

In the search of the  
students' role in  
innovation ecosystems

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## **Abstract**

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### **Keywords**

“ecosystems for innovation”, “eco systems for social innovation”, “social innovation ecosystems”, “quadruple helix” “students- innovation ecosystem” “students role in innovation ecosystems”

### **Purpose**

The purpose of this study is to explore the specific role of students in innovation ecosystems. By gaining a deeper understanding of their role, this research aims to contribute to a more nuanced micro-dynamic perspective on the role of students in innovation ecosystems. This thesis explores conceptualizations and metaphors of innovation ecosystems with the aim of exploring different theorizing in the field, related to the role of students within those.

### **Research question**

- What is the role of students in innovation ecosystems?

### **Method**

The study was based on a qualitative method. The empirical data was collected through semi-structured interviews and observations using focus groups with 5 actors within the public, academia, industry and civil society.

### **Conclusion**

The role of the student is at the heart of the innovation ecosystem metaphor - that of emergence and co-evolution. Rather, the empirical evidence of this thesis concurs that the roles available to students also depend on other actors taking them seriously, and that the reasons for less than optimal exchange between students and other actors deserves further investigation. It is an interesting observation that students fall between the system perspective's grand theorizing and pedagogics' narrower focus on education: - So what is the point of pursuing a research approach where either students or ecosystems are not mentioned? There is an obvious gap in where the abstract level of the system perspective, whilst it can serve as an overview of the concept, does not specify actors and misses to provide a micro perspective on what is occurring between actors, that could explain how it all happens. Are students rather representatives of the *civil society*, or of what Powell referred to 'amphibians', or representative of nothing but themselves as *individuals-in-the-making*, as a representative of *becoming* itself and *emergence* in itself – through their interaction *on* a campus which they don't own, but inhabit? And what do companies really want when they want to be a campus? What is special about a campus and life on a campus? What is the very essence of it?

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Sincerely,

Cornelia Alenbring

A handwritten signature in black ink, consisting of a large, stylized 'C' followed by a horizontal line that extends to the right and then curves downwards.

“Just think about it today, you can’t think of any tech company that doesn’t refer to their offices as a campus. They look like campuses, they try to act like campuses. And of course, universities look more like firms today. And it was through seeing this role of *amphibians* who move back and forth between realms, carrying practices into unfamiliar settings and then repurposing them back into their original setting and transforming it, that John and I started thinking about: “where does the emergence of fundamentally new categories of thought and new categories of organizing come from?” ... Even today, it’s just an absolute blast when undergraduates or graduate students walk into my office and say, “oh I want to study vulnerability, I want to understand when systems tip, I want to see when things are likely to be vulnerable to perturbation or reconfiguration.” That book tried more than any other that I’ve worked on to, not just describe and categorize, but really theorize something brand new. We do a very a poor job in the social sciences of studying *emergence*. Most social science begins with the second act of a play, after the dust has settled, to use Peyton Young’s language. This was an attempt to see where the dust came from.”

Woody Powell (Anheier & Powell, 2021)

*This thesis is one out of three that are having Creative Lab as a partner. My attempt is to look upon students role in an innovation ecosystems whilst the other reports includes managerial aspects of a student driven innovation Lab as well as collaborating elements among actors. The other thesis have been done by Ines Acinas, on the design and definition of Creative Lab as an thought of future organization, and by Simon Lindblom, on the factors that make a successful collaboration. Further this thesis does not explore a specific ecosystem, moreover conceptualizations and metaphors of innovation ecosystems.*

## 1. Introduction

This thesis is about a practical problem that arised when students in an innovation design Master's program sought to actively engage with both internal and external actors to enhance and use their learning and exchange of skills and perspectives throughout their education at a masters level. Their objective from their experiences regarding this was to create a sustainable and organic framework for sharing resources and experiences. The students recognized the importance of establishing connections with actors from different spheres to participate in social innovation initiatives while the thought of launching an ideal organization. They initiated contact with actors, as they identified a pressing need to exchange experiences, knowledge, and perspectives with students and actors in between. However, the students perceived that this valuable competence was being overlooked, and the lack of a system within their institution presented a significant challenge in addressing this issue. I interpreted the practical problem into creating a metaphor, following; *“Students are like hidden seeds of social innovation in the fertile soil of an ecosystem, waiting to sprout and drive positive change”*.

After conducting an extensive data search and reviewing well over a hundred articles on the formations of triple- quadruple- and quintuple- helix; *that I interpret as metaphorical representations of conceptualizations of the interactions and relationships between academia, industry, and government in an ecosystem for innovation, I realized that students are not mentioned - other than just in passing in a maximum of 4-5 sentences in total.* Bellandi (2021) means that few studies have representative empirical findings on the actors role in quadruple helix for innovation, which leads me further into exploring research in the context of delving into universities and students to get closer to a micro-level in finding students' role in an ecosystem for innovation. Despite the presence of a policy framework at the university level of student entrepreneurship looking into the role of students in education, the focus remains predominantly on entrepreneurial education, with little attention given to the micro-level interactions and contributions of students within an ecosystem of actors as government officials, entrepreneurs, firms, professional, in which the researcher expressively states is necessary to delve into the students role (c.f. Schuhmacher and Thieu, 2022; Bock et al., 202; Reichert, 2019). The lack of research in this context is supported by another researcher Claus's (2018) in which he highlights the scarcity of literature on students in ecosystems. Upon further investigation, it becomes evident that there is a research gap concerning the inclusion of students in the discourse on ecosystems. Whilst Bock et al. (2021) explores, “ecosystems universities” evolved the students' innovation capability, the role itself is not evident more similar to educating entrepreneurship in line with Schuhmacher and Thieu (2022) article. While the ecosystem thrives with diverse actors and interactions, the presence of these budding seeds of innovation remains unnoticed where no research in neither innovation literature nor pedagogic literature, their potential for creating impactful solutions and fostering societal progress could be seen as overlooked or a new area of delving into the

representation of these metaphors of quadruple helix and ecosystem for innovation. Just as the ecosystem relies on the collective contributions of its members, recognizing and nurturing the growth of as actors of innovation within the ecosystem unleash a powerful force for positive transformation, bringing perspectives, innovative ideas, and collaborative action to address pressing social challenge existing literature has not yet addressed relations among actors in practice studies, specifically students.

Looking at Aalborg University – a university that holds the #1 position in ‘impact’ in Times’ university ranking, one example that stands out in its clarity is Nielsen & Cappelen’s (2014) meaning; if the business partner fails to recognize and value the students' potential to contribute valuable knowledge, it can limit the students' engagement and constrain their ability to fully participate as knowledge workers. In their article they found that less mutual knowledge transfer was perceived in student-industry collaboration than between researchers and businesses (*ibid*). They emphasized the significance of students' and actors' behavior in collaboration efforts. They discussed that the way students approach their role within the project can shape the level of seriousness attributed to them by the business partners and conversely, *the role of the business partner in shaping student behavior (ibid)*. Their contribution emphasized a need for a mutually respectful and conducive environment where students are encouraged to engage as knowledgeable contributors, while business partners acknowledge and value their capabilities (*ibid*).

Linked to Powell and DiMaggio (1983); Anheier & Powell (2021) and aspects of emergence in observation of the role of taken-for-granted assumptions, not least manifest in institutionalized perceptions and expectations of actors, including their roles and (legitimate) action, this led me to think about the categorization of students, in which they are heavily perceived as "anyone from the university" according to the innovation literature, whereas the pedagogical literature does not consider the interaction between students and the rest of the ecosystem; instead focusing on educating entrepreneurship (Schuhmacher and Thieu, 2022).

It seems that the literature fails to address the nuanced role and services that students can offer within the ecosystem and thereby emergence. The existing research mainly focuses on broader aspects and overlooks the micro-level dynamics and interactions involving students. Therefore, there is a clear research gap in understanding of students within ecosystems, moreover a world ocean of unanswered questions, in the middle of continents of established theories: some completely comprehensive system theories about innovation, some about students and e.g. problem-based learning but which do not discuss the students' specific role in the interaction with the rest of society. The current focus on entrepreneurial education falls short in capturing the comprehensive connections and collaborations between students and the ecosystem. By framing the issue as a metaphorical journey, the students'

struggle became more tangible, evoking a sense of curiosity and the quest for discovery. It highlighted the need for an exploration in a new conceptualization that acknowledged and facilitated the students' aspirations to engage and collaborate with external actors and embrace the invaluable insights that lie beyond the traditional confines of academia categorization. Furthermore, rather than finding every puzzle of findings of the so-called research gap, this research evoked a need of exploring the universities unspent resource, students, and expanding their role in current innovation systems.

## **2. Background**

As the journey unfolds and the story takes shape, it is crucial to set the stage and lay the foundation for what lies ahead. Before we delve deeper into the intricacies and complexities of this thesis narrative where the roots of our tale intertwine with the broader context that surrounds it, the background section serves as a gateway to understanding the rich tapestry of this thesis.

### **2.1 Ecosystems**

Historically, an ecosystem was defined as a community of living things (such as plants, animals, and microorganisms) interacting with one another and with their physical surroundings (such as air, water, and soil) (Bogers et al., 2019). It can also be a natural system, such as a forest or a coral reef, or it can be a human-made system, such as an agricultural or urban environment (ibid). Each species in an ecosystem has a role or niche that contributes to the general functioning of the system. Plants, for example, absorb carbon dioxide and release oxygen, whereas mammals eat plants and aid in seed dispersal (ibid). Ecosystems can be complex and interrelated, with numerous species and physical processes influencing one another in a variety of ways (ibid). Human activities such as pollution, deforestation, and climate change can disturb or even destroy ecosystems, resulting in severe impacts on biodiversity and ecosystem services such as clean air and water, food, and recreation (ibid). In the field of management of technology and innovation, and the context of human activity and innovation, the concept of an ecosystem has gained increasing significance (Adner & Kapoor, 2010, Kapoor & Lee, 2013, Meyer et al., 2005, Pierce, 2009, Teece, 2007), further explored in the next chapter.

### **2.2 Innovation ecosystems**

In the context of human activity and innovation, the concept of an ecosystem has gained importance in recent decades. While natural ecosystems have long been studied, the application of the ecosystem metaphor to social and economic processes, including innovation, arose more prominently in the late twentieth century. In the 1990s, the term "ecosystem" was first used in the field of innovation and entrepreneurship to describe the intricate interrelationships between numerous people, organizations, and resources engaged in the innovation process (Moore, 1993). It stressed the dynamic and linked



character of innovation processes, as well as the significance of collaboration, knowledge exchange, and resource sharing across many actors within a certain domain (ibid). Since then, the concept of an innovation ecosystem has evolved and is now widely recognized and used in a variety of disciplines including technology, business, and policy (Mair and Seelos, 2012; Starr & Hattendorf, 2012; Simon, 2015; Hansen et al., 2015). Understanding and applying ecosystem thinking to innovation has brought useful insights into *how innovation occurs* and *how actors* could be utilized on a systematic level to encourage innovation and economic progress. Ecosystems, in which stakeholders from various sectors collaborate to address societal concerns, play a critical role in driving social innovation. This collaborative approach brings together government, business, and civil society to produce innovative solutions (Mair and Seelos, 2012). Businesses, institutions, and individuals who support the implementation of these projects, such as social entrepreneurs, investors, foundations, and research institutes, comprise social innovation ecosystems (Hansen et al., 2015). These ecosystems accelerate the creation and implementation of social innovation solutions by facilitating information exchange, resource sharing, and funding (Meissner & Howaldt, 2015; Starr & Hattendorf, 2012). The concept of quadruple helix has gained prominence, expanding traditional actor classifications and emphasizing the transformative nature of social innovation (Meissner & Howaldt, 2015; Starr & Hattendorf, 2012; Simon, 2015; Hansen et al., 2015).

### **2.3 Forms of innovation ecosystems**

The Quadruple Helix Model evolved from the original Triple Helix Model, which serves as a metaphor for understanding the processes of invention. Etzkowitz and Leydesdorff's (1995) Triple Helix Model emphasizes interaction and collaboration among three main actors: academics, industry, and government. Henry Etzkowitz and Loet Leydesdorff first presented the concept in the 1990s, and it has subsequently acquired considerable support as a means of comprehending the dynamics of innovation in modern society (Etzkowitz & Leydesdorff, 1995). Academia, represented by universities and research organizations, provides critical resources for innovation, such as knowledge and human capital. Industry, which consists of firms and corporations, plays an important role in enabling innovation by contributing financial and technological resources. The government, through policymakers and regulators, sets the legal and regulatory frameworks that either support or hinder innovation. However, as our understanding of the mechanics of invention expanded, the Quadruple Helix model emerged, which included civil society as a fourth helix (Carayannis & Campbell, 2009; Etzkowitz & Leydesdorff, 2000). This expansion occurred in response to the acknowledgement of non-academic, non-industrial, and non-governmental players' contributions to generating innovation and societal growth. The term "civil society" refers to community groups, non-profit organizations, and grassroots efforts that provide a variety of perspectives and societal goals to the innovation ecosystems.

The addition of civil society in the Quadruple Helix model reflects society's growing complexity and the recognition that knowledge generation and innovation require a greater range of players and organizations (Carayannis & Campbell, 2009; Etzkowitz & Leydesdorff, 2000). The objective of including civil society is to create more inclusive, participatory, and socially responsible innovation systems. This growth also resulted in the identification of a new gap, which gave rise to the Quintuple Helix model, which emphasizes the role of users and customers in influencing innovation (Etzkowitz & Leydesdorff, 2000). The Quintuple Helix model extends the stakeholder reach even farther by recognizing citizens', consumers', and individuals' active participation in giving insights, needs, and preferences that influence innovation. Furthermore, rapid technology breakthroughs and worldwide interconnection have introduced new actors and networks, such as multinational corporations, international organizations, and global networks, which expand the process of knowledge generation and innovation (ibid). The development of the Quadruple and Quintuple Helix models represents an evolving society toward recognizing diversity and inclusiveness. In order to establish comprehensive and equitable innovation ecosystems, these models emphasize the necessity of combining perspectives and contributions from a varied variety of stakeholders, including marginalized communities, underrepresented groups, and diverse cultural backgrounds (ibid).

## **2.4 Purpose**

The purpose of this study is to explore the specific role of students in innovation ecosystems. By gaining a deeper understanding of their role, this research aims to contribute to a more nuanced micro-dynamic perspective on the role of students in innovation ecosystems. This thesis explores conceptualizations and metaphors of innovation ecosystem with the aim of exploring different theorizing in the field, related to the role of students within these.

## **2.5 Research question**

While there has been extensive research on innovation systems in terms of general frameworks and their established classifications, and the pivotal role of students is increasingly being recognized (Kelly et al., 2023), research on the specific role of students as relevant stakeholders is still in its infancy (Kliewe et al., 2019; Clauss et al. 2018). Nielsen and Capellen (2015) is one of few studies who specifically discusses the students' role in innovation ecosystems. Students as a specific category are typically omitted in established innovation ecosystems frameworks, as well as in ongoing debates about their conceptual rigor and validity (c.f. Cai et al., 2020; Granstrand & Holgersson, 2020). For this thesis, one main research question will be used upon the notion of students role in innovation ecosystems, following:

- What is the role of students in innovation ecosystems?

