innovation pedagogy methods are expected to support innovation competence development, but this relationship is not automatic. Teaching methods such as project-based learning, problem-based learning, case-based learning, collaborative group work, and university–industry collaboration create conditions for learning; they do not guarantee competence development by themselves. Their effect depends on how they activate learning processes such as analytical reasoning, reflection, implementation, collaboration, and engagement with authentic working-life problems (Hero et al. 2021; Konst (e. Penttilä) and Kairisto-Mertanen 2020). Therefore, the key analytical issue is not only whether such methods are present in a program, but whether students experience them as meaningful, coherent, and relevant to working life. This non-automatic relationship can be explained through three conceptual gaps that connect the literature on innovation pedagogy, competence development, and working-life preparation.

A first relevant concept concerns pedagogical clarity. Active and experiential teaching methods may be designed to support competence development, but students do not always perceive their purpose or developmental value clearly. Research on active learning shows that students may feel they are learning less in active-learning settings than in traditional lectures, even when learning outcomes are stronger, because active methods require more cognitive effort and responsibility (Deslauriers et al. 2019). Similarly, students may interpret open-ended tasks as unclear or poorly designed if the pedagogical rationale is not communicated explicitly (Tharayil et al. 2018). For this thesis, this literature is relevant because it helps interpret how students make sense of the clarity, purpose, and developmental value of teaching methods in relation to perceived innovation competence development.

A second relevant concept concerns curriculum coherence. Innovation competences such as critical thinking, initiative, collaboration, and networking are unlikely to develop through isolated teaching activities alone; they require repeated and meaningful learning opportunities across a program. Constructive alignment literature emphasizes that learning outcomes, teaching activities, and assessment should reinforce one another (Biggs 1996, 2003). In this thesis,

curriculum coherence is used as a sensitizing concept for interpreting whether students perceive teaching methods as connected, cumulative, and relevant to working-life preparation.

The main conceptual focus of this chapter concerns the relationship between higher education and working-life preparation. Working-life literature shows that graduates are increasingly expected to demonstrate analytical problem-solving, independent judgment, collaboration, adaptability, and the ability to apply knowledge in unfamiliar situations (Andrews and Higson 2008; Clarke 2018). However, graduate employability research also shows that students may leave higher education with theoretical knowledge but limited opportunities to apply that knowledge in authentic professional contexts (Abelha et al. 2020; Okolie et al. 2020). For innovation pedagogy, this means that working-life preparation requires more than the presence of active teaching methods. Learning situations need to be perceived by students as realistic, meaningful, and connected to professional practice, including elements such as uncertainty, responsibility, stakeholder interaction, practical tools, and organizational problem-solving. This focus is directly relevant to the empirical analysis, which examines how ITM students interpret the working-life relevance and developmental value of their learning experiences.

In the context of this thesis, these concepts provide a lens for interpreting students' perceptions of the ITM master's program at the University of Tartu. The official program description presents ITM as an interdisciplinary curriculum combining innovation, technology management, digitalization, business process improvement, data analysis, digital product management, and stakeholder communication (University of Tartu 2021). These aims provide a curriculum-level reference point for interpreting students' perceptions. In particular, they make it possible to examine whether students perceive the program's teaching methods as supporting the working-life-oriented competences emphasized in this thesis: critical thinking and problem-solving, initiative and implementation-oriented action, and collaboration and networking.

Based on the literature reviewed above, Figure 1 presents the conceptual framework used in this thesis. It defines innovation competence as a combination of knowledge, skills, and attitudes and analyzes it through cognitive, behavioral, and relational dimensions. These dimensions are then linked to teaching methods within innovation pedagogy and to students' perceived competence development for working life (Hero et al. 2017, 2021; Konst (e. Penttilä) and Kairisto-Mertanen 2020; Marin-Garcia et al. 2016).

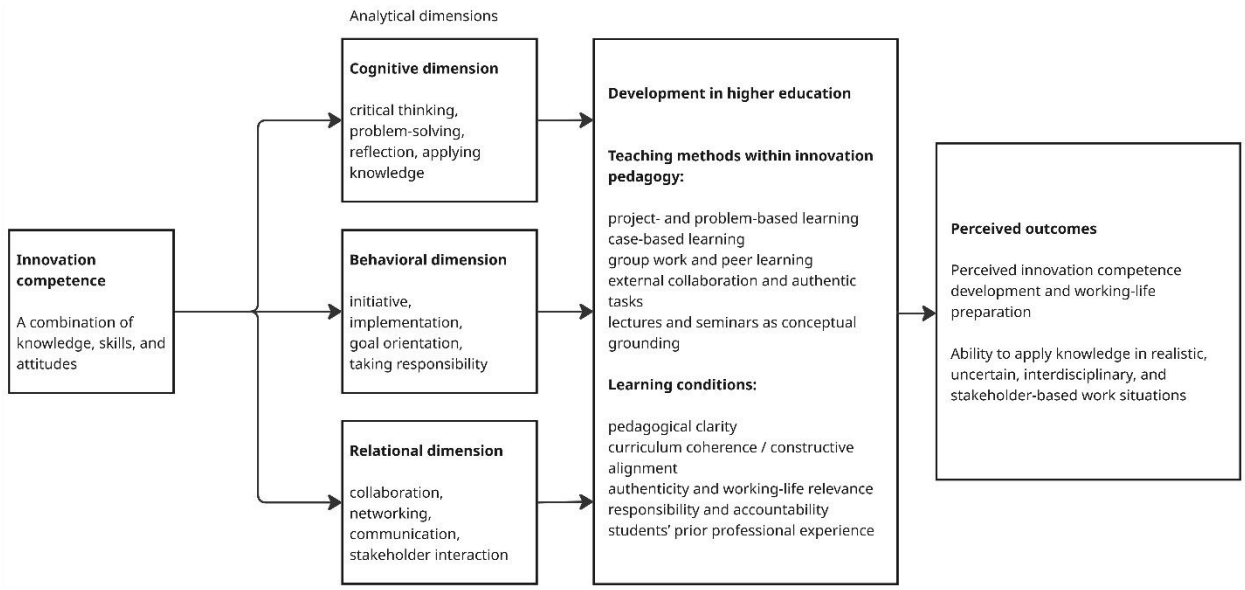

Figure 1. Conceptual framework of perceived innovation competence development in higher education

Source: compiled by the author based on (Biggs 1996, 2003; Hero et al. 2017, 2021; Konst (e. Penttilä) and Kairisto-Mertanen 2020; Marin-Garcia et al. 2016; Ovbiagbonhia et al. 2019, 2020).