## **2.6 Limitations**

In my empirically driven thesis I will explore the role of the students in the innovation ecosystems due to the practical problem of this thesis. I acknowledge the significance of my findings, but I embrace the fact that there is knowledge waiting to be explored within this area for a longer time period than this thesis. Therefore, I am aware that this thesis is one chapter of an ongoing exploration, and eager for pushing the boundaries of knowledge and painting a more complete picture of the intricate roles that students play within the innovation ecosystems.

## **3. Theoretical framework**

While not having the ambition of filling the requirements of a systematic literature review, the search for a relevant framework for discussing the *role of students* in the *innovation ecosystems* turned out to be an exploration of different fields of research, which approach the phenomenon of interest from different perspectives respectively, without making a perfect match with the research question. Therefore, each one of the aspects of *innovation ecosystems*, *students* and their *role* in that context are discussed in some length. The chapter is concluded by the presentation of an integrative model that matches the research question and analysis of the empirical findings. As it appears to be a scarcity of research about the students' roles in general, the specific case of social innovation is mentioned in passing, even though that aspect of innovation further underscores the point made about the role of the students in innovation ecosystems more generally.

### **3.1 Exploring ecosystems for innovation**

In the light of later years' academic debate about the relevance and validity of different frameworks and definitions of innovation ecosystems, Granstrand & Holgersson (2020) presented an integrative framework based on aspects included in the majority of earlier suggestions of different authors. They specifically emphasized the need for balancing the relevance and conceptual relevance of theoretical models, underscoring the importance of not only highlighting the aspect of collaboration, but also competition within an ecosystem, thus including both complementary and substitute relations. Not least, they pointed at the emergent aspect of the '*innovation ecosystem as an evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors*'.

According to Granstrand and Holgersson (2020) in their review of the ecosystems for innovation there are mainly the key components that are described as; Physical infrastructure, Human capital, Financial capital, Knowledge infrastructure and Policy and Regulatory frameworks.

While *Physical infrastructure*, such as research labs and incubators, but also roads, bridges, airports, power grids, water supply systems, and telecommunications networks – and university campuses – matter, there are components of even more direct consequences for innovation, such as Human capital, i.e., the skills, knowledge and abilities of people. *Human capital* is an essential element of innovation because it enables people to create and use novel concepts, technologies, and business models. (Granstrand & Holgersson, 2020) . A wide range of abilities are necessary for innovation, including technical proficiency, creativity, critical thinking, problem-solving, and entrepreneurialism. These abilities can be gained through official and informal learning environments, as well as through education, training, and experience. *The character and quantity of a company's human resources are directly related to its capacity for innovation.* Businesses that make an investment in the education of their staff members are more likely to be successful and inventive than those that don't. Businesses can foster an environment that fosters creativity and experimentation and results in the creation of new goods, services, and procedures by giving employees the tools and training they need. According to Granstrand & Holgersson, (2020) research, human capital is crucial to innovation because it provides the information, skills, and talents required to create and apply fresh concepts and technologies. As a result, organizations that place a high priority on developing their human resources typically exhibit greater innovation and long-term success. *Financial capital* - financial resources and investments required to promote the creation and commercialization of novel concepts and technology – is also crucial for the creation and commercialization of novel innovative ideas, concepts and technologies. Without sufficient funding, a business can find it difficult to sell its products or successfully compete with other industry competitors. As a result, financial capital is a crucial component of business success. It is crucial to remember that success cannot be achieved with just finances, long-term business success also depends on other elements including innovation, market analysis, efficient management, and a solid team (ibid.).

As important as knowledge is for innovation, so is its diffusion. Granstrand and Holgersson (2020) underline the importance of *Knowledge infrastructure* in supporting innovation and collaboration among ecosystem members. Within an innovation ecosystem, knowledge is spread through to the underlying framework and resources that enable its creation, dissemination, and application by the associations and collaborations that promote the sharing of information and skills, such as academic research networks and business-academic partnerships, manifest in research institutes, universities, libraries, databases, communication networks, intellectual property systems, and supporting policies. *The foundation for knowledge exchange, learning, and the emergence of new ideas is provided by*

*knowledge infrastructure*. It fosters an ecosystem in which individuals and organizations may gain access to and exploit existing knowledge, cooperate on R&D efforts, and translate knowledge into innovative products, services, or processes. A well-developed and inclusive knowledge infrastructure, according to Granstrand and Holgersson (2020), *improves the flow of knowledge among diverse players, fosters knowledge spillovers, and promotes the emergence of new ideas and chances for collaboration in generating vibrant and dynamic innovation ecosystems*. The concept of knowledge infrastructure emphasizes the importance of developing and maintaining a robust knowledge ecosystem that fosters innovation, learning, and the exchange of ideas across many stakeholders (Granstrand & Holgersson, 2020).

*In order for the innovation ecosystem to work properly, societal institutions matter*. Thus, an innovation ecosystem is also dependent on a *Legislative and regulatory framework* that fosters innovation, including intellectual property rules and financial incentives for research and development (Granstrand & Holgersson, 2020). The researchers refer to the legislative and regulatory measures put in place by governments and other governing organizations to enable and foster innovation, as mentioned in the article. These frameworks include a variety of criteria such as intellectual property restrictions, financial incentives for R&D, industry regulations, and standards (Granstrand & Holgersson, 2020). The relevance of legislative and regulatory frameworks in shaping and affecting the dynamics of innovation ecosystems is emphasized by the writers. They suggest that effective policy interventions and supportive regulatory regimes are critical for fostering innovation, increasing collaboration among various players, preserving intellectual property rights, and encouraging investment in R&D (Granstrand & Holgersson, 2020). The review of policy and regulatory frameworks by Granstrand and Holgersson (2020) emphasizes their importance in providing an enabling environment for innovation within an ecosystem. They investigate how these frameworks can help to improve the movement of knowledge, resources, and investments, as well as how they can affect the overall functioning and success of an innovation ecosystem.

Summing up the implications of Granstrand & Holgersson's (2020) framework, there are a range of factors that need to be in place for an innovation ecosystem to flourish. As the topic of specific interest for this thesis is *the role of students in the innovation ecosystem*, aspects of Human capital, Knowledge infrastructure as well as institutions (as developed further below when discussing the *role* of students), as well as the question of how an innovation ecosystem evolves, and what *students* have to do with those aspects of *emergence*. However, Granstrand & Holgersson's (2020) framework *does not say anything specific about students as actors, neither does their framework explain how emergence in innovation ecosystems comes about*. However, motivating their contribution in contrast to earlier definitions one-sidedly emphasizing e.g. collaboration at the cost of aspects of competition, they discussed the need balance between generality, simplicity and accuracy when conceptualizing

social behavior (with reference to Weick, 1979), arguing that these definitions had gone too far in sacrificing accuracy to gain simplicity, with the result of being underspecified and overly general. They further remarked that other definitions were not parsimonious enough. This argument provides a key to understanding why the role of students aren't mentioned in general innovation ecosystems frameworks: emanating out of a rich stream of literature in economics in the 1980s and 90s trying to explain innovation systems, and Moore's (1993) notion of a business ecosystem, the innovation ecosystem literature provides an alternative to traditional classifications of different industries and other branches of society broken down to subdivisions, instead emphasizing their relationships over specificity on a societal level. Hence, while being omitted in the innovation ecosystem literature, students are assumed to be a representative of other, broader categories, such as the Knowledge infrastructure (as representatives of their universities) or Human capital (as possessors, or receivers through teaching and/or experience within the innovation ecosystem).

While *the pivotal role of students* is increasingly being recognized (Kelly et al., 2023), there is a dearth of empirical studies addressing their role in the innovation ecosystem. Llewellyn (2003) commented that the question qualitative researchers have after having gathered the empirical is how this all should be understood and explained, typically being met with the recommendations to 'incorporate some theory' as the value-added of qualitative academic research. Theorization or conceptual framing of empirical events is, however, not straightforward but involves more choices than just picking a theory and should involve considerations about the relevance of the 'level of theorization' (Llewellyn, 2003, p. 663) of abstract theorists for explaining empirical work. Llewellyn (2003) called for a rethinking of how theory can support empirical research through the use of ideas, concepts, philosophical (meta)theories, conceptual tools and grand theory, suggesting five different ways of theorizing:

<b>Level</b>	<b>Theory</b>	<b>Focus</b>
One	Metaphor theories	By image-ing and grounding experience
Two	Differentiation theories	By "cutting the pie" of experience
Three	Concepts theories	By linking agency and structure through practice
Four	Theorizing settings	Explaining how contexts for practices are organized

Five	Theorizing structures	Explaining impersonal, large scale and enduring aspects of social life
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(from Lewelly, 2003, p. 667)

With reference to Baiyere (2018), Granstrand & Holgersson (2020) commented that “there is a limited consensus about what innovation ecosystems actually are, despite the concept’s widespread use”, and that the concept has become more than just a metaphor; a persuasive (albeit contested) definition. This begs the question of whether the omittance in empirical research on the role of students in the innovation ecosystem may reflect the very content of the definition itself; in that case suggesting a dearth of empirical research that does *not* theory-driven, but take concrete, practical issues as a point of departure for their research. Furthermore, we may be tempted to ask whether innovation ecosystem researchers understand the notion in terms of a metaphor, or possibly confound it with de-contextualized ‘grand theorizing’. Whatever the explanation might be, it is remarkable that so little seems to be written about students from the theoretical lens of innovation ecosystems. It is striking that there are so few traces left from the original actual context that more than anything drew attention to the innovation topic: Silicon Valley and the institutional entrepreneurship of university administrators, profiling Stanford University as a cold-war university perfectly designed to receive military funding that made it become ‘the Harvard of the West’ and an important spark to the empirical phenomenon ‘Silicon Valley’ (c.f. O’Mara, 2019), as well as to the detached theorizing about innovation systems.

Moore’s (1993) original application of the metaphor as ‘business ecosystems’ had the very *logic of change* at its heart, with reference to the anthropologist Gregory Bateson’s notion of *co-evolution* as its core, asking us to consider ‘predators and prey’ as much as ‘flowering plants and their pollinators’ (p. 75), as well as ‘the birth of new ecosystems or the competition among those that already exist’ (p. 76). In a similar vein, he remarked that just like a biological ecosystem, it “gradually moves from a random collection of elements to a more structured community” (ibid.). With the rise of the personal computer as its first appealing example, the ‘business ecosystem’ was described in terms of a progression in four phases; birth, expansion, leadership and self-renewal – with the chance of flourishing and risk of failure and decline in each one of them. Moore (1993) anticipated that the ecological perspective on management should become more common and that the pace of change would increase, ending on a more pessimistic note, rather emphasizing the opposite to the euphoria often associated with notions of ‘innovation ecosystems’:

“For the individuals caught up in these ecosystem struggles, the stakes are high. As a society, we must find ways of helping members of dying ecosystems get into more vital ones while avoiding the

temptation of propping up the failed ecosystems themselves. From an ecological perspective, it matters not which particular ecosystem stays alive; rather, it's only essential that competition among them is fierce and fair – and that the fittest survive.” (Moore 1993, p. 86)

### **3.2 Nuancing ecosystems for innovation**

Moore's (1993) concluding concerns raise questions about the role of universities as well as students as a specific category of actors with regard to notions of innovation ecosystems. When it comes to social sector organizations, Mair and Seelos (2012) claimed that social innovation requires a supportive ecosystem that includes with key factors being *Knowledge infrastructure*, *Talent development*, and *Networks and collaboration* being important, but also stressed the *Funding mechanisms*, contending that conventional finance models, such as government grants or contributions from charitable groups, are frequently insufficient for social innovation efforts since they are constrained in their scope and length and may not be long-term viable. Instead, Mair and Seelos (2012) argued that a more varied and adaptable funding ecosystem is needed for social innovation. They also stressed how crucial it is to match funding strategies with the unique requirements and objectives of social innovators, which might change depending on the type and stage of the initiative. Early-stage social innovations, for instance, can need seed money and assistance for experimentation and learning, whereas later-stage projects might require more money and resources for scaling and replication.

Charity, philanthropic motivations and alike are evidently related to values and normative aspects of the context. The context may further be specified, which may in turn be related to different types and levels of theorizing. Simpact (2016) distinguished between four contextual (“onion-”) layers of social innovation ecosystems, highlighting the context-specific drivers and impediments, with the argument that every initiative operates within a set of partially visible, partially invisible variables that make up the multi-layered social innovation ecosystem.





(Figure on the (“onion”) layers of social innovation ecosystems, Simpects (2016)).

*Macro Context:* Macro context is the first context and serves as the outermost layer of the Onion Model that includes the broader social, economic, and political systems that influence the development and diffusion of social innovations. This layer includes factors such as government policies, cultural *norms* and values, and economic conditions. Depending on the specific situation and conditions, the macro context can help or hinder social innovation. In contrast, economic instability or political upheaval can make it more challenging for social innovation to thrive. As an example, government policies that foster social entrepreneurship and innovation can promote the creation of social innovation ecosystems.

*Meso Context:* Meso context serves as the second layer of the Onion Model and includes the more specific social innovation ecosystems, such as networks, organizations, and communities, that support and facilitate the development and diffusion of social innovation. This layer comprises the linkages and exchanges between various actors, including colleges, foundations, incubators, and social enterprises. The infrastructure and resources required for social innovation to take off are provided by the Meso Context. For instance, while foundations and incubators can provide funding and assistance for social innovation projects, universities can offer research and development resources for social innovators.

*Micro Context:* The micro context according to Simpect (2016) is the third layer of the Onion Model that includes the individuals and organizations that are directly involved in the creation and implementation of social innovations. Actors in this layer include volunteers, social entrepreneurs, and innovators. Ideas for social innovation are developed and tested in the micro context, which is also where the actual job of making a social effect is done. Volunteers may offer their time and expertise to

social innovation projects, while social entrepreneurs may create new technologies or business models that address social issues.

*Impact Context:* In its final stage, the Onion Model's innermost layer contains the results and effects of social innovation, such as modifications to social, economic, or environmental situations. The Impact Context is where social innovation's final success or failure is measured and assessed. For social innovation stakeholders, this layer offers feedback and educational opportunities that can be used to guide future projects and efforts. For instance, if a social innovation initiative has the desired impact, this may encourage others to adopt the model or modify it for use in other situations.

### **3.3 Nuancing institutional conditions**

Institutional conditions have a place in many frameworks and theories about innovation ecosystems. However, in line with the tradition of economics – from where the innovation systems discourse originated – the most common focus is on the regulative side of institutional conditions, and in some cases also the normative context as an institutional aspect. More rarely, the cognitive aspect of the institutional environment is problematized, i.e. conscious or more frequently unconscious ideas linking specific actors' roles to specific kinds of behavior, shaping expectations or even perception as such through taken-for-granted assumptions. Meissner and Howaldt (2018) nuanced the notion of institutions, proposing a framework for understanding social innovation ecosystems based on four main components: Actors, relationships, resources, and institutions described here below.

#### **3.3.1 Actors**

Actors in social innovation include a wide spectrum of people and groups, including social entrepreneurs, middlemen, universities, and funders. They contend that actors are an essential part of the ecosystem and that in order to enable social innovation, a varied range of actors with various resources, talents, and views is required (Meissner and Howaldt , 2018). The selection of actors that are frequently present in social innovation ecosystems is provided by the authors: Social entrepreneurs, Intermediaries, Universities and research institutions, Government agencies, and Civil society organizations (Meissner and Howaldt , 2018). Meissner and Howaldt (2018) contend that the success of social innovation ecosystems depends on the connections and networks that develop between these actors. Additionally, they contend that by combining various viewpoints and methods for resolving societal issues, the diversity of ecosystem actors might promote creativity.

Social entrepreneurs are those who create and put into practice cutting-edge solutions to social problems, frequently while working in a nonprofit or social enterprise environment. The intermediary organizations are those that support social entrepreneurs as well as other ecosystem participants like

impact investors, accelerators, and incubators. The provision of knowledge, research, and skills to enable social innovation is a responsibility of universities and research institutes. Government organizations can contribute to social innovation by giving financing, formulating laws and regulations that encourage it, and working with other ecosystem participants. These groups can serve as a forum for generating support for social innovation and reflect the interests of various populations for civil society organizations. (Meissner and Howaldt , 2018)

### **3.3.2 Relationships**

These are the relationships and exchanges that take place between the different actors, including networking, collaboration, and knowledge sharing. Meissner and Howaldt (2018) place a strong emphasis on the value of interactions and relationships among participants in social innovation ecosystems. They contend that these connections are crucial in fostering an atmosphere that is favorable to social innovation. According to the authors, the following linkages are crucial to social innovation ecosystems. By combining the resources and experience of various players, collaboration can help find more creative and effective solutions to societal problems (Meissner and Howaldt , 2018). Networks of connections between individuals can aid in the sharing of information, knowledge, and resources as well as open up doors for cooperation and partnership (Meissner and Howaldt , 2018). Co-creation entails collaborating with users and stakeholders to create solutions that suit their needs and tackle societal issues (ibid). Interactions between ecosystem actors can promote learning and knowledge exchange, allowing actors to develop their skills and expertise and adapt to new opportunities and challenges (ibid). Meissner and Howaldt contend that these many kinds of interactions are interrelated and can feed off of one another, fostering an ecosystem-wide cycle of innovation and cooperation (ibid). Additionally, they contend that by bringing together actors and offering forums for communication and information exchange, intermediaries can significantly contribute to the facilitation of these connections (Meissner and Howaldt , 2018).

### **3.3.3 Resources**

This component encompasses the various types of resources required for social innovation, including financial resources, human resources, and social capital. In their thesis the thesis s contend that in order for social entrepreneurs and other actors in the ecosystem to create and put into practice novel solutions to social problems, they must have access to resources.

The following resources, among others, are significant in social innovation ecosystems, according to the authors: *financial resources, human resources, social capital, knowledge and information.* *Financial resources:* They can be used to support the creation and expansion of innovative solutions. These include money from governments, philanthropic organizations, impact investors, and other

sources. *Human resources*: These comprise qualified, driven people who can contribute their skills, knowledge, and originality to social innovation initiatives. The ties, trust, and standards that exist between the various actors in the ecosystem are referred to as *social capital*. *High social capital* can serve to encourage networking and collaboration as well as open up new learning and sharing opportunities. *Knowledge and information*: Having access to knowledge and information, such as data and research, can assist actors in recognizing social issues, coming up with creative solutions, and assessing the results of their interventions. (Meissner and Howaldt , 2018)

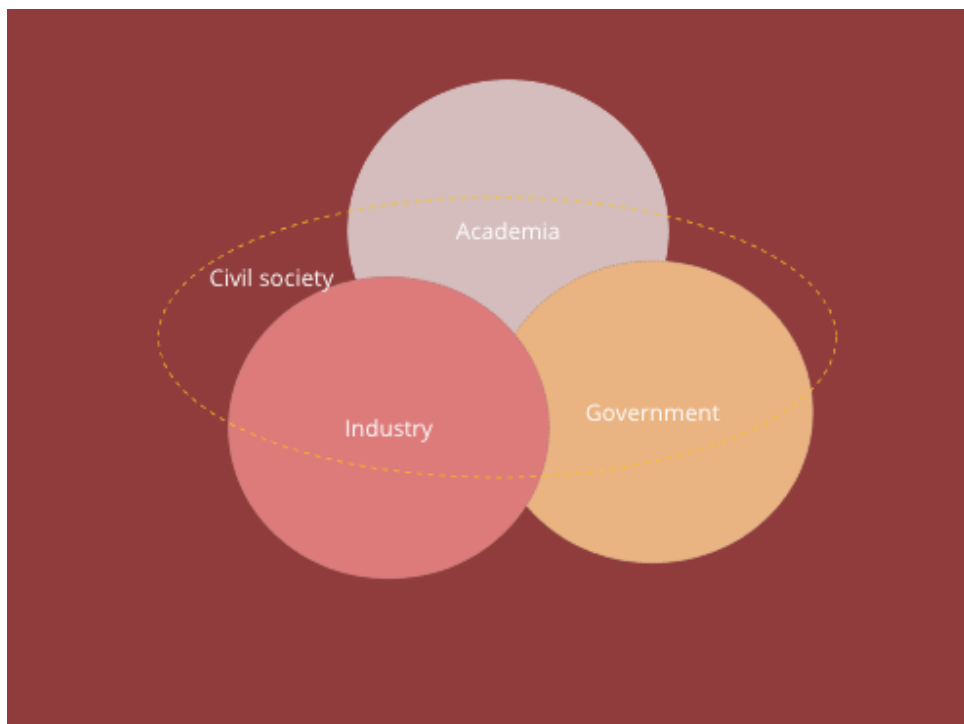
The availability and distribution of these resources within the ecosystem, according to Meissner and Howaldt (2018), can have a substantial impact on the success of social innovation initiatives. They contend that intermediaries and other players can assist close resource gaps and guarantee that funds are distributed in a way that fosters innovation and impact.

### **3.3.4 Institutions**

According to Meissner and Howaldt (2018) *institutions* contain formal and informal rules, norms, and values that shape the behavior of actors in the ecosystem, including legal frameworks, cultural values, and social. The capacity of social entrepreneurs and other players to create and put into practice novel solutions to social problems can be significantly impacted by these institutions as regulatory institutions, normative institutions, and cognitive institutions (Meissner and Howaldt , 2018). Meissner and Howaldt (2018) insist that these institutions have the power to both support and stifle social innovation. The ability of social entrepreneurs to operate and innovate, for instance, might be constrained by restrictive rules, but supporting regulatory institutions can foster an enabling climate for it (ibid). While cognitive institutions can affect how social problems are articulated and understood, normative institutions can also have an impact on how social innovation is demanded (ibid) Meissner and Howaldt (2018) states that intermediaries and other ecosystem actors can help mold and reshape institutions to foster a climate that is more favorable to social innovation. This may entail advocating for new norms and values, challenging established mental models, and fighting to reform laws and regulations about social issues. Institutions in the ecosystem as *regulatory institutions* in the ecosystem, such as social enterprises and other organizations, include laws, rules, and policies (ibid). Actors in *normative institutions* include cultural norms and values that influence how consumers, investors, and legislators view social innovation as well as the attitudes and actions of other actors in the ecosystem (ibid). Lastly, Cognitive institutions include the common assumptions and conceptual frameworks that direct the behavior of ecosystem participants, such as how social issues are seen and how they are addressed (ibid).

## **3.4 Quadruple Helix and civil society**

One of the more established metaphors for understanding innovation systems is the triple- and later Quadruple Helix, which added civil society to the former model. The Quadruple Helix Model is a representative metaphor that emphasizes the role of four key stakeholders in the innovation process: academia, industry, government, and society (Carayannis & Campbell, 2009; Etzkowitz & Leydesdorff, 2000). The metaphor recommends that various stakeholders collaborate in order to advance innovation, produce new knowledge, and achieve sustainable development. According to Carayannis and Campbell (2009) these four sectors can form a Quadruple Helix that drives innovation and sustainable development in which they collaboratively work, share knowledge, resources and are engaged to have an ongoing interaction and dialogue. Stewart et al.,(2014) further contribute to the discussion in various forms of public engagement and the potential roles that individuals and organizations can play in co-shaping the innovation process . In line with the authors, this process of innovation must balance economic, social, and environmental factors, and the framework highlights the value of collaboration and communication between the many sectors (Stewart et al.,2014; Carayannis & Campbell, 2009; Etzkowitz & Leydesdorff, 2000). See visualization on the quadruple helix model below.



*(Own visualization made of the quadruple helix, originally retrieved from Etzkowitz & Leydesdorff, 2000, Alenbring 2023)*

### **3.4.1 Academia**

Universities, research institutions, and other knowledge-based enterprises that produce new knowledge and ideas are included in the academic sector (Leydesdorff & Etzkowitz, 1998). By conducting research, creating new technologies, and educating and training aspiring innovators, this

industry plays a crucial part in the innovation process according to the model (ibid). The academic community can help participants in the other three sectors cooperate and share knowledge.

### **3.4.2 Industrial sector**

Businesses, corporations, and other entities that develop and market new goods, services, and technology are categorized as belonging to the industrial sector (Etzkowitz & Leydesdorff, 2000). This sector is in charge of generating and executing innovations that fulfill societal demands, as well as providing important resources and expertise to the other three sectors (ibid). Collaborations with academia, government, and civil society can help the industrial sector develop new ideas that are both socially and economically viable (ibid).

### **3.4.3 Government**

Local, regional, and national governments, as well as regulatory agencies and other public institutions, are all part of the government sector (Etzkowitz & Leydesdorff, 2000; Bessant & Tsekouras, 2001). This sector Bessant and Tsekouras, (2001) claim is crucial in developing policies, regulations, and incentives that support innovation and long-term development . Collaborations between academics, industry, and civil society can also be supported by the government sector through financing, infrastructure, and other resources.

### **3.4.4 Civil society**

The civil society includes individuals, community groups, and other organizations that represent the interests of citizens and promote social change (Etzkowitz & Leydesdorff, 2000). This sector plays a crucial role in the innovation process by providing input on societal needs, advocating for social and environmental justice, and holding other sectors accountable for their actions. The civil society sector can also work collaboratively with the other three sectors to create innovations that address societal challenges and promote sustainable development (ibid).

## **3.5 Social Innovation as a process**

Despite the fact that Moore's (1993) original application of the ecosystem-metaphor had the *logic of change* at its heart, most conceptualizations of innovation ecosystems rather contain an inventory of actors, relations and resources or quality that need to be in place for the 'miracle' of innovation to happen, rather than talking about *how* it happens in any greater specificity: what actors, what processes, what triggers and what timing. However, the process of creating and implementing social innovations requires a number of crucial components and levels, including the identification of societal challenges, the mobilization of resources and actors, idea generation, implementation, testing and scaling, and value creation (Mulgan & Pulford, 2010; Lindberg, 2021; Westley et al., 2017).

These typically repeat and weave together rather than always occur in chronological order. The steps involved in the social innovation process include identifying and analyzing societal challenges, enlisting the support of actors and resources, developing and testing new solutions, putting those solutions into practice and scaling them up, and demonstrating the value of the new solutions to individuals, organizations, and societal structures (Mulgan & Pulford, 2010; Lindberg, 2021; Westley et al., 2017). A micro level is where individual initiatives for social change are dealt with, a meso level is where these initiatives are organized, and a macro level is where the societal structures that both influence and are influenced by the initiatives are dealt with. The many roles and participants in the ecosystem must support and facilitate all phases and stages of the process for social innovation to be able to contribute to long-lasting social change (Mulgan & Pulford, 2010; Lindberg, 2021).



*(The illustration is inspired by Mulgan & Pulford; Lindberg, 2021; Westley et al, 2017, 2010, from social innovation (2022))*

Some central intervention areas in a social innovation process include

- Make needs and societal challenges visible from a diversity of perspectives
- Create the conditions for cross-sector cooperation

- Enable active participation for the target groups and other stakeholders who directly affected by the societal challenge
- Ensure influence and benefit at the individual, organizational and societal level
- Enable lasting solutions and long-term impact measurement

Something that is increasingly being noticed, in both politics and research, is the potential of social innovations to contribute to transformative and systemic change in society (Bonnedahl et al, 2022; Westley et al, 2017).

To achieve that potential, we may need to look away from our existing ecosystem for social innovation in Sweden. So far there is a need for a special ecosystem for social innovation and social entrepreneurship, as this report shows. In the long term, however, more and more actors need to adopt socially innovative ways of working in order to deal with complex societal challenges, renew the Swedish welfare system and achieve the global sustainability goals in Agenda 2030, in a system-changing and transformative way. How would e.g. our conditions for meeting societal challenges be affected if socially innovative working methods are not only applied in individual initiatives and support actors, but also in society's ordinary system? What values would be created if all sectors of society overall gets better at capturing and understanding societal challenges from a collaborative perspective, diversity of perspectives and to create innovative solutions that benefit those concerned individuals, organizations and social structures?

### **3.6 Summing up the theorizing about innovation ecosystems**

The reason for this quest was the difficulty to find relevant literature to interpret and analyze empirical findings concerning the role of students in the innovation ecosystem; a question that led to reflections over theorizing and different uses of this emergent and ambiguous metaphor for innovation – seen from a system's perspective. It's an intriguing and perplexing journey through different perspectives – albeit all from different strands within innovation systems research. With few exceptions, the role of students has been omitted, arguably for a number of reasons speculated about here above. The process perspective of Moore (1993) is echoed by Mulgan & Pulford (2010) and followers, but is rather de-emphasized in the most other frameworks, as if the question of *how* innovation through co-creation occurs, or even get started, was not of interest. This – as the general omittance of students and their role – may have to do with the level of analysis of theories – or rather metaphors that have become interpreted and established as explanatory theories – and the fact that system theories are interested in the relationship between actors, rather than in detailed specifications of specific actors, in sharp contrast to empirical findings, especially in qualitative research.