The framework is used as an interpretive structure rather than as a model for measuring objective competence development. Its purpose is to show how the main theoretical concepts reviewed in the previous chapters are connected in the empirical analysis. First, innovation competence is divided into cognitive, behavioral, and relational dimensions in order to make the broad concept analytically manageable. Second, these dimensions are linked to teaching methods associated with innovation pedagogy, because the thesis examines how students experience these methods in practice rather than evaluating innovation pedagogy as an institutional model. Third, the framework includes learning conditions, such as pedagogical clarity, curriculum coherence, authenticity, responsibility, and prior professional experience, because the literature suggests that active teaching methods do not automatically lead to perceived competence development. Therefore, the framework guides the interview design, coding, and interpretation of findings by connecting students' accounts of teaching methods with their perceived preparation for working life.

4. Research methodology

4.1. Research design, strategy, and ethical considerations

This study adopts an interpretivist qualitative interview-based design situated in the ITM master's program at the University of Tartu. A qualitative approach is appropriate because the purpose is not to measure competence levels statistically, but to understand students' experiences, interpretations, and perceived development (Creswell and Poth 2018; Merriam and Tisdell 2015). Interpretivism is suitable for this study because perceived competence development is not treated as an objectively measurable outcome, but as something students construct through their own interpretations of learning experiences, teaching methods, and working-life expectations (Creswell and Poth 2018). This fits the purpose of the thesis, which is to examine how students make sense of the perceived contribution of innovation pedagogy methods to their competence development rather than to evaluate actual competence gains.

The study is positioned within an interpretivist research paradigm and uses a qualitative interview-based design situated in the ITM master's program at the University of Tartu. From an interpretivist perspective, social reality is understood through the meanings participants attach to their experiences (Creswell and Poth 2018), which fits the thesis focus on students' perceived competence development rather than objectively measured competence gain. The ITM master's program provides empirical context for the study. It is a suitable context because it has a defined curriculum, a clearly identifiable student cohort, and an explicit working-life orientation. However, the study does not aim to evaluate the program as an institutional case through multiple sources of evidence. Instead, it focuses specifically on final-year students' perceptions of teaching methods, perceived innovation competence development, and working-life preparation. The interviews therefore provide insight into how students interpret their learning experiences, which teaching methods they perceive as developmentally meaningful, and how they understand the relationship between their studies and working-life expectations.

Ethical considerations were addressed throughout the research process. Before each interview, participants were informed about the purpose of the study, the voluntary nature of participation, the use of interview data for thesis research, and their right to withdraw. Consent was obtained before the interviews were conducted and recorded. To protect anonymity, participants' names and directly identifying details are not used in the thesis. Instead, participants are referred to using codes from P01 to P13. At the same time, the analysis preserves relevant

contextual information by using broad descriptors, such as work-experience range, educational background, and the relevance of prior work experience to the ITM field. This approach supports anonymity while still allowing empirical analysis to show how participants' backgrounds shaped their perceptions. Because the participants came from a small cohort within one master's program, there was a potential risk of indirect identification. To reduce this risk, the thesis avoids names and directly identifying details, uses broad background categories rather than detailed individual profiles, and presents quotations only with information that is analytically relevant.

4.2. Data collection and participants

Data was collected through semi-structured individual interviews with final-year students of the ITM master's program. Semi-structured interviews were selected because they provide a balance between consistency and flexibility: the same core themes can be discussed with all participants, while follow-up questions allow participants to explain their experiences in their own words (Merriam and Tisdell 2015). This method was appropriate for exploring how students experience teaching methods, how they perceive the development of innovation competences, and how they connect these competences to working-life preparation.

The interview guide was developed based on the theoretical framework of the thesis. This means that the interview design was partly deductive, as the questions were informed by the selected competence dimensions and the literature on innovation pedagogy and working-life preparation. The questions focused on three main areas: students' experiences of teaching methods used in the program, their perceived development of the three focal innovation competence dimensions, and their views on preparation for working life. The three focal dimensions were critical thinking and problem-solving, initiative and implementation-oriented action, and collaboration and networking. These dimensions were derived from the innovation competence literature, especially the FINCODA model, and interpreted through the broader logic of innovation pedagogy and working-life-oriented higher education.

The interview guide included open-ended questions and short 1–5 rating prompts. The ratings were not used as quantitative measurements or for statistical comparison, but as conversational prompts to help participants reflect on their experiences. The analysis focused on participants' explanations, examples, and reasoning behind the ratings rather than on the numerical values themselves.

Before the main data collection, two pilot interviews were conducted to test the clarity, relevance, and flow of the interview questions. The pilot interviews followed the same general structure as the final interviews and were therefore not treated as a separate methodological stage. The only change made after the pilot interviews was the addition of a more explicit background question about prior work experience. This change was made because work experience emerged as relevant during the pilot interviews: one participant discussed it spontaneously, while another did not, which made it clear that the topic needed to be asked consistently across interviews. Since the pilot interviews used the same interview structure and produced relevant data for the research questions, they were included in the final analysis.

Before each interview, participants received a brief explanation of key terms, including innovation, teaching methods, and innovation competences. This was done because the pilot interviews showed that some participants were unfamiliar with the term "innovation competence" or interpreted it in very different ways, which made it difficult to discuss the topic consistently within the planned interview time. Providing short explanations therefore helped create a shared starting point for the discussion and reduced the need for lengthy clarification during the interview. At the same time, this may have shaped how participants understood and discussed the concepts. To reduce this influence, the explanations were kept brief and general, and participants were encouraged to describe their own experiences and examples in their own words. The interviews were conducted individually in English and lasted approximately 15–25 minutes. Individual interviews were chosen because they allowed participants to speak freely about both positive and critical experiences without being influenced by classmates.