Nevertheless, some nuancing of these metaphors-as-grand-theorizing may be found in the critical role of funding for social innovation (Mair & Seelos, 2012), raising questions about values and normative aspects through the logic of charity and philanthropic motivations. This context may be further specified in line with Simpat's (2016) 'onion-model' of contextual layers of social innovation ecosystems, with context-specific drivers and impediments, suggesting that every initiative takes place within a set of partially visible, partially invisible variables that make up the multi-layered social innovation ecosystem. Meissner and Howaldt (2018) further nuanced the notion of institutions, distinguishing between regulatory-, normative- and cognitive institutions, the latter highlighting social aspects of roles and expectations on behavior as taken-for-granted assumptions. Finally, the notion of a Quadruple Helix (Etzkowitz & Leydesdorff, 2000) added the aspect of civil society on par with the traditional classification of industry, government and academia. Taken together, there seems to be enough components around to discuss the role of students in innovation ecosystems. One example that stands out in its clarity is Nielsen & Cappelen's (2014) "Exploring the mechanisms of knowledge transfer in university-industry collaborations: A study of companies, students and researchers", with the main author representing the business school at Aalborg University – a university that holds the #1 position in 'impact' in Times' university ranking. The authors found that less mutual knowledge transfer was perceived in student-industry collaboration than between researchers and businesses, and they concluded:

"Hence we argue that creating a better understanding of the role and competences of the involved parties can diminish the problem. Absence of feedback from the business side after a concluded project period, is a further challenge in student-industry collaboration projects. To secure long-term benefits and knowledge creation for all parties it might be necessary to rethink collaboration procedures." (Nielsen & Cappelen, 2014, p. 389)

### **3.7 Exploring the role of students**

Aalborg University is known for its general profile Problem Based Learning (PBL) and is the very university that persistently holds the #1 position in 'impact' in the Times' university ranking. It is intriguing that while Aalborg University Business School seems to be the only place to share the *specific* interest in *the role of students in the innovation ecosystem*, correspondence with other experts on PBL (one PhD in PBL didactics in engineering and one professor at the Aalborg Centre for Problem Based Learning in Engineering Science and Sustainability) showed that the specific formulation was not immediately recognized generally at the university. Hence, it seems that the interest in the specific connection between "the role of students" and "the innovation ecosystem" is confined to specific academic communities, i.e. what Adam's (1976) called "academic tribes".

A neighboring and partly overlapping sub-discipline to innovation management in business studies is service management, albeit with a closer connection to marketing research. In a recent book (anthology), Gummesson et al (2022) suggested new conceptualizations of “Improving the evaluation of scholarly work” by the application of service theory. In this context, Paredes (2022) examined ways to “reframing students’ role in higher education through value co-creation and service-dominant logic”. However, while this was done in terms of (service) ecosystems, the interpretation was done from the perspective of marketing, hence arguing against the ‘dyadic’ relationship between students (as customers) and the university, instead suggesting that students should be engaged in co-creation of value with other actors in the (service) ecosystem. The conclusion did not nuance the character of this interaction, but rather conventionally suggested what students need to learn in order to “integrate their resources with those of the firm” (p. 41), i.e. promoting the basic idea of complementarity in ecosystems without further problematizing students as a category or their specific role. In similar vein, Quero & Ventrua (2022) commented that “Universities are a social catalyst that have a big responsibility as connector of heterogeneous actors and producer of value for individuals and society.” (p. 11), but on the other hand, their literature review of higher education institutions’ (HEI) context as an ecosystem concluded that “The conceptualization of the HEI-University as ‘engaged’ does not have much of a tradition in the literature, but its connections with the ‘entrepreneurial university’ generate synergies that have not yet been identified fully” (p. 19).

In the tradition of the Entrepreneurial university, Kliewe et al. (2019) commented that “research on the link between students and the entrepreneurial university is still in its infancy” (p. 30) with reference to Clauss et al (2018) who concluded: “In sum, the research contributions emphasize the students’ role as relevant entrepreneurial university stakeholders. Yet, in comparison with other stakeholders, these research streams remain currently underrepresented” (p. 21). In their literature review leading to suggestions for a research agenda for Entrepreneurial Education, Schuhmacher & Thieu (2022) pointed at the need for educators to improve students’ entrepreneurial attitudes, educational institutes to promote an entrepreneurial culture, employability as motivation for students, from an industrial perspective to stimulate people to become intrapreneurs in established firms, from a government perspective to generate start-ups or nascent entrepreneurs as a result of entrepreneurial education. The authors summed up that future research on entrepreneurial education should take a broader network perspective, and commented that there is little research on how that networking leads to efficient education: “Specifically, there is little research on how the interaction between different stakeholders and their characteristics leads to effective EE. In total, only four studies investigate some relationship. There is no study accounting for the educator-institute or for the student-educator-institute relation” (p. 295). And further: “It would be worthwhile to conduct research with the aim to develop an effective communication model between and among students, educators

and educational institutes hosting EE also with other stakeholders (e.g., government officials, entrepreneurs, firms, professional associations, university alumni) (p. 298).

As shown above, very few studies and literature reviews have further specified the very *character of the* shortcomings of the present state of how universities contribute to the greater system of stakeholders and actors in general, i.e. what we above have called innovation ecosystem(s). However, posing the question how students comprehend the collaboration and their role in the collaboration with external organizations, Gottlieb & Eriksson (2019) noted that students did not perceive their role as dealing with ambiguities in the organizations. This begs the question of whether the map or the terrain is the problem; whether students need to learn entrepreneurial behavior and to deal with ambiguities and complexities in real-life situations, or if the actors, stakeholders, institutions and interactions surrounding them need to change, or if the established metaphors-as-grand-theories are too distant and should be adapted to a more practically useful perspective of explaining *how* the strived for dynamics in interactions should *emerge*. Or whether students primarily should be seen as a part of the university education at all. What expectations should the university and other actors in the ecosystem have on students and their role? Or, is it even an ecosystem at all? Is the notion of ecosystem as well as the notion of students as a part of “the-university-as-an-actor” really empirically relevant and valid?

The very title of Gärdebo & Wiggberg’s (2012) report (in anthology) on pedagogical development “Students, the university’s unspent resource – Revolutionizing higher education through active student participation” raises questions about “students-as-a-resource”, “students-as-a-property-of-universities”, and what kind of properties students have; as actors, characteristics, locus etc. While not talking about ‘innovation ecosystems’ at all and only mentioning ‘regional ecosystems’ and ‘entrepreneurship’ once respectively, and ‘innovation’ three times in almost 200 pages, How can students be all or some of these things while *not* participating – at least not actively enough? What is it being a student? What are the fundamental properties of being a student and what is that connection to the university? The Vice Chancellor and Pro Vice Chancellor stated already in the preface:

“As an internationally oriented research establishment, Uppsala University aims to undertake research and education for the highest quality and to offer study environments where students can develop into knowledgeable, critically thinking, creative and responsible *individuals*. (italics added) Active student participation in the broadest sense is a cornerstone of the university’s strategy for quality enhancement.” Eva Åkesson & Anders Malmberg, preface, in Gärdebo & Wiggberg (2012)

Powell & DiMaggio (1983) contrasted the idea of Weber's notion of bureaucracy as an 'iron-cage' of rationality with what the (neo-)institutionalist observation of the role of taken-for-granted assumptions, not least manifest in institutionalized perceptions and expectations of actors, including their roles and (legitimate) action. According to Uppsala University, the aim is to generate individuals of certain qualities (knowledgeable, critically thinking, creative and responsible), but still – '*individuals*'. Based on local observations, Powell (1990) theorized about networks as 'neither markets nor hierarchies' and in an interview with Anheier (Anheier & Powell, 2021), he reflected upon the fact that tech companies refer to their offices as campuses – they like to look like campuses, to act like campuses and continued:

“... And it was through seeing this role of amphibians who move back and forth between realms, carrying practices into unfamiliar settings and then repurposing them back into their original setting and transforming it, that John and I started thinking about: “where does the emergence of fundamentally new categories of thought and new categories of organizing come from? (Powell, in Anheier & Powell, 2021)

” ... We do a very poor job in the social sciences of studying emergence. Most social science begins with the second act of a play, after the dust has settled ...” (Powell, in Anheier & Powell, 2021)

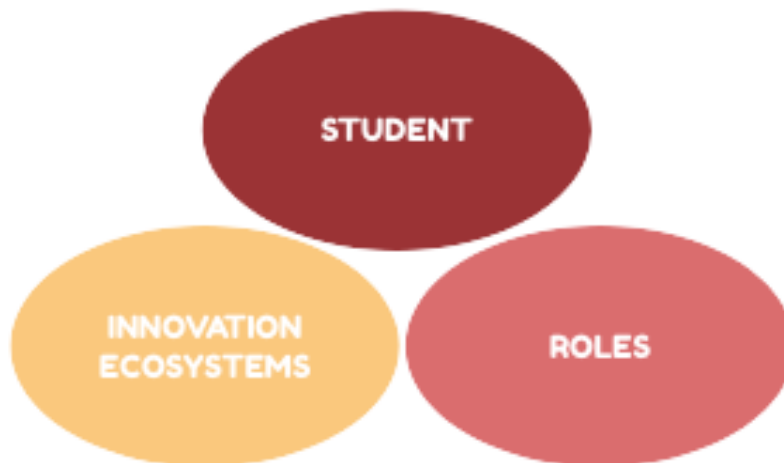
While university campuses are evidently simple to categorize in terms of resources of the ecosystem – as a part of the physical infrastructure, or in terms of ownership, as 'the university', there is an important distinction between students – from an educational or administrative perspective – and students from the perspective of becoming individuals of certain qualities.

While university campuses are evidently simple to categorize in terms of resources of the ecosystem – as a part of the physical infrastructure, or in terms of ownership, as 'the university', there is an important distinction between students – from an educational or administrative perspective – and students from the perspective of becoming individuals of certain qualities. Lundquist borrowed the notion of ethos from classical rhetoric to contrast “a public (servant) ethos” from the ethos derived from new public management's perspective on the public sector primarily as a service provider. While students are evidently not public servants – in what sense are they representatives of the university and in what sense are they not? Are students rather representatives of the *civil society*, or of what Powell referred to 'amphibians', or representative of nothing but themselves as *individuals-in-the-making*, as a representative of *becoming* itself and *emergence* in itself – through their interaction *on* a campus which they don't own, but inhabit?

In practice, *the role of students* will be negotiated within the emerging ecosystem and will be a different thing before the ecosystem is established through interaction compared to what it will be in

retrospect. Whatever role the respective actors play, it will be judged by the audience with confirmation or denial, through interaction (c.f. Goffman, 1959).

### 3.8 Summary of Theoretical framework



*(Own Visualisation on terms from the theoretical framework)*

In exploring the existing concepts or representative metaphors researchers have come across, it becomes evident that various concepts encompass different aspects related to students, innovation, ecosystems, and roles. However, there lacks a cohesive and comprehensive theory that sheds light on these elements collectively and the dynamic relationships between them. When specifically examining the role of students, previous research primarily emphasizes the importance of *fostering entrepreneurship education* (Gummeson et al, 2022) within innovation systems. The focus revolves around how collaboration can be utilized to enhance quality assurance or training within these systems. Interestingly, previous literature has acknowledged universities as prominent stakeholders within innovation ecosystems and helix models (Etzkowitz & Leydesdorff, 2000; Mair & Seelos, 2012; Simpat, 2016; Bonnedahl et al., 2022; Westley et al., 2017; Moore, 1993; Mulgan & Pulford, 2010; Granstrand och Holgersson, 2020). However, it is notable that the attention given to students and their individual roles within these frameworks remains considerably limited. And by contracting whether students belong to university, or the perspective upon how social behaviors set roles for collaborations and categorizations, norms and behaviors of historical conceptualizations affect the role of students, as it will be judged by the audience with confirmation or denial, through interaction (c.f. Goffman, 1959). (Powell & DiMaggio, 1983). While some literature views students as a valuable resource (Gärdebo & Wiggberg, 2012) or the need for more contributions (Gummeson et al, 2022;

Kliewe et al. 2019) researchers have not yet provided a comprehensive understanding of the dynamic relationship between these concepts. With the previously mentioned terms in the figure above as a starting point, these lay a foundation to venture into the unexplored jungle of the dynamics and potential role that students could have in the ecosystem. By combining these concepts and theories, the empirically driven study aims to navigate through this unknown territory.

## **4. Method**

- *“A social science researcher knows that facts are fabricated and wishes to know how they were fabricated.”* Czarniawska (2004,p.132)

This section provides a detailed description of the methods used to collect and analyze data. In this section, research design, data collection methods, sampling techniques, data analysis procedures are presented. As a base for this rich tapestry of thesis, this chapter serves as a foundation of all the gathered material to ensure research inquiry, transparency and the contribution of advancement of knowledge in the field. The structure follows a positivistic structure, entailed by details, but not the positivist worldview upon how the world picture and facts is true.

### **4.1 Researchers positionality**

Czarniawska's quote underscores the critical lens through which a social science researcher views facts and data. Rather than accepting them at face value, the researcher is interested in unraveling the processes and mechanisms behind their fabrication. As a researcher, I interpret Czarniawska's quote as a call for analytical rigor and skepticism. It reminds me that facts, which are often considered objective and indisputable, are actually products of fabrication. This realization prompts me to question how these facts were constructed and what factors influenced their creation through further exploration in a new positioning as the gap of representations of metaphors for ecosystems for innovation reveals. As the stand of a researcher, my approach is driven by empirical evidence. I am dedicated to conducting an empirical-driven study, where the focus lies on gathering and analyzing real-world data to gain insights and understand experiences, social behaviors that form the informants interpretations in the field.

By adopting an analytical perspective, I strive to unravel the intricacies behind the fabrication of facts and seek to uncover the underlying mechanisms and processes that contribute to the formation of facts of the metaphor contributions of ecosystems for social innovation. I am aware that multiple social,

cultural, and political forces shape the data I encounter. This awareness drives me to critically examine the context in which facts are produced and the potential biases inherent in their fabrication.

I am interested in understanding the power dynamics, social norms, and institutional influences that shape the construction of these facts. By doing so, I aim to reveal the complexities, contradictions, and limitations within the data for future conceptualizations of the metaphors within this phenomenon. Taking an analytical stance also involves introspection and reflexivity. I acknowledge that my own perspectives, biases, and theoretical frameworks influence the way I interpret and analyze the facts. I strive to be mindful of these factors and continually question my own assumptions and preconceived notions.

Additionally, I embrace the opportunity to explore alternative narratives and multiple perspectives that challenge the dominant interpretations. By critically engaging with the fabrication of facts, I aim to contribute to the advancement of knowledge and foster a more nuanced understanding of the social phenomena I study. The positioning of this study adopts an interpretive approach, which deviates from positivism's pursuit of strict accuracy, objectivity, and theory-driven analysis. Instead, the researcher embraces the philosophical perspective of pragmatism, which emphasizes the practical implications and utility of ideas, theories, and beliefs. Pragmatists recognize that knowledge holds value when it can be practically applied to solve real-world problems. They prioritize considering the context, individual experiences, and the social consequences of actions. By adopting a pragmatic stance, this study aims to provide insights that are not solely focused on abstract theories but also contribute to practical solutions and address real-world challenges. Overall, as a researcher, I approach the fabrication of facts with a critical and analytical lens. I recognize that facts are not fixed entities but rather social constructions that require careful examination. By embracing this perspective, I aim to enhance the rigor and depth of my research findings and contribute to the broader field of the area.

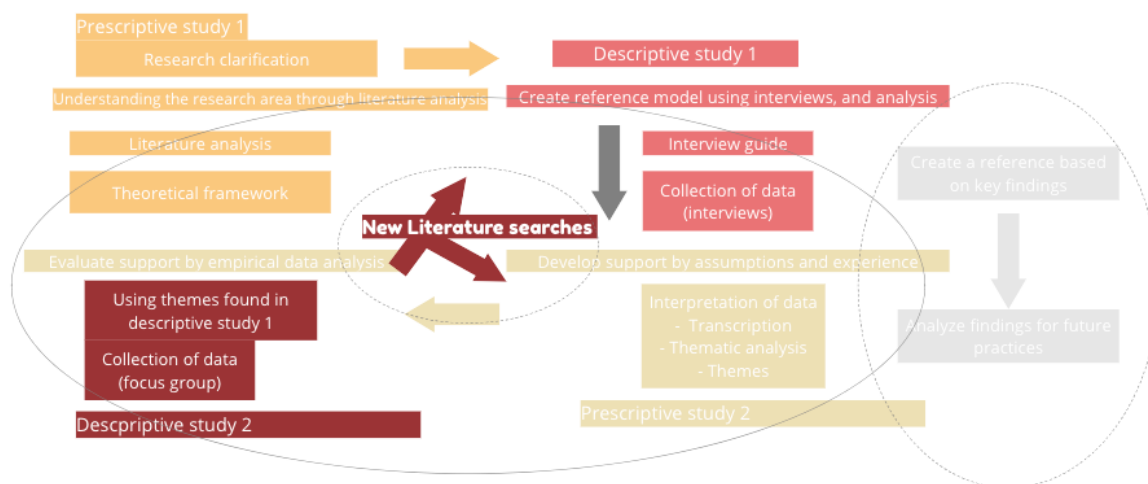
## **4.2 Prescriptive part 1**

In this section 4.2, the thesis *Prescriptive part 1* is presented below.

### **4.2.1 Research design**

This thesis is inspired by the design research methodology in line with Blessing and Chakrabarti (2009) framework of design research in order to develop and validate knowledge systematically and simultaneously furthermore encourages exploration of a wide range of design concepts. This

methodology supports exploration, and the importance of evaluation and refinement, in which it can improve the quality of the design solutions that in turn could lead to more innovative solutions (Blessing & Chakrabarti, 2009). The framework however serves as inspiration and has been refined in a sense to customize this thesis 's interpretive approach. Motivational manners with using this research design methodology in addition is the philosophical perspective the researcher has using a pragmatism view. Iterative procedures, prototyping, user-centered approaches, and a focus on application and outcomes are common in design research. Pragmatism, which emphasizes the relevance of context, experience, and the social implications of acts, is compatible with these concepts. It motivates researchers to think about the practical ramifications of their study and develop solutions that have real-world applications. As pragmatism interprets truth and knowledge as dynamic and evolving, rather than absolute and fixed, this encourages a problem-solving and action-oriented approach to knowledge and inquiry. It emphasizes the importance of experimentation, testing, and learning through practical engagement with the world. Moreover the paper in which it requires a research methodology that supports the studies' exploration of looking for ways to explore ways for a student driven ecosystem for innovation was of importance to a large extent. Blessing and Chakrabarti (2009) propose a framework for design research that consists of four key stages, however only taking inspiration from the model step 2,3 and 4 in this paper, is more fluid with flexibility to go back and forth multiple times if necessary. See visualization below.



(Visualization on the research design, researchers interpretation with inspiration from: Blessing and Chakrabarti (2009)).

The iterative and learning parts of the design process are heavily emphasized in Blessing and Chakrabarti (2009) approach, they point out. In order to make sure that the final design is both



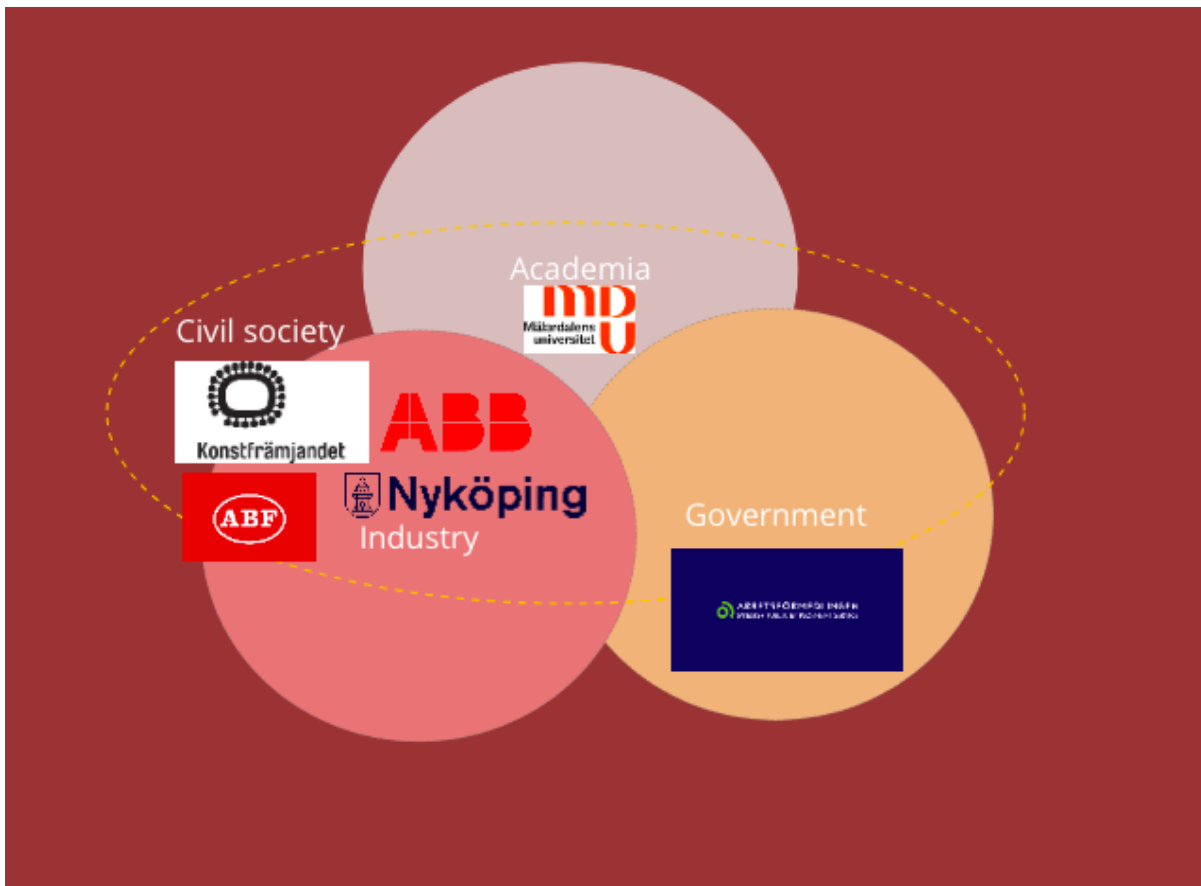
efficient and acceptable, it also urges designers to adopt a holistic approach and include numerous stakeholders throughout the design process. One crucial point is that, despite being largely geared toward design study, this framework shares several characteristics with other research frameworks, such as the scientific method. It includes, for instance, crucial research components like problem identification, hypothesis formulation, testing, and iterative improvement. All of the parts of the research design methodology are described further in the methodology section.

#### **4.2.2 Literature search**

The part of literature research has involved multiple layers of research investigations due to the empirical driven thesis, as it in the end covered all of the descriptive parts of this thesis methodology design. Secondary data, or information that is already available, includes information from prior studies, publications, surveys, and more (Bryman & Bell 2017). Books and scholarly papers that are pertinent to the study's topic made up the majority of the literature collected for this investigation. Since Google Scholar offers a broad and convenient selection of literature, it has been the primary method of collecting literature. As this research started with an exploration of *“Ecosystem for innovation” “Ecosystem for social innovation” Ecosystem for social innovation in quadruple helix”*, the studies empirical findings did not support existing conceptualizations nor representative metaphor in the innovation literature, resulting in a need to expand the view of existing research in a broader context looking into different research fronts. The literature search went from involving areas in innovation literature to pedagogics, institutional theory, marketing, service management (dyadic relationships) to social theory with an aim to understand students' role more in the phenomenon investigated. Whilst papers considered parts of the phenomenon that was investigated, none of these had particular parallel linkages, which instead resulting in theories looking upon theoritization in a means to delve deeper into understanding of the building blocks on previous contributions in the fields, which led me further to understanding that the gap was now a larger than a world ocean of different continents. Instead of standing at the harbor and choosing a boat (a metaphor for choosing one concept), I found myself needing to explore different research fronts, but also sources that also highlight this lack of presentation regarding the role of students in an innovation system to support my interpretations. As I delved into the existing literature, it became apparent that there was a noticeable gap when it came to recognizing and understanding the contributions of students within innovation systems. To address this gap, I embarked on a journey through various research avenues. Just as a sailor sets out to explore uncharted waters, I navigated through different scholarly works, seeking insights and perspectives that could shed light on the absent representation of students in the context of innovation systems. Like an explorer uncovering hidden treasures, I searched for sources that would unveil the significance of students' involvement and their potential impact within the innovation landscape.

### 4.2.3 Stakeholder Mapping

In this study various actors are involved to perform an explorative study focusing on different parameters of collaboration in line with the quadruple helix model (academia, industry, government and civil society). Based on that the collaborative elements are mainly retrieved in the empirical gathering for this thesis. See visualization below.



*(Own visualization on the stakeholders in this thesis in the formation of quadruple helix model)*

The stakeholders involved are in line with the quadruple helix model including academia, industry, government and civil society. The stakeholders are primarily individuals within these actors, described in short for context of the companies below and their role within society.

As for industries it includes actors with a specific interest amongst collaboration with universities that aim to support with empirical gathering for the research, see visualization above. Academia refers to people that are operating in that environment including students and individuals with responsibility for various learning processes, teaching assistants. The term "civil society" refers to a group of non-governmental, non-profit organizations and institutions and individuals, to advance social justice, seek common interests, and encourage citizen participation. The civil society in this study referred to

individuals of informants in this study with motivation that they operate within the civil society outside their work titles. Since the researcher researched a particular difficulty that organizations are currently confronting, the thesis takes a collaborative approach. This is because the researcher relies heavily on the data and insights gathered from each stakeholder. The informants

#### **4.2.4 Creative Lab**

Further, a student driven Innovation Lab named Creative Lab was the main collaboration partner in terms of looking into how this organization could be functioning with the thought of finding new ways of working with businesses through collaboration and co-production creating added value for actors involved in the network and future actors. Creative Lab as mentioned in the introduction, were the collaborative partner that found the practical problem in this paper. Creative Lab was started by students from the Master Program Innovation and Design at MDU in the autumn of 2022 in a course at the program. The researcher of this paper joined Creative Lab on the 1st of January 2023, with the thought of generating a wider range of platforms for various projects and collaborations for the students as well as the university with other actors. The role of this thesis towards Creative Lab is functioning as a pre-study creating a deeper understanding of ways to facilitate this start-up of existing network for future practices looking into dimensions of eco systems for innovation, ecosystems for social innovation and social innovation ecosystems and the role for students within these. See attachments for full description of Creative Lab.

#### **4.2.5 Data collection**

The primary data was collected in a qualitative method to get a depth upon the phenomenon studies, as this study is empirically driven. Below is an overview of the primary data for prescriptive part 1.

#### **4.2.6 Primary data**

In the present study, a qualitative research method has been used in which the aim is to gain an increased understanding and deeper insight into the role of students in a potential ecosystem for innovation. An empirical methodology has been used to guide the study. According to Bryman and Bell (2017), qualitative research is typically more concerned with developing theories than testing them using quantitative techniques. So, rather than links that can be statistically verified, sentences and meanings are of relevance in qualitative approaches (Alvehus, 2013). As a result, qualitative information offers a more in-depth comprehension of a topic and information about it (Hair et al., 2019), whereas quantitative research is ideal for obtaining a basic overview of a phenomenon (Bryman & Bell, 2017). Studies that aim to provide more comprehensive answers to posed issues should use the quantitative method (Bryman & Bell, 2017). According to Eliasson (2006), the bulk of questions posed using the quantitative method concern different conditions, whereas questions posed

using the qualitative method are thoroughly investigated. According to Yin (2014), a qualitative study starts with "how" and "why" questions that must then be tested using the data gathered. This fulfills the study's research objective in agreement with the research questions. Alvehus (2013) asserts that qualitative research instead demonstrates the complexity, analysis, and account of reality rather than trying to simplify how it appears. The epistemological perspective of qualitative research is typically characterized as interpretation- or interpretative-oriented (Bryman & Bell, 2017). This indicates that understanding social reality and how people present in a situation or setting perceive it is the main goal. Also, Yin (2013) emphasizes that the primary goal of the qualitative technique is to convey the participants' viewpoints rather than the researcher's values, ideas, and prior notions about the subject. By gathering information from chosen informants, research interviews are used in qualitative studies to increase understanding of a topic or phenomenon (Kvale & Brinkmann, 2014). A variety of interview formats are available for use in qualitative research. Due to the study's time constraints and resource availability, the author perceived that semi-structured interviews were the most suitable method for this investigation (Bryman, 2016). Semi-structured interviews typically adhere to an operationalization or question schedule, giving the interviewers freedom, the chance to rearrange the questions, and the chance to ask unanticipated follow-up questions (Bryman, 2016). Kvale and Brinkmann (2014) emphasize the significance of the first impression in establishing a supportive and comfortable setting for the informant. This can be achieved by the interviewer clearly stating the goal of the study and the grounds the subject is thought to be compelling (Kvale & Brinkmann, 2014). The participants in the study's informants will first be contacted by phone or email to explain the study's aim before the interviews are conducted. In order to offer the informants a chance to comprehend the study more thoroughly before the interview, they reviewed the interview questions after agreeing to participate.

#### **4.2.7 Selection of informants**

The selection in the present study is purposive, which Bryman and Bell (2017) explain that most selections in qualitative research are. The idea of goal-directed selection is based on the fact that the selection of units has a direct connection to the research questions. For the context of this research, purposive sampling consists of non-probability sampling (Bryman & Bell, 2017). Those selected are relevant to the formulated questions and the questions can provide guidance regarding who should be selected (Bryman & Bell, 2017). According to Hair et al. (2019), the aim and scope of the study are crucial in defining the sample. The sample is the group of individuals who are relevant to the research project. They are relevant because they have information about the topic that the study aims to investigate (Hair et al., 2019). At first, an academy was chosen as an actor and then individuals who worked within this goal-directed as students. In order to get a spread within the sample, students who are currently studying the same education, master's innovation and design, where all students have

different educational backgrounds from before and share different work life experiences from before, see informant table in next chapter 4.2.8 *Informants*, 6 informants were chosen.

### 4.2.8 Informants

Following section presents an overview of the informants from the 6 interviews with students. Work experience is used in the table in which the intent is to broaden the field of backgrounds of individuals chosen.