The study included 13 final-year ITM students out of a cohort of 21 students. Final-year students were selected through purposive sampling because they had completed most of the program and were therefore able to reflect on their cumulative learning experience rather than on isolated course impressions. Participants had diverse educational and professional backgrounds, including business, economics, information systems, engineering, and information technology. Several participants also had prior work experience, ranging from limited experience to more than five years.

Because the analysis showed that prior professional background shaped how participants evaluated the program, work experience was treated as an important contextual factor. However, work experience was not interpreted only by length. A distinction was also made between

general work experience and work experience relevant to the ITM field, such as experience connected to technology, business processes, project work, data, innovation, or management. For analytical purposes, participants were described through broad categories: work experience under 2 years, 2–5 years, or more than 5 years; educational background such as business/economics, technology/engineering, or mixed/other; and relevance of previous work experience to ITM as high, partial, low, or unclear. These descriptors were used interpretively, not as rigid classification groups.

4.3. Data analysis and reliability

The interview data were analyzed using reflexive thematic analysis, following the logic of Braun and Clarke's six-phase approach (Braun and Clarke 2006, 2021). Reflexive thematic analysis was appropriate because the study aimed to interpret patterned meanings in students' accounts rather than validate a framework or evaluate objective competence development.

The analysis began with familiarization. Interview recordings were transcribed using Microsoft Teams and then checked by the researcher while reading the transcripts several times. During this stage, initial notes were made about repeated ideas, strong examples, contradictions, and differences between participants with different backgrounds. Attention was paid to how students described teaching methods, which methods they perceived as useful or less useful, and how they connected these experiences with competence development and working-life readiness.

The second phase involved generating initial codes. Coding was conducted manually in Excel, which was suitable for the small interview dataset and allowed close engagement with the data. The coding followed a theory-guided but flexible approach. Deductive sensitivity came mainly from the three focal competence dimensions: critical thinking and problem-solving, initiative and implementation-oriented action, and collaboration and networking. At the same time, the coding remained open to ideas that participants emphasized themselves, such as unclear task instructions, limited company collaboration, practical tool gaps, unequal group contribution, and the role of prior work experience. Emerging patterns were treated as inductive when they were repeatedly raised by participants or when they added nuance to the theoretical expectations. Appendix B provides an example of how selected codes were grouped into broader themes.

The third phase involved grouping related codes into candidate themes. In this thesis, a theme was understood as a broader analytical pattern that connects several related codes around a central idea and helps answer the research questions. For example, "group work" was treated as a

teaching method rather than a theme; related codes such as unequal contribution, schedule coordination, and shared responsibility were analyzed for what they revealed about perceived collaboration development.

The candidate themes were then reviewed against the full dataset. Each theme was checked for internal coherence, relevance to the research questions, and connection to the theoretical framework. Special attention was paid to prior work experience because the pilot interviews and early coding showed that students with different professional backgrounds used different benchmarks when evaluating working-life relevance.

The final themes were named according to both their empirical focus and their connection to the theoretical framework. The first theme, alignment between teaching methods and competence development, links to pedagogical clarity and curriculum coherence. The second theme, authentic working-life preparation and curriculum gaps, links to working-life relevance, authentic learning, and the education–workplace connection. The third theme, uneven competence development across collaboration, initiative, and prior experience, links to the selected FINCODA-informed competence dimensions and the role of students' backgrounds in shaping perceived development. This structure helped keep the themes analytically distinct while connecting the interview data with the theoretical framework.

Data reliability was addressed through credibility, dependability, transferability, and confirmability (Lincoln and Guba 1985; Nowell et al. 2017). Credibility was supported through a theory-informed interview guide, clarification of key terms before the interviews, verbatim transcription, and the use of quotations to ground analytical claims in the data. Dependability was supported by documenting the movement from transcripts to codes and from codes to themes. Transferability was supported by describing the case context, sampling logic, participant profile categories, and the proportion of the cohort included in the study. Confirmability was supported by documenting coding decisions, linking claims to interview quotations, and distinguishing the researcher's interpretations from participants' accounts. Limitations are discussed in Chapter 6.

5. Empirical findings

This chapter presents the empirical findings from 13 semi-structured interviews with final-year ITM students (ITM students P01–P13 2026). Participants are referred to as P01–P13, and quotations are accompanied by broad profile descriptors to preserve anonymity while

retaining relevant analytical context. The findings are organized into three analytical sections developed through reflexive thematic analysis and focus on how students perceived the relationship between ITM teaching methods, innovation competence development, and working-life readiness.

5.1. Alignment between teaching methods and competence development

Students consistently described the ITM program as methodologically varied. Across the coded interview material, lectures, group work, case studies, project-based tasks, workshops, presentations, guest lectures, seminars, assignments, company-related activities, and occasional external collaboration all appeared in participants' accounts. This means that students did not experience the program as relying on a single pedagogical format. However, methodological variety in itself did not guarantee a strong sense of competence development. A recurring pattern across the interviews was that students distinguished clearly between methods they experienced as developmentally meaningful and methods they experienced as formally present but weakly connected to innovation competence development.

The main analytical pattern in this section is that students did not evaluate teaching methods only by their format, such as whether they were lectures, group work, projects, or cases. Rather, they evaluated them according to the conditions under which these methods were experienced. Methods were perceived as more competence-developing when students could see their purpose, connect them to realistic professional situations, and take responsibility for decisions or outcomes. Conversely, the same types of methods were perceived as less useful when they felt unclear, overly theoretical, weakly connected to practice, or poorly structured. Therefore, the analytical issue in this section is not which teaching method was preferred, but what made a method feel pedagogically meaningful for innovation competence development.