NAME	DATE	Duration interview	CURRENT ROLE	Educational background
CHARLES.AUGUSTE	2023-04-24	48 minutes	Master of innovation and design student	Bachelor in mechanics engineering in France
TATENDA.J.CHIKWEYA	2023-04-25	59 minutes	Master of innovation and design student	Bachelor degree in business administration in Zimbabwe and postgraduate diploma in higher and tertiary education in Zimbabwe.
NEUD.TESSWOLDE	2023-04-27	66 minutes	Master of innovation and design student/System Administrator in Production Engineering at Hästens Beds	Bachelor in mechanical engineering, Örebro university
MALIN.KÄLLSTRÖM	2023-04-28	50 minutes	Master of innovation and design student/Sales Responsible, IKEA, Interior designer /Stylist and communicator at Dresses & Dreams	Bachelor in information design, spatial design MDU
VELINA.PARAPANOVA	2023-04-28	49 minutes	Master of innovation and design student/Senior Visual designer at Ericsson	Bachelor in Visual arts in Bulgaria
ISABELLE.MALMKVIST	2023-04-28	66 minutes	Master of innovation and design student/Business coordinator, Nyköping Municipality, teaching assistant Mjölardalen university	Bachelor in Innovation management

*(Own visualization of table on informants from the interviews with students)*

### 4.3 Descriptive part 1

In this section 4.3, the thesis descriptive part 1 is presented below.

### **4.3.1 Interview guide**

In order to gather valuable insights for this thesis, a structured interview guide was developed and utilized. Specifically, the interviews targeted students currently enrolled in the Master of Innovation and Design program at Mälardalen University. The design of the interview guide was based on the research questions and objectives of the thesis. According to Bryman (2008), it is crucial for an interview guide to be flexible, allowing for spontaneity and the inclusion of follow-up questions. This flexibility enhances the possibility of obtaining richer data. Therefore, the interview guide employed for this study consisted of a combination of more structured and less structured questions. Certain portions of the interview were guided by a predefined list of questions and topics that the researcher aimed to explore, as suggested by Merriam and Tisdell (2016). Semi-structured interviews were used to capture that the evolving nature of the research was captured and that the interviews delved deeper into emerging themes. By employing a well-designed interview guide, this study sought to extract valuable information and diverse perspectives from students enrolled in the Master of Innovation and Design program. The guide's flexibility allowed for a dynamic and responsive interaction between the researcher and the interviewees, ultimately contributing to the generation of new insights and understanding within the field of study. The interview guide was used as a guidance template, however the interviews allowed flexibility in a sense that it was possible to go back and forth and skip if the student already had responded to different aspects. See interview guide in attachments.

### **4.3.2 Interviews**

To gain a better understanding of the student perspective, 6 semi-structured interviews have been processed in this paper. Semi-structured interviews enable flexibility in the interview process, providing the researcher the power to delve further into some topics or alter the session's flow as necessary (Baker & Edwards, 2012; Fontana & Frey, 2005; Tisdell, 2016). The choice of method mainly relates to the openness of structure which Fontana and Frey, (2005) and Rubin and Rubin, (2012) means could provide more honest and detailed responses since the flexibility strengthens the possibilities of giving the informants more openness in the sense of not being constrained by specific questions. However this choice of method can also lead to difficulty in the lateron analysis: meaning that open-ended nature of semi-structured interviews can make it more difficult to analyze and compare data across participants and the amount of data can vary to a large extent (Kvale & Brinkmann, 2009; Rubin & Rubin, 2012; Tisdell, 2016). Even though this choice of empirical

gathering can provide a large amount of data where time aspects are a critical aspect (Baker & Edwards, 2012; Kvale & Brinkmann, 2009; Tisdell, 2016), a more full picture of the participant's experiences, viewpoints, and beliefs can be obtained through semi-structured interviews, which frequently produce rich and extensive data (Baker & Edwards, 2012; Rubin & Rubin, 2012).

### **4.3.3 Pilot test- interview**

To examine how the formulated questions for the interview is perceived in this research, a pilot study for the interview questions was performed. A pilot study for research questions serves several reasons on why researchers want to examine the questions before putting it into practice (Baker & Edwards, 2012; Palinkas et al., 2015; Ritchie et al., 2013; Collins et al., 2011). This can help researchers make any necessary adjustments to the study design before beginning the main study (Collins et al., 2011). According to Baker and Edwards (2012) a pilot study has the possibility to test clarity and comprehensibility of the questions. Researchers have the opportunity to see if their interview questions are understandable to participants by conducting a pilot study. By doing this, you can avoid questions being misunderstood or confusing throughout the actual data gathering process (Baker & Edwards, 2012; Palinkas et al., 2015). As stated by Palinkas et al. (2015), this could reveal any potential issues with their interview questions, such as those that would be too challenging for interviewees to respond to or questions that might be too delicate or personal. Early detection of these problems can assist researchers in revising their questions before starting the main study. The informant in the pilot study had the possibility to see the questions, in which one recommendation was to shorten some of the questions and take usage of sub questions, so that later on informants do not have to answer many things in one question to minimize the risk of getting non-depth answers in relation to the comprehensibility of the study. Regarding the flow of questions that Ritchie et al (2013) states is of high importance for the logical and meaningful sequence, more general questions were placed in the beginning of the study after feedback from the informant. In the context of the theoretical framework of the study, this pilot study made the researcher aware of the thought of answers in relation to the operationalization and purpose of the question in which it could be measured if it were appropriately related to the field of study. For the feasibility of the study researchers can evaluate their study's viability, including participant enrollment and retention, as well as the usefulness of the data collection methods, with the aid of a pilot study (Collins et al., 2011).

## **4.4 Prescriptive part 2**

In this section 4.4, the thesis *Prescriptive part 2* is presented below.

### **4.4.1 Ethics**

The ethical side of research is crucial (Saunders et al., 2016). Any research project's design phase is the ideal time to anticipate and resolve the majority of ethical issues. The research project is planned and carried out in accordance with the ethical concept of doing no harm, and as necessary, a research strategy or method is adjusted (Saunders et al., 2016). Examples of this include topic selection, research design, data collecting, processing, and storage, as well as data analysis and result reporting (Saunders et al., 2016). Implementing research requirements helps to guarantee that studies are high-quality and are based on important issues (Vetenskapsrdet, 2002). There are four key needs for the person protection requirement in research (Vetenskapsrdet, 2002), which states that people should not be subjected to mental or physical injury, humiliation, or violation. As part of the information requirement, the researcher is required to explain the project's goals and participation requirements to informants and survey respondents. So, individuals must be made aware that participation is optional and that they have the ability to revoke it. All aspects of the present survey that could possibly be regarded to influence their willingness to participate must be included in the material. According to the permission requirement, the researcher is required to secure the consent of both data suppliers and research participants. In research, the person protection requirement, which states that people shouldn't be subjected to humiliation, abuse, or other forms of harm, includes four primary components (Vetenskapsrdet, 2002). The researcher is required under the information requirement to tell informants and survey respondents about their position in the study and the rules that govern their participation. So, it is necessary to let them know that participation is optional and that they have the option to decline. All aspects of the present poll that would, in a rational world, be thought to affect people's willingness to participate must be covered in the material. According to the consent requirement, the researcher is required to secure the consent of both data suppliers and research participants. The confidentiality requirement states that all information pertaining to the subjects of an inquiry must be treated with the highest level of secrecy feasible, and that all personal data must be preserved in a way that prevents unauthorized access. Last but not least, the usage requirement specifies that personal data may only be utilized for research. The protection of study participants is ensured by all fundamental requirements (Vetenskapsrdet, 2002). Initial information regarding the aim and purpose of the research was provided to the informants in the current study during the interviews. Everyone is aware that participation is completely optional and that they have the freedom to revoke it at any moment for any reason, as goes for the focus group as well.

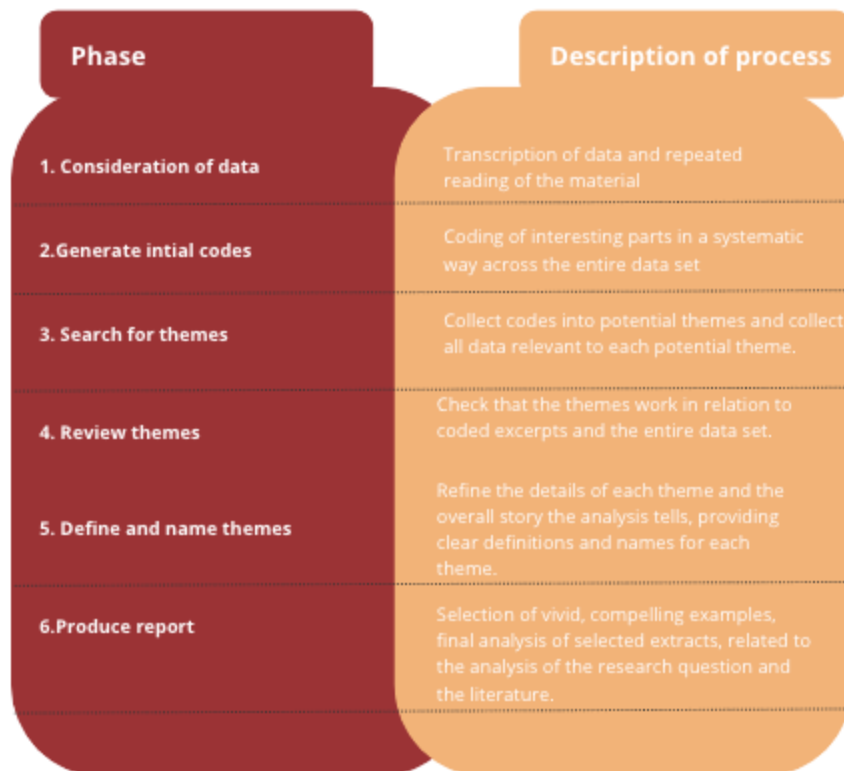


#### **4.4.2 Transcription**

According to Saunders et al. (2016), transcription is a frequent qualitative method that involves reproducing verbatim accounts in the form of word-processed accounts. There are various benefits to transcription of the data obtained for this investigation (Bryman & Bell, 2017). Since human capacity can be impaired by factors including inherent limitations, memory, and unconscious interpretations, transcribed material can enhance and expand knowledge of the facts (Bryman & Bell, 2017). As the author will have access to all recorded material, choosing to transcribe also strengthens the validity of the interpretation of the empirical findings. Saunders et al. (2016) assert that in order to avoid audio recordings and the associated labor piling up later, it is advantageous to transcribe interviews as soon as possible after they have been completed. It takes time to transcribe (Saunders et al., 2016). According to Bryman and Bell (2017), it is possible to omit portions of the interview that are irrelevant to the study in order to limit the amount of data during transcription. Consequently, the transcription removed the formal starting and concluding sentences.

#### **4.4.3 Analysis method**

Thematic analysis will be used to study the primary data. A methodical strategy for analyzing qualitative data is thematic analysis (Braun & Clarke, 2006). This method's primary objective is to look for common themes or patterns in a data set. Thematic analysis is a fundamental technique for qualitative analysis of, among other things, interviews, according to Braun and Clarke (2006). With the addition of the analytical approach, it is now possible to condense enormous volumes of qualitative data, combine relevant information from many transcriptions and notes, and create and test ideas and explanations based on thematic patterns or links (Saunders et al., 2016). Thematic analysis undergoes a process divided into six phases that do not necessarily always follow chronological order in practice (Braun & Clarke, 2006). The different phases are summarized in table 2.



*(Visualization on thematic analysis, from the steps in Braun & Clarke, 2006 process, Alenbring, 2023)*

Braun and Clarke (2006) state that familiarization with the data, which mostly occurred in connection with the transcription of all interviews, comes first in the theme analysis process. Reading through the content allowed the author to become even more familiar with the information. According to Saunders et al. (2016), this step fosters dedication to the content, and the analytical process can be initiated based on the content summary, which serves as a crucial entry point for the theme analysis. Visual representations can be useful in this step to separate codes into several themes, according to Braun and Clarke (2006). The second phase began when the material had been read and the author had familiarized with the information. This phase involves the production of initial codes based on the data (Braun & Clarke, 2006). Coding was started with the help of color codes (red, yellow, purple). Initially, words, phrases and sentences were marked with different colors in a systematic way across the entire data set, words in *red*, phrases in *yellow* and sentences with purple. When all the data had been coded and sorted into the three colors (red, yellow and purple) and sorted, phase three began.

In this phase, which takes the analysis to a broader level of themes rather than codes, different codes are sorted into potential themes, and relevant coded data extracts are gathered within the identified themes, according to Braun and Clarke (2006). The author considered how codes could be combined to create overarching themes. A table was used to sort different codes into themes during this phase. Braun and Clarke (2006) suggest that using visual representations to categorize codes into different themes can be helpful at this stage. Subthemes and main themes begin to take shape in this phase. Phase four involves refining the identified themes, in line with Braun and Clarke (2006). During this phase, the complete data was read through again for two reasons: firstly, to determine whether the themes accurately represent the dataset, and secondly, to code any additional data within the themes that may have been missed during the previous coding phase. This phase was of high importance in the iterative process since the amount of data provided by the interviews were approximately 71 pages in a means to ensure that essential information in the study is processed. By the end of phase four, the author obtained a relatively good understanding of the themes and the interpretation of the data. Phase five could then be initiated, and four main themes were determined, see visualization below.



*(Visualization on the themes processed from the thematic analysis, Alenbring 2023)*

Braun and Clarke (2006) examines that theme names should be concise, powerful, and immediately convey the theme's essence. The main themes represent the context in which vital factors are

communicated in an ecosystem for innovation from a student perspective, while subthemes support the main themes and create a structure within the individual main themes. Once elaborated themes were established, phase six could commence (Braun & Clarke, 2006), and thesis writing began.

## **4.5 Descriptive part 2**

In this section 4.5, the thesis *Descriptive part 2* is presented below.

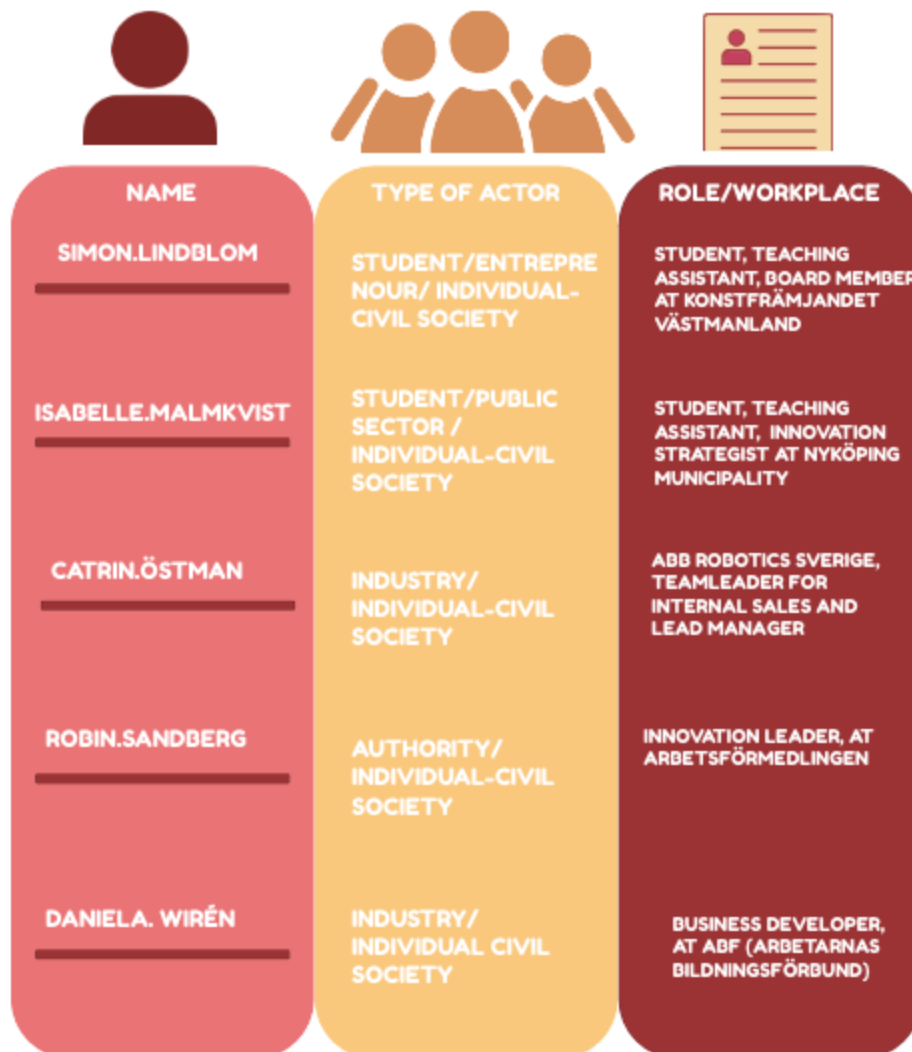
### **4.5.1 Focus group- workshop**

Focus groups are a qualitative research technique that entail gathering a group of people to talk about a certain subject or problem. Focus groups have a number of benefits, but there are also some drawbacks to this approach that should be taken into account (Tisdell, 2016). In-depth information gathered through focus groups can shed light on the attitudes, opinions, and experiences of the members. Focus groups promote group interaction and let participants build on one another's concepts to achieve a more thorough comprehension of the subject (Bryman & Bell 2017).

For this study Focus groups provide an effective way to collect data from multiple participants simultaneously in relation to the focus of interviews that are time consuming. According to Tisdell (2016), focus groups can be held in a brief amount of time, allowing for the quick collection of data from a high number of participants. Another motivation for the choice of method in the descriptive part two of the study is that it allows the researcher to probe deeper into the issues and topics being discussed, for generating a more complete picture of the participants' views in the design of the ecosystem for social innovation. To have in consideration focus groups into account because focus groups typically have a limited sample size and individuals who are not necessarily representative of the public as a whole, the results may not be generalizable to a larger population (Saunders, 2016). . Due to the fact that individuals may bring their own biases and viewpoints to the discussion, it is crucial to take this into account as the potential solutions are dependent on biases (Saunders, 2016).

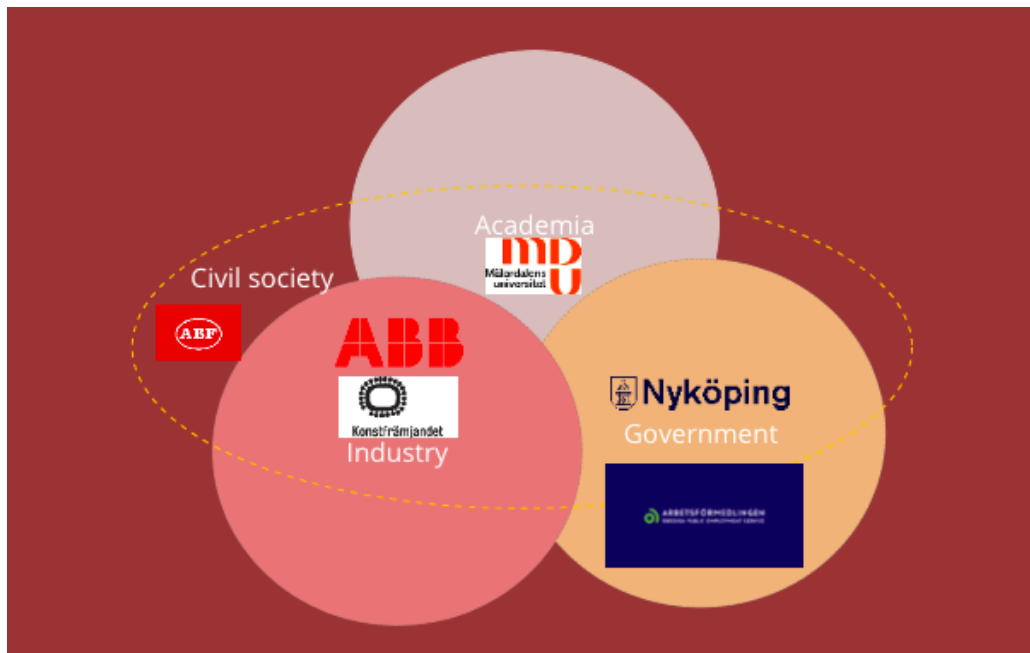
The setting for the group dynamics will also be a crucial factor in a means that it could influence the data collected, as some participants may dominate the discussion or others may be hesitant to share their views, in which a skilled facilitator is required to manage the discussion and keep it focused on the topic of the research context (Saunders, 2016). The importance of participants involved also encourages engagement in the choice of topic since it provides how depth responses will occur related to their interest (Bryman & Bell, 2017).

#### 4.5.2 Workshop participants- focus group



NAME	TYPE OF ACTOR	ROLE/WORKPLACE
SIMON.LINDBLOM	STUDENT/ENTREPRENOUR/ INDIVIDUAL-CIVIL SOCIETY	STUDENT, TEACHING ASSISTANT, BOARD MEMBER AT KONSTFRÅMJANDET VÄSTMANLAND
ISABELLE.MALMKVIST	STUDENT/PUBLIC SECTOR / INDIVIDUAL-CIVIL SOCIETY	STUDENT, TEACHING ASSISTANT, INNOVATION STRATEGIST AT NYKÖPING MUNICIPALITY
CATRIN.ÖSTMAN	INDUSTRY/ INDIVIDUAL-CIVIL SOCIETY	ABB ROBOTICS SVERIGE, TEAMLEADER FOR INTERNAL SALES AND LEAD MANAGER
ROBIN.SANDBERG	AUTHORITY/ INDIVIDUAL-CIVIL SOCIETY	INNOVATION LEADER, AT ARBETSFÖRMEDLINGEN
DANIELA. WIRÉN	INDUSTRY/ INDIVIDUAL CIVIL SOCIETY	BUSINESS DEVELOPER, AT ABF (ARBETARNAS BILDNINGSFÖRBUND)

Related to the quadruple helix model, different actors serve different roles, as for academia, private, public sector, industry and civil society. Related to civil society, all of the chosen informants are part of civil society independent of their role at their workplace in which they are referred to both as a part of an actor and as a civil person. Below is a refreshment of their positioning within the quadruple helix based on their workplace.



*(Visualization on the stakeholder and their roles within quadruple helix model, Alenbring 2023)*

Mälardalen University functions within academia, Arbetsförmedlingen and Nyköping municipality to Government as for ABB operating in industry. *Clarification;* Arbetarnas bildningsförbund (mentioned as ABF) is a study association in which ABF's activities are financed for the most part with contributions from the state, region and municipality, as well as with fees from participants and member organizations. Therefore my interpretation of putting these in the civil society is based on that they are not owned by state, region or municipality. However the fundings from these actors is indirectly crucial for the survival of the association, and it was established by the social democrats in Sweden, which means that it could also belong to the government, with openness to other possible interpretations of their position in the quadruple helix model. This has no further influence on the thesis however since it only serves as a visual representation of the context.

### **4.5.3 Workshop design- focus group**

For gaining empirical material, the focus group session followed a workshop based on design thinking principles in a means to explore and work iteratively through the session. Plattner et al., (2010) states that design thinking promotes a culture of experimentation and iteration. Due to its various benefits, design thinking, a problem-solving technique stressing empathy, collaboration, and iterative prototyping, has grown in popularity across businesses and disciplines (Brown, 2008). When used in a workshop format, design thinking provides various benefits to both participants and overall outcomes. For instance, design thinking promotes a human-centered approach to problem solving, particularly enhances knowledge of end-users or stakeholders and leads to meaningful solutions (Brown, 2008).

Secondly, it promotes collaboration and multidisciplinary teamwork by bringing together people from various backgrounds and experiences (Liedtka, 2015).

This collaborative environment promotes cross-pollination of ideas and leveraging strengths for more innovative outcomes as well as emphasizing visual and tangible representations in which sketches, diagrams, or physical prototypes, participants can communicate complex concepts more effectively (Martin, 2009). The choice of design thinking as a method had the purpose to cultivate a mindset of innovation and creativity, by encouraging each individual to reflect outside the box, challenge their assumptions and specifically explore multiple possibilities in line with Kelley and Kelley (2013) through the different themes (*from the thematic analysis*) found in the *descriptive part 1* of the study. These methods can contribute to enhanced problem-solving, creativity, and the generation of impactful solutions focusing mainly on finding the “real problem” (Brown, 2008; Kelley & Kelley, 2013; Liedtka, 2015; Martin, 2009; Plattner et al., 2010).

However, it is important to consider limitations when using design thinking as a research method and to adapt the approach based on the specific research objectives and context. Some researchers mean that design thinking methods using the user-centered nature may result in a limited presentation of samples, in which they mean could overlook other perspectives necessary for the context by engaging specific groups or stakeholders increasing the potential for sample bias. It is therefore of importance to be clear with which participants are included in the workshop and further the limitations on the choice of participants. Since the number of participants were relatively few (five), the researcher had no interest in gaining a generalizability in the discussions and activities, rather broadening the perspectives of the exploration to gain a deeper understanding on the different needs and desires. Whilst still aware of the limitations on the amount of participants of the sample representation. This is something that Verganti, (2016) claims with its emphasis on specific user contexts and needs, may produce insights and solutions that are context-dependent and lack generalizability to broader populations or situations. Another aspect is that design thinking primarily relies on subjective interpretations and perspectives, biases may occur during the research process, particularly during the stages of empathy (understanding user requirements) and ideation (creating ideas). According to critics, these biases can impair objectivity in research and result in findings that are biased or influenced by subjective perspectives rather than objective analyses. In line with Denzin and Lincoln, (2018), this qualitative method and the usage of subjectivity is a fundamental aspect of qualitative inquiry and further acknowledges that perspectives and biases can influence the data collection, analysis, and interpretation processes, however that the subjectivity allows researchers to delve deeply into participants' experiences, meanings, and contexts. In this thesis the researcher emphasizes that knowledge is co-constructed between the researcher and participants, valuing their perspectives and allowing for a more nuanced and comprehensive understanding of the research topic.

#### 4.5.4 Workshop outline

The problem statement was done in accordance with Lewrick et al., (2020) through a problem focused workshop, with five participants (*in which the researcher functioned as a facilitator and observer*) with a duration of 2 hours. The tool for this workshop was Google Jamboard, which functioned as a whiteboard with notes and figures. According to Brown (2008) and Köping Olsson and Florin (2011) visual representations can create a common understanding of the problems for the participants by formulating the gathered data to the problem analysis towards a design challenge. Lewrick et al.,(2020) that one of the aspects in a design thinking is the importance of understanding the problem before solving it, in which this method had the thought of exploring different challenges in relation to the themes found in the thematic analysis. See visualization below.



*(Own Visualization on the themes processed from the thematic analysis)*

Based on the themes found, the participants had a question to relate the themes to in what they perceive is missing within each theme and why they felt like it is missing, see question below.



How can we as actors collaborate with MDU as a university and its students better and work together with societal challenges to create a sustainable ecosystem?

*(Own Visualization on the question in the workshop, focus group)*

After each theme, all of the participants explained to the group what they have written, resulting in discussions about similarities and differences while listening to each other's perspectives and individual experiences. When the exploration of problem areas upon what the participants perceived were missing, discussions and idea generation began to unfold upon these challenges in a means to get a better understanding for the roles as actors for these limited sample representations of the participants. This led further into the second activity in the workshop in which the participants were encouraged to look at opportunities for how this could be improved. In this activity discussion among the actors were the main component, on the thought of delving more into aspects previously discussed. It is crucial to take into account the profound discussions that arose from our choices regarding the focus areas. These decisions sparked through experiences and reflections, with informants eagerly expressing their desire to delve into the subject from a student-centered perspective. Additionally, the deliberate selection of informants, as mentioned earlier, played a significant role in creating a comfortable setting for our research. Having had prior interactions with these individuals in various contexts as a researcher, we established a rapport that fostered openness and trust, in which results could have been looking different if the trust towards me as a researcher were not that evident. My interpretation throughout our discussions atmosphere prevailed, characterized by genuine respect and an eagerness to understand each other's diverse viewpoints which contributed to the discussions among the different actors in which was not something that could not be known ahead. Every participant approached the conversations with mutual consideration for one another, resulting in a harmonious exchange. The more open and unrestricted format we adopted allowed for a sense of liberation. The participants created an environment where everyone felt encouraged to share their thoughts and interpretations freely. Within this atmosphere of "*intellectual freedom*", ideas were encouraged unrestricted by rigid boundaries. Whilst taking into consideration that it is a limitation of this paper in which this discussion only held for a total of duration of 2 hours.

#### **4.5.5 Workshop participant-observation**

According to Merriam and Tisdell, 2016 observations can be implemented in various ways. The aim of this research methodology is to employ the *observer as a participant* technique to gain insights into the specific activities of individuals, as well as their actions, thoughts, and communication, within a

context that aligns with Merriam and Tisdell (2016) perspective on this type of observation, exploring people's behavior, interactions, and beliefs. Merriam and Tisdell (2016) claims that by immersing oneself into a particular social situation or group, the researcher uses the technique to take part in group activities while also monitoring the group's behavior and interactions. In this focus group participant-observation was used to explore the people's behavior, interactions, and beliefs during the workshop. The intent of observations is mainly to contribute to dialogues regarding the topic collaboration with academia and the discussions around it with the aim to create a better understanding on the situation in relation to the exploration of student driven ecosystems for social innovation in a quadruple helix setting of actors in relation to the studies themes from the thematic analysis. This approach might be useful for any research effort that aims to comprehend the experiences of people or groups within a certain social setting in which the degree of engagement is mutable and ranges from non-participatory (the weakest) to complete participation (the strongest but most demanding (Merriam & Tisdell, 2016). The intentions were however not to be a highly involved participant observer, in a means to not color the direction of the discussions to a broader sense. To capture potential data that is not interpreted through , a recording of the meeting was made in the consent of the participants approval. The transcriptions produced through observer involvement could be highly useful for later data processing and interpretation (Garcia & Hernandez, 2016). They are a rich source of qualitative data, providing insights into the research environment as well as the actions and experiences of the participants (Braun & Clarke, 2019).