The methods most often perceived as meaningful were case work, project-based tasks, open-ended assignments, and group activities that required students to analyze unfamiliar situations, coordinate roles, and move toward a concrete output. These formats were especially likely to be linked with critical thinking and problem solving, and sometimes with initiative, because they forced students to make decisions rather than reproduce pre-given answers. This pattern appeared across participants with different backgrounds. In these accounts, competence development was most visible when students had to interpret ambiguous tasks, compare options, or shape a response from incomplete information.

At the same time, the data suggests that students did not experience all courses as equally aligned with the working-life orientation implied by the degree. Several participants, especially P02, P03, P04, P07, and P09, contrasted active and analytical tasks with more theoretical or textbook-heavy teaching. Their criticism was not directed at theory as such, but at theory that remained insufficiently connected to application. This theory-practice tension was especially visible among participants with prior professional experience. For example, P09 noted that "a lot of the things that we do are very theoretical, but in the actual environment or in the actual practical life, it's a bit different" (P09, 5+ years, tech background, partial ITM relevance). Participants repeatedly described a difference between understanding concepts and using them. The theory–practice mismatch should therefore not be interpreted simply as a rejection of theoretical learning. Rather, students questioned theory when its practical purpose was not visible. This means that the perceived weakness was not theory itself, but the absence of a clear bridge between conceptual knowledge and its application in realistic innovation or working-life contexts. This pattern indicates that students read the issue mainly as uneven course-level alignment rather than as a total program failure: some courses were described as useful and competence-relevant, while others felt only loosely connected to innovation or working-life needs.

Group work illustrates this ambivalence particularly well. It was the most frequently mentioned teaching format and also one of the most polarizing. On the one hand, participants credited it with building communication, adaptability, shared responsibility, and exposure to different ways of thinking. On the other hand, they repeatedly described schedule conflicts, unequal contribution, unclear role division, and mismatched levels of motivation. This tension appeared across P01, P02, P04, P07, P09, P10, and P12. One especially useful nuance came from P13, who suggested that even group work's developmental value depends on design. P13 described self-selected group work as "the least useful because people work with people who they already know," suggesting that familiar group formation may reduce the developmental benefits of collaboration (P13, tech background, no prior work experience). This indicates that group work should not be treated as automatically competence-developing; its perceived value depends on how group formation, roles, accountability, and task purpose are organized. This suggests that group work became developmental when it created structured responsibility and meaningful interaction. It was less likely to be experienced as developmental when coordination

problems, unequal contribution, or unclear roles overshadowed the learning purpose. Therefore, the issue was not group work itself, but the conditions under which group work enabled or limited students' perception of collaboration competence development.

The coding material also suggests that the clarity of pedagogy mattered almost as much as the method itself. P09 explicitly linked difficulty in group work to unclear instructions, noting that different students could interpret the same task differently. This is analytically important because it shows that students were not only responding to methods at the surface level, but also to how clearly the purpose and structure of those methods were communicated. In other words, alignment was experienced through design quality, not merely through the presence of "active learning" labels. This also shows that ambiguity had a double role in students' accounts. When open-ended tasks were connected to a clear purpose and realistic problem-solving, ambiguity could support critical thinking and initiative. However, when the purpose or expectations were unclear, ambiguity was interpreted as weak pedagogical design. This distinction is important because innovation-related learning often involves uncertainty, but students still need enough structure to understand why that uncertainty matters.

A useful counterpoint should also be retained. Not all traditional or more structured methods were experienced negatively. P13 described device-free written work as helpful for "genuine thinking," because it prevented overreliance on external tools and forced students to use their own reasoning. P06 also articulated a more balanced view, suggesting that the program provided both theoretical and practical understanding. These negative cases matter because they show that students did not reject structure or theory automatically. Rather, they responded more positively when they could see how a method contributed to a competence they valued.

Overall, the findings in this section show that students' perceptions of teaching methods were shaped less by the method category itself than by the perceived quality of the learning situation. Case work, projects, group work, and open-ended assignments were experienced as competence-developing when they combined authenticity, pedagogical clarity, and responsibility. When these conditions were missing, the same methods could be perceived as theoretical, unclear, or weakly connected to working-life preparation. This suggests that the alignment between teaching methods and innovation competence development depends not only on the presence of active learning methods, but on whether students can recognize their developmental purpose and connect them to meaningful professional practice.

5.2. Authentic working-life preparation and curriculum gaps

Across the coding material, authenticity emerged as the condition that most directly shaped whether students experienced learning as preparation for working life. Participants did not simply ask for "more practice" in an abstract sense. Instead, they repeatedly described specific qualities that made tasks feel more or less connected to actual work: incomplete information, time pressure, real stakeholders, practical consequences, industry tools, and contact with organizations beyond the classroom. The strongest accounts of this pattern came from P02, P03, P04, P07, P08, P09, and P11. Analytically, authenticity in students' accounts did not refer to one single feature of teaching. Rather, it was constructed through a combination of conditions: realistic ambiguity, responsibility for outcomes, practical consequences, stakeholder or organizational relevance, and the use of tools or processes associated with professional work. This means that students perceived learning as more developmental when it resembled not only the content of working life, but also its conditions. Authenticity therefore functioned as a bridge between teaching methods and perceived competence development.

Several participants drew a clear distinction between classroom tasks and the messier conditions of work. P04, for example, described academic tasks as more structured, while real business environments required faster decisions under time pressure and with incomplete information. P04 contrasted structured academic tasks with workplace decision-making, explaining that in real business environments people often make decisions "with incomplete information" and "under the time pressure" (P04, business background, partial ITM relevance). P08 similarly emphasized that real work involved coordination with many uncontrollable factors, which made it more complex than textbook-based classroom tasks. These accounts suggest that workplace realism was associated less with the topic of an assignment and more with the conditions under which the task was carried out. Students perceived tasks as closer to working life when they involved uncertainty, time pressure, coordination, and the need to make judgments without complete information. In this sense, authenticity was linked to the experience of professional complexity rather than simply to the presence of practical examples.

Another strong pattern concerned external exposure. Students repeatedly described stronger company collaboration as the most valuable missing element in the program. This point appeared in different forms: more real projects with organizations, more frequent industry interaction, company shadowing, workplace exposure, or clearer understanding of labor market

expectations. P01 explicitly compared ITM with other faculties that, in their view, involved students with industry more often (P01, 5+ years, tech/business background, high ITM relevance). The need for authentic exposure was also visible in P08's suggestion of "shadow work," where students could "follow maybe a company for maybe a day" and observe "how the practical situation works" (P08, humanities background, partial ITM relevance). P11 connected this issue directly to employability, arguing that international students need closer contact with actual market conditions rather than only English-medium classroom discussion about innovation. Together, these accounts suggest that occasional company contact was not perceived as enough; students wanted learning situations that more closely reflected actual organizational practice. External collaboration mattered because it introduced a form of accountability that ordinary classroom tasks could not fully reproduce. When students imagined working with companies, real stakeholders, or workplace shadowing, they were not only asking for more contact with employers. They were asking for learning situations where their decisions, communication, and outputs would matter beyond the classroom. This helps explain why external exposure was repeatedly connected to perceived working-life preparation.

The phrase "more practical" in the interviews also had a very concrete technical meaning. Participants did not only want more general exposure to work. They repeatedly named specific skill gaps: AI-related developments, industry-standard digital tools, deeper analytics exposure, and tool-based workflows relevant to organizational settings. P03 referred to the need to follow global trends and the growing importance of AI. P04 asked for more digital tools. P05 wanted deeper rather than introductory use of R and Python. P09 linked working-life readiness directly to industry-standard tools, arguing that data-related courses should include "the very basics of tools like Tableau maybe, then Power BI, Excel, SQL" (P09, 5+ years, tech background, partial ITM relevance). P10 mentioned tools such as Confluence and Jira. P07 similarly asked for more exposure to industry-standard work. Together, these accounts show that "practicality" was often understood as a combination of technical tool familiarity and realistic organizational application. Tool-related comments should therefore be understood as part of the broader authenticity pattern. Students did not mention tools only as technical skills to be added to the curriculum; they treated them as symbols of professional relevance. Familiarity with tools such as Power BI, SQL, Tableau, Jira, or Confluence represented a way of making learning feel closer to actual

organizational work. This suggests that practical tool use contributed to perceived competence development by making the learning environment more recognizable as a working-life context.

Project management formed part of the same authenticity pattern. P02 argued that the program did not sufficiently address how to handle a project from beginning to completion. This suggests that students could experience project-based activity without necessarily experiencing systematic project-management learning, a distinction relevant for the recommendations.

Not all participants described working-life preparation negatively. P06 gave one of the most positive ratings, describing the program as genuinely helpful for understanding how innovation works and as offering both theoretical and practical knowledge. P13 similarly felt that the courses did develop relevant soft skills. Even so, the more positive cases did not remove the broader pattern. They were compatible with a repeated request for deeper practical exposure, better tools, and more sustained company involvement. The issue, then, is not whether the program contains practical elements at all, but whether those elements are sufficiently authentic, cumulative, and visible to students.

Prior professional experience shaped these perceptions because it gave some students a stronger comparative reference point. Students with work experience could compare classroom tasks with situations they had encountered in organizations, including time pressure, unclear requirements, tool-based workflows, stakeholder expectations, and implementation constraints. As a result, they were often more specific and more critical when evaluating whether a learning activity felt professionally authentic. Students with less work experience, by contrast, were more likely to evaluate authenticity through confidence-building, communication practice, or general exposure to professional topics.

Overall, the findings in this section show that authentic working-life preparation was not understood by students as a single activity, such as company collaboration, or as a general request for “more practice.” Instead, authenticity was perceived through a combination of realistic ambiguity, responsibility, practical consequences, stakeholder relevance, professional tools, and exposure to organizational conditions. These elements made teaching methods feel more closely connected to innovation competence development because they allowed students to imagine how knowledge, collaboration, initiative, and problem-solving would be used in real work. The analysis also shows that prior work experience shaped how strictly students judged

authenticity, since experienced students had stronger workplace reference points for evaluating whether learning tasks resembled professional practice.

5.3. Uneven competence development across collaboration, initiative, and prior experience

The interview data do not support the idea that the program develops all focal innovation competences equally. Instead, the material suggests a distinctly uneven pattern. Collaboration was the strongest and most consistently supported dimension. Critical thinking and problem solving were present but more conditional on task design. Initiative and implementation-oriented action showed the widest variation and were the most clearly shaped by prior experience and self-perception. The unevenness was not only a matter of which competences appeared more often in students' accounts. It also reflected the different pedagogical conditions through which students recognized competence development. Collaboration was linked mainly to repeated peer interaction and exposure to different perspectives. Initiative was linked more strongly to responsibility, deadlines, role expectations, and the need to complete shared tasks. Critical thinking was linked to ambiguity, open-ended questions, and the need to evaluate alternatives. This means that the three competence dimensions were shaped by overlapping but not identical learning conditions.

Collaboration was the most positively narrated competence across the dataset. Repeated group work, multicultural classroom interaction, and exposure to different working styles were described by many participants as meaningful preparation for teamwork in professional settings. P03, P04, P05, P09, P10, P11, P12, and P13 all linked group-based learning to communication, adaptability, perspective-taking, or relationship-building. In several cases, students described the value of learning how to work with people unlike themselves rather than with people who shared their own background or pace. For P04, multicultural group work supported both self-expression and perspective-taking: group-based activities helped "a lot to express myself," while students from different backgrounds brought "different perspectives" into the learning process (P04, business background, partial ITM relevance). The coding material therefore supports a strong claim that the program is perceived to create meaningful opportunities for classroom collaboration.

However, the data also suggests that collaboration and networking should not be treated as the same thing. Students spoke more confidently about teamwork inside the classroom than about networking beyond it. P02 and P10 described group work as a way to meet people and

learn to work with others, but P01, P07, P08, and P09 gave more reserved or mixed accounts. P07 explicitly rated collaboration lower because they were often busy with their own work. P08 framed both initiative and collaboration partly as matters of self-motivation rather than clear pedagogical outcomes. This indicates that the collaborative environment of the classroom was strong, but its translation into broader professional networking was weaker and more uneven. This distinction is analytically important because it shows that relational competence had two different meanings in students' accounts. Classroom collaboration referred mainly to managing peer interaction, communication, and shared work. Professional networking, by contrast, implied contact with external actors, organizational contexts, and future career opportunities. The program was therefore perceived as stronger in developing internal collaborative capacity than in creating broader professional network exposure.

The pattern is even clearer in initiative and implementation-oriented action. Some participants described strong growth in this area because the program forced them to take responsibility. P01 (5+ years, tech/business background, high ITM relevance) said that group work pushed students to take initiative because "no one wants to take it." P04 connected initiative with analyzing projects from the beginning, distributing responsibilities, and setting deadlines. P09 described learning a project cycle over several months, from understanding requirements to implementation, delivery, and feedback. P12's account was particularly important because it showed initiative emerging through obligation rather than confidence. P12 described initiative as developing through the necessity of taking responsibility in group tasks: "everyone should have a role. I cannot say that no, I don't want to do this… You should take some role and do your job" (P12, under 2 years, business background, partial ITM relevance). These examples suggest that initiative was often experienced as something produced by responsibility, deadlines, and shared project demands.

Initiative therefore appeared less as a stable personal trait and more as a situated response to task conditions. When students were required to take a role, coordinate with others, meet deadlines, or deliver an outcome, they were more likely to describe initiative as developing. This suggests that perceived initiative development depended on whether teaching methods created structured responsibility rather than simply encouraging students to be proactive in general.

At the same time, a smaller but analytically significant cluster of participants did not credit the program strongly for initiative development because they saw initiative as prior

disposition or self-motivation. P02 explicitly said they already had initiative before the program and did not see the courses as making them take more initiative. P05 made a similar point, noting that they had already been an initiative-taker. P08 also framed initiative largely as a matter of self-motivation. These accounts should not be treated as contradictions to the stronger initiative claims above. Rather, they show that perceived development depends partly on what students believe they have already brought with them into the program.

Prior experience was analytically central because students with more extensive or ITM-relevant professional backgrounds tended to use stricter workplace benchmarks when judging the program, while students with less experience more often emphasized confidence, communication, and general readiness gains. This pattern should not be simplified into experienced students being negative and inexperienced students being positive; rather, prior experience shaped the lens through which the same pedagogical environment was interpreted.

Prior experience functioned as a professional frame of reference. Students with more relevant work experience were able to compare classroom tasks with real organizational conditions, including uncertainty, stakeholder expectations, practical tools, and implementation constraints. This made them more likely to judge whether a task felt genuinely authentic or only academically simulated. Students with less work experience often evaluated development through a different frame, such as increased confidence, communication practice, or exposure to new ways of working.

A final nuance concerns critical thinking. Although collaboration was the strongest recurring dimension and initiative the most variable, critical thinking sat between them. It was most positively linked to case studies, analytical tasks, open-ended questions, role-play, and assignments that required students to think without relying mechanically on ready-made answers. P01, P03, P04, P06, P08, P09, and P13 all referred to tasks that required analysis or problem framing. Yet critical thinking ratings decreased when participants felt that courses required rote reproduction of definitions or ideas without enough implementation context. This again reinforces the broader argument of the chapter: perceived competence development depends less on whether a competence is named in the curriculum and more on how students experience the learning conditions attached to it.

This section implies that the analysis should focus on uneven perceived development, not on a generalized claim that the program does or does not develop innovation competences.

Collaboration appears to be the most robust strength. Initiative is less stable and often depends on whether responsibility is intentionally structured. Prior work experience and ITM relevance shape how students judge both strengths and weaknesses, which means that a single pedagogical design may be experienced quite differently across the cohort.

Taken together, the findings suggest that the ITM program is perceived as methodologically rich and particularly strong in fostering classroom-based collaboration, but less consistent in supporting students' perceptions of initiative, implementation, and professional networking. Across the three competence dimensions, perceived development was strongest when learning situations involved task openness, responsibility, accountability, interaction, and recognizable links to professional practice. When methods felt overly theoretical, weakly structured, or insufficiently authentic, students were less likely to connect them with innovation competence development. The analysis therefore shows that the same pedagogical environment can be interpreted differently depending on students' prior experience, self-perception, and expectations of working-life relevance.

6. Discussion, conclusions, and recommendations

6.1. Discussion in relation to the theoretical framework

The aim of this thesis was to examine how ITM master's students perceive the role of innovation pedagogy methods in their innovation competence development and working-life preparation. The findings show that students perceived the program as methodologically varied, but that perceived competence development depended less on the presence of active methods than on the conditions under which those methods were experienced. The most important conditions were pedagogical clarity, authenticity, responsibility, and connection to working-life practice.

In relation to the first research question, students experienced innovation pedagogy methods as most relevant when they could recognize their purpose and connect them to realistic professional situations. This supports the theoretical argument that active learning methods do not automatically produce perceived competence development; their value depends on how clearly students understand the link between task design, learning purpose, and practical application (Deslauriers et al. 2019; Ovbiagbonhia et al. 2020). In the ITM context, this was visible in students' mixed evaluations of group work, project tasks, and theoretical courses.

These methods were valued when they created meaningful responsibility and application, but criticized when they felt unclear, unevenly structured, or weakly connected to practice.

In relation to the second research question, students perceived competence development as uneven across the three analytical dimensions. Collaboration was the strongest dimension, mainly because repeated group work and multicultural classroom interaction gave students opportunities to practice communication, coordination, and perspective-taking. However, the findings refine the relational dimension of innovation competence by showing that classroom collaboration and professional networking were not experienced as the same. Professional networking required external actors, organizational contexts, and working-life exposure, which students perceived as less consistently developed.

Critical thinking and problem-solving were perceived as supported through case-based, open-ended, and discussion-based learning, but their developmental value depended on authenticity and application. Initiative and implementation-oriented action were the most unevenly perceived dimensions. Students connected initiative less to personality alone and more to structured responsibility, deadlines, role expectations, and delivery of outcomes. This supports the idea that implementation-oriented competences require intentional learning conditions rather than simply the presence of group or project work (Chen and Yang 2019; Hero et al. 2021).

The findings also show that authenticity was central to perceived working-life preparation. Students associated authentic learning not only with company collaboration, but also with ambiguity, accountability, practical consequences, professional tools, and organizational complexity. This interpretation connects the empirical findings with literature on working-life-oriented learning and university–industry collaboration, which emphasizes the value of realistic tasks, stakeholder interaction, and application in professional contexts (Hero et al. 2021; Lahdenperä et al. 2022).

Finally, prior professional experience shaped how students interpreted the same learning environment. Students with more ITM-relevant experience used workplace complexity as a comparative frame, while students with less experience more often emphasized confidence and general readiness. This means that perceived innovation competence development was not only shaped by teaching methods, but also by the professional reference points students brought into the program. Overall, the thesis contributes by showing that students' perceived competence

development depends on the interaction between teaching methods, authenticity, pedagogical clarity, and students' prior experience.

6.2. Conclusions

The thesis set out to examine how innovation pedagogy methods in the ITM master's program at the University of Tartu are perceived to support students' innovation competences relevant for working life. Based on the analysis of thirteen semi-structured interviews, the study concludes that the ITM program provides a methodologically varied and relationally rich learning environment, but that students perceive its contribution to innovation competence development as uneven.

In response to the first research question, students describe the ITM program as using a wide range of teaching methods, especially lectures, group work, case studies, project-based assignments, workshops, seminars, and limited external collaboration. Students generally value active and practical methods more than purely theoretical instruction, especially when the connection to innovation and working life is clear. However, the developmental purpose of some methods is not always visible to students. Therefore, the program is experienced as active and diverse, but not always as coherently aligned around a clear innovation competence trajectory.

In response to the second research question, students perceive the program as supporting collaboration and networking most strongly, critical thinking and problem-solving moderately, and initiative and implementation-oriented action unevenly. Collaboration is strengthened through repeated group work and interaction with diverse peers. Critical thinking is supported through case-based, open-ended, and discussion-based learning, but is limited by the gap between academic tasks and real workplace complexity. Initiative develops mainly through project responsibility and group necessity, but students do not always perceive it as deliberately taught or systematically scaffolded. The most consistent perceived gaps are limited sustained company collaboration, insufficient depth in practical digital tools, and lack of structured project-management preparation.

The central contribution of the thesis is therefore to show that students' perceived innovation competence development depends on three conditions: visible alignment between methods and competence aims, authentic working-life learning opportunities, and progressive support across the curriculum. Its contribution lies in explaining how students make sense of the

relationship between teaching methods, competence development, and working-life readiness in a specific innovation-related master's program.

6.3. Recommendations for the ITM program

The recommendations are based on the empirical findings and their interpretation through the theoretical framework. First, the program should make the competence-development logic of courses more explicit. Each course should clearly communicate which innovation competences it aims to develop and how its teaching methods and assessments support those competences. This would help reduce the intention–experience gap and strengthen constructive alignment across the curriculum (Biggs 2003; Ovbiagbonhia et al. 2020).

Second, the program could strengthen authentic external engagement through company-linked projects, guest challenges, shadowing opportunities, or assignments based on real organizational cases. Such external engagement can support innovation competence development by exposing students to stakeholder relevance, practical consequences, professional communication, and organizational contexts (Hero et al. 2021; Lahdenperä et al. 2022). This recommendation is also supported by students' comments, which repeatedly emphasized the need for more realistic contact with working-life settings.

Third, practical digital and analytical tools should be integrated more deeply into the curriculum. Because the official ITM program aims include ICT implementation, company data analysis, business process improvement, and digital product management, students should have repeated opportunities to use tools such as SQL, Python, Power BI, Tableau, AI tools, or comparable industry-relevant technologies in applied tasks (University of Tartu 2021). This would strengthen the link between program aims and experienced learning.

Fourth, project-management and implementation skills should be scaffolded more deliberately. Rather than assuming that students develop initiative through group projects automatically, courses should include explicit project planning, role distribution, milestones, feedback points, implementation reflection, and delivery evaluation. This would help transform initiative from an incidental outcome into a designed competence-development pathway, consistent with the argument that implementation-oriented innovation competences require intentional pedagogical support (Chen and Yang 2019; Hero et al. 2021).

Fifth, group work should be further structured to improve fairness and developmental value. Instructor-assigned diverse groups, clearer role expectations, peer evaluation, and

individual reflection or presentation components could reduce unequal participation and make collaboration more accountable. This recommendation follows from the finding that collaboration is one of the program's strengths, but that its developmental value depends on facilitation and assessment design.

6.4. Limitations and directions for future research

Several limitations should be acknowledged. First, the study is based on student perceptions and cannot measure actual innovation competence development. Second, it focuses on one master's program and thirteen participants, so the findings are analytically rather than statistically generalized. Third, participation was voluntary, and not all students in the cohort participated because some declined or did not respond to the invitation. This may have created self-selection bias, as students with stronger views or greater availability may have been more likely to participate. Fourth, the study does not include lecturer, employer, or curriculum-designer perspectives, meaning that pedagogical intentions and workplace expectations are interpreted only through student accounts.

Future research could include lecturers, program director, alumni, or employer perspectives to compare student perceptions with pedagogical intentions and workplace expectations. A mixed-methods design could also combine interviews with validated innovation competence instruments to compare perceived development with more structured competence assessment.

In conclusion, the ITM program has a strong foundation for innovation competence development because it already uses varied teaching methods and provides a diverse collaborative learning environment. However, the findings suggest that the program's potential would be strengthened by making competence aims more visible, increasing authentic company-based learning, deepening practical tool use, and scaffolding implementation skills more deliberately. These changes would help the program better translate its official working-life-oriented aims into students' experienced learning and perceived readiness for innovation-related work.

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Appendices

Appendix A. Semi-Structured Interview Guide

Interview Introduction.
Before the interview, participants were provided with a short explanation of key terms to ensure a shared understanding. Innovation was defined as applying knowledge in practice and contributing to improvements, solutions, or new ways of working. Teaching methods referred to instructional practices such as lectures, group work, projects, case studies, and collaboration with external partners. Innovation competences referred to skills such as problem-solving, initiative, collaboration, and the ability to apply knowledge in practice. Participants were informed that there were no right or wrong answers and that the focus was on their personal experiences and perceptions.
Interview questions
1. Background
    - Could you briefly introduce yourself and describe your educational background prior to starting the ITM master's program (e.g., previous degree and field of study)?

Follow-up:
    - Do you have prior professional work experience? If yes, please briefly describe its nature and duration.

2. Innovation pedagogy
    - What teaching methods are most commonly used in your courses (e.g., lectures, group work, projects, case studies, collaboration with external partners)?

Follow-up:
    - Are there any methods you find challenging or less useful? Could you give an example?

3. Innovation competences (overall)
    - On a scale from 1 to 5, how well do current teaching methods prepare you for innovation-related demands in working life?

Follow-up:
    - Which competences do you think are most important in this context?
    - What explains your rating?
    - Do you see any gaps between your studies and work-life expectations? If yes, in what ways?

4. Critical thinking and problem-solving
    - On a scale from 1 to 5, to what extent do your studies support the development of your critical thinking and problem-solving competences?

Follow-up:
    - Could you give an example of an activity or assignment?

5. Initiative and implementation-oriented action
    - On a scale from 1 to 5, to what extent do your studies support your ability to take initiative and carry tasks from planning to implementation?

Follow-up:
    - Can you describe a situation where this was required?

6. Collaboration and networking competences

- On a scale from 1 to 5, to what extent do group-based or collaborative activities support your collaboration and networking competences?

Follow-up:

- Can you give an example of a group or team activity?

7. Reflection

- Are there any competences you feel are still missing or could be developed further during your studies?

Source: prepared by the author based on the theoretical framework of the thesis, especially the innovation competence dimensions and innovation pedagogy literature (Hero et al. 2017, 2021; Konst (e. Penttilä) and Kairisto-Mertanen 2020; Marin-Garcia et al. 2016).

Appendix B. Example of Coding and Theme Development

Example of the movement from initial codes to final analytical themes

Initial codes	Broader category	Final analytical theme
unclear task instructions; unclear purpose of assignments; theory not connected to practice	Pedagogical clarity and alignment	Alignment between teaching methods and competence development
limited company collaboration; lack of real stakeholders; need for shadowing	Authenticity and external exposure	Authentic working-life preparation and curriculum gaps
unequal contribution in group work; schedule coordination problems; self-selected groups	Group work challenges	Uneven competence development across collaboration, initiative, and prior experience

Source: compiled by the author based on the interview data and reflexive thematic analysis process (Braun and Clarke 2006, 2021).

Resümee

TAJUTUD INNOVATSIOONIPÄDEVUSE ARENG TÖÖELUKS: ÜLIÕPILASTE VAATED TARTU ÜLIKOOLI INNOVATSIOONI JA TEHNOLOOGIA JUHTIMISE MAGISTRIPROGRAMMI PÕHJAL

Narmin Babayeva

Käesolev magistritöö uurib, kuidas Tartu Ülikooli innovatsiooni ja tehnoloogia juhtimise magistriprogrammi üliõpilased tajuvad innovatsioonipedagoogiliste õppemeetodite rolli tööeluks vajalike innovatsioonipädevuste arendamisel. Töö keskendub üliõpilaste arusaamadele õppemeetoditest, pädevuste arengust ja ettevalmistusest tööeluks. Teoreetiline raamistik tugineb innovatsioonipädevuse, innovatsioonipedagoogika ning tööelule suunatud kõrghariduse käsitlustele. Innovatsioonipädevust vaadeldakse kolme peamise mõõtme kaudu: kriitiline mõtlemine ja probleemilahendus, algatusvõime ja rakendamisele suunatud tegutsemine ning koostöö ja võrgustumine.

Uurimus põhineb kvalitatiivsel uurimisviisil. Andmed koguti poolstruktureeritud intervjuude kaudu, milles osales kolmteist innovatsiooni ja tehnoloogia juhtimise magistriprogrammi viimase aasta üliõpilast. Intervjuuandmeid analüüsiti refleksiivse temaatilise analüüsi abil. Tulemused näitavad, et üliõpilased tajuvad programmi õppemeetodeid mitmekesistena. Nende hulka kuuluvad loengud, rühmatööd, juhtumianalüüsid, projektipõhised ülesanded, töötoad, seminarid ja piiratud määral koostöö väliste partneritega. Samas ei sõltu tajutud pädevuste areng ainult aktiivsete õpetamismeetodite olemasolust, vaid sellest, kui selgelt on need seotud pädevuseesmärkide, praktilise rakendamise ja tööeluga.

Tulemuste põhjal tajuvad üliõpilased kõige tugevamalt koostööpädevuse arengut, mida toetavad korduvad rühmatööd ja suhtlus erineva taustaga kaasüliõpilastega. Kriitilist mõtlemist ja probleemilahendust toetavad eelkõige juhtumipõhised ja avatud ülesanded, kuid nende väärtus sõltub ülesannete praktilisusest ja seotusest tegelike tööelusituatsioonidega. Algatusvõime ja rakendamisele suunatud tegutsemise arengut tajutakse ebaühtlasemalt ning see ilmneb tugevamalt olukordades, kus üliõpilastel on selged rollid, tähtajad, vastutus ja vajadus jõuda konkreetse tulemuseni.

Peamiste arengukohtadena tõid üliõpilased esile vajaduse tugevamaks koostööks ettevõtetega, praktiliste digitaalsete ja analüütiliste tööriistade sügavama kasutamise ning süsteemsema projektijuhtimise ettevalmistuse järele. Magistritöö järeldab, et programm loob hea aluse

innovatsioonipädevuste arenguks, kuid selle mõju saaks tugevdada pädevuseesmärkide selgema nähtavaks tegemise, autentsemate tööelupõhiste õpikogemuste ja rakendamisoskuste sihipärasema toetamise kaudu.

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Narmin Babayeva

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