## **5. Empirical findings**

In this chapter findings are presented from the interviews, that is based on an analysis of the transcribed data from the interviews and further with analysis based on the theoretical framework of this thesis . The four themes that have been identified mentioned previously are as follows: Crossing boundaries (*Subtheme: cross disciplinary teams*), Actor of networks (*Subtheme: relational building*), Openness (*Subtheme: Willingness*), Matchmaking- (*Subtheme: competence attributes*). As mentioned previously in the method section, themes found from the thematic analysis of the interview transcription were used as main themes in the workshop, which will also be included within this chapter.

### **5.1 Crossing boundaries**

All informants stated from the interviews that there is value in collaborating with actors outside the university amongst their education independent of the field of studies they have operated in. To a relatively large extent all of the informants mentioned collaborator of choice due to courses and tasks provided by agreements on collaborating partners or initiated through them. All of the informants

have had both practical and theoretical based education in universities, in which they serve as a crucial function to gain both perspectives for future practices. Related to their current education, based on their beliefs and perception of their choice of education (Master of innovation and design at MDU) they had high expectations of outside collaboration with external partners due to the field of research context and obtaining practice in real life context for learning. Looking into the informants thoughts about external collaborations the persuasion that it has a fundamental role providing knowledge, network opportunities and a context of business practices. One student (personal communication, 27th of April, 2023) stated that external actors are crucial in one's career development, providing valuable knowledge and networking opportunities. He emphasized that external actors not only enhance one's knowledge but also help to develop career trajectories through networking (ibid). Further he portrays the perspective as recognizing the key role that actors play in one's career development and that they provide benefits in terms of both knowledge and networking, which are essential to building a successful career (ibid)

I think it's really nice and I see it also sometimes, as professional experience as well in a way. And I learn almost more from it than I learn from the course.(ibid)

Another student (Personal communication, 15th of May) suggests that there has been a lack of emphasis on building external contacts and interactions during education, regardless of the specific field of study in which he means sets the tone for the later on or ongoing work life as a student. Further another student (Personal communication, 10th of May, 2023) is striving for a structure where the school can help students to network with external actors and society. She emphasizes that if the school had a platform for providing such opportunity, it would be of great benefit (ibid). However, she notes that it may not work that way within your specific areas of expertise, and that it is instead up to the students themselves to build their own networks (ibid). This viewpoint emphasizes the importance of creating a structured and supportive environment where students are given the tools and resources to create external contacts and networks (Ibid). It points to the need for the school to offer guidance and support to make it easier for students to establish and develop their own professional networks she means and that this could mean that the school offers workshops, training or mentoring programs that help students build relationships and create opportunities for themselves (ibid). She discusses that it is important to create awareness that networking is an important part of professional life and that it requires initiative and effort on the part of the individual (ibid). Although the school can offer support and resources, it is up to each student to actively participate and take advantage of these opportunities according to her (ibid) . As for collaborations with external actors she states following:

“It is something that is built privately today. This is done via already existing contacts who can offer additional new contacts. It is, after all, to be able to move one's contact

network. So trying to run as many physical events and talk to people and create informal meetings.” (M.Källström, Personal communication, 10th of May, 2023).

There was a variety of different aspects in the perspective of crossing boundaries between actors. In the past, the collaboration between universities and MDU, has often been viewed through a narrow lens, primarily focusing on the interaction between students and a single actor or organization according to the students. In which tensions on this limited perspective fails to capture the full potential of collaboration in addressing societal challenges they mean. Traditionally, the emphasis has been on students engaging with a single partner, typically in the form of a project or assignment. While this approach offers valuable learning experiences, it lacks the richness and complexity that arise from engaging with multiple actors in an ecosystem setting.

“...we wanted to sell a robot package to schools. And what we feel right now is that it's hard to know where to start making contact. Which way to go in. Because if you get in contact with a good student, it leaves the school within 3-5 years. And then the contact you've had that has been very good disappears. And then you don't always know who to contact. And then the process starts over again. You have to look for a new bunch of contacts.” Informant from ABB Swede, , Personal communication, 10th of May, 2023)

As for collaborating with academia the informant from ABB Sweden (Personal communication, 10th of May, 2023) discussed about how poorly aware her company sometimes is of what is happening in schools. She stated an example in which one of the students in the focus group of this thesis came to ABB Robotics Sweden and talked about Industry 4.0 being gone, and that now it is Industry 5.0 in which she reacted upon, is it gone? Is it not what we are doing anymore? The informant from Arbetsförmedlingen (Personal communication, 10th of May, 2023) is in line with the informant from ABB Sweden's reflection about the contact barriers, and the system, and the structures. He reflects upon Arbetsförmedlingen in Eskilstuna and Västerås, and that he doesn't think they know what MDU can do for them (ibid).

“I don't think MDU knows what the union can do for them. You don't know each other. I think the way there is quite long. I know a teacher there, or several teachers. That's my way in. I can only say the most. So it's quite time-consuming, I think, to create an understanding for each other. And that's why I think some kind of way in, I don't know, a collaboration surface or base is needed.”(ibid).

Further one student (Personal communication, 10th of May, 2023) took up a discussion on what is mentioned above and makes a distinction when it comes the operative and strategic efforts in a application as an actor for an potential ecosystem meaning that instead of looking at it like a job advisory on the ones who is working with humans for example with dealing societal challenges, moreover focusing in the area that the actor is currently working within (ibid). He continues by extracting that strategic systematic level or operative work in those who work with people, in which

he sees that there are also two completely different areas where some may fit some education and some may not (ibid).

“Is it meeting people? Can it be meeting people in difficult situations or just meeting people? There are many different things that happen in the meetings or things that happen before the planning and there you can also take and be like, now we're going to have a social effort among those who have been long-time unemployed in the rural area outside Västerås yes, which department can that be interesting for? and that it is more like, it gets more fuzzy but then it becomes easier to look at which it can be interesting for you. So instead of having a finished solution, you can just say the problem is far from being solved there.” (ibid)

“Okay, but which ones are interesting for you? No, but it can be interesting to even include ABB because it can be someone who might need to be trained and then work on building these robots. There can be a lot of things that can come together if you don't give the answer in advance, but rather be open in the formulations and then go that way. Are you all in? It's the classical ladder, really. If you say you open it from the beginning and then you go down, and maybe you do it more clearly with the passage of time.”(ibid).

From the students reflections above the informant from ABB Sweden (Personal communication, 10th of May, 2023) continued:

“And maybe get a little more access to the facilities. I would like to see that we, both as actors, ABB Sweden and as MDU, have a dedicated person who is responsible for each other. So that we have a contact within, so that if someone at ABB Sweden wants to contact MDU, they contact that person, so they know who to contact, or that they know who at MDU they can contact, and then they can contact the next. It's easy for us to contact the robotics program or the engineering program, but we also need to contact the other courses or the other educations at MDU. But there it stops, and you just go back to the old ones you've gone to”.(ibid)

A barrier of crossing boundaries from industry to academia and that it influences the roles individuals within it might have or who actually can work in it, is something that the informant from Arbetsförmedlingen (Personal communication, 10th of May, 2023) means is more than accessibility, moreover how actors in a quadruple helix are functioning differently that he meant potentially could affect the thought of eco system following:

“you can see that no matter which company you talk to, especially smaller companies, you often start to see the light at the end of the tunnel. You are in the now. But when you talk about innovation leadership or you start working with trend-spanning, which we get to learn, it's a lot about working proactively and seeing what kind of trends we can see, what can we see in the world, what is happening and that is something we want to give a response to. But then you start working proactively and when you go out and talk to municipalities, authorities, private small companies, they don't understand, but how do you think we should have time to do this? We have more work to do now. When will we find the time to work proactively?”. (ibid)

### **5.1.1 Cross-disciplinary teams**

One student (Personal communication, 27th of April, 2023) suggests that collaboration should be based on connecting individuals or actors with similar interests and competencies, rather than creating artificial problems for the sake of collaboration . He noted that if the problems are not real, the collaboration would likely be seen as an assignment rather than a real-world scenario (ibid). Instead, he recommended that companies provide a list of projects that are ready for student involvement (ibid). This approach allows students to assist the company while gaining valuable experience according to him and perspectives such as promoting collaboration based on genuine interests and competencies, and encouraging companies to offer real-world projects that students can contribute to (ibid).

Within academia, one student (Personal communication, 10th of May) highlighted the perspective that diversity brings to the innovation project on the master of innovation and design. The team in different settings of courses consists of individuals with varied backgrounds, including different genders, ages, and nationalities. This diversity leads to a meeting place where diverse competences and perspectives are present where she stated that differences in cultural norms and practices are observed during discussions, providing new thoughts and ideas. The student pointed out that in more structured programs, such as engineering courses at MDU in which she has been a teaching assistant within, tends to be a lack of diversity, resulting in a uniform way of thinking often looking at the same type of results. In contrast, the master of Innovation and design programme, with its diverse composition, stands out as it brings together individuals with different experiences and expertise according to the student, where she emphasizes the program's international nature and adds another layer of diversity. This is something the student brought up as ways of working in business life as well, or the choosage of collaboration partners focusing only on educational status in which it tends to be more specific and not diverse from her working experience.

“And immediately when you look at, not wow, our class, but where there are maybe 24 left or something like that and that's probably like 20 different educations in other countries that people have gone to and I also think that the youngest is 25 and the oldest maybe 45 so we have a lot and it's an international program so we are maybe six people who are born and raised in Sweden. “ (ibid)

“I was just thinking from my perspective when I worked in a municipality. I think it would be valuable to say that you come with a challenge. You have the opportunity to talk to candidates or master students about it. You give them a challenge, a bit like what Simon said, it's okay if you fail.

What I think would be fantastically valuable is to say that we would come up with a challenge, that we actually need a challenge we have. We need to reach the companies that are

not so active in the different types of activities we offer. We offer a lot of different things, there are company lunches, there is networking, there is everything possible. But it's always the same companies that come and we can't reach or attract those that never show up. And in a way, if we say that this would be the challenge, if they don't come up with a solution, it would be just as valuable for us to get the insight into why they don't come up with a solution. Because then maybe we get an understanding of why we don't succeed either. So they might see it more clearly. It happened because of this, or it happened because of this. So I think that just the reflections from the students can also give a lot. But then there is another part of it, and that is that I think so because I myself am a student and am passionate about the issues that I have studied for five years on a program where no one really understands what we do or what we can do and you don't really have a... It has been a little harder for us to cooperate, I think. So I have thought about all these things, but we have a lot of my colleagues who don't understand or don't think it's valuable to get new insights.” (Informant, student, 10th of May, 2023)

## **5.2 Actor of networks**

One of the students (Personal communication, 28 April, 2023) is discussing the importance of having a professional network in order to achieve one's goals. The informant gives an example of their own thesis work and how their network was crucial in gathering the data they needed (ibid). She also mentioned that having an own built up network within their university and at their job has been beneficial for their work at municipality and her own (ibid). The student emphasizes the importance of having a network in order to enhance one's work and achieve success. However, from a student point of view collaborations according to her, could be something that differs from other stakeholders in society (ibid).

“And we believe that collaborations could be only a positive thing. And if we just do it right, it will be perfect. And then if you talk to someone who has done this for 20 years, they don't have the same perspective of collaboration. They think it's just as important as we do, but they have more experience of it and find it more difficult, I would say. So this is also a thing, are we too naive in the way we look at collaborations as students? Which I don't know if it's a positive or a negative thing. Maybe it is a positive thing because we think that it's awesome and we're just gonna do it and maybe that drives us further in doing things. We're not as restricted by laws and regulations either.” (ibid)

Another student (Personal communication, 25th of April, 2023) sees an importance of a balanced mix in which he explains that the ecosystem needs to have society and public organizations, generally speaking, which he means is the form of backbone of actors for driving social innovation.

As for the role of actors, one student also a municipal worker (Personal communication, 28th of April, 2023) means that one of the main perspectives on actors role within networks, is to have a linking bridge or foundation between academia, civil society and industry that is available to each stakeholder in which it functions like an intermediary between these.

“I think that for it to work at all, you need someone who is kind of the bridge between and kind of like a boundary crosser. I would say it's very important to have, otherwise you live in two... You have two different perspectives. So it's very important that you have someone who is this sort of boundary crosser or walking this kind of between and kind of have the perspective of both worlds. I think it's very important because communication in itself is very difficult when we're talking about collaborations. We have different languages in academia or in the practical world, and that goes both for the private and public sector. They talk in a different way, they write in a different way, and we have very different ways of communicating internally within our own organizations.” (ibid).

The student further emphasized the importance of involving the public sector, particularly municipalities and regions, in addressing societal issues. She noted that the public sector has a unique approach to handling these concerns, holding significant power in shaping society (ibid).

However, she observed that it is not necessarily the public sector that drives these issues, but rather the private sector or academia (ibid). She recognized that academia's mission is to educate and serve society, generating knowledge to enhance the community and create a better society (ibid). Entrepreneurs, who start businesses, are equally important and invested in driving progress. Further she described entrepreneurs as having a strong sense of motivation or "eldsjäl".(ibid) The nonprofit sector, while also driven like entrepreneurs, does not necessarily focus on creating monetary value for themselves (ibid). She further points on the importance of the public sector, academia, entrepreneurs, and non-profit sectors in driving societal progress (ibid).

The informant from ABB Sweden (Personal communication, 10th of May, 2023) explained that there is a desire for improved cooperation with the academy, but the challenge lies in not knowing where to start. As a result, it becomes easier to respond to incoming emails or follow up on existing conversations rather than proactively seeking opportunities for collaboration. While there is openness and willingness to engage, the lack of a clear and easy path forward becomes a significant barrier she discusses (ibid)

One student (Personal communication, 28th of april, 2023) expressed her interest in specific actors beyond just employers, such as students with similar interests and interesting actors in more specific areas. She noted that municipalities are too broad for her focus, and she would prefer to see more



project-based approaches in various subjects in line with the thought of addressing societal needs (ibid). Another student (Personal communication, 25th of April, 2023) also expressed concern that the current project-based tasks with external actors in his courses is not tailored to students' interests, as the projects are pre-set and students have limited options to choose from. He suggested that it would be more fruitful if students could come up with their own project ideas and select a partner who shares their interests regarding different challenges (ibid). In his opinion this approach would lead to more productive collaborations and projects that align better with the students' goals and interests (ibid).

Meanwhile one student (Personal communication, 28th of April, 2023) expanded her thoughts beyond her own course structure to the networks that universities offer, emphasizing the importance of these networks in her work. From this perspective she is emphasizing the need for a more focused approach in identifying actors of interest, particularly students and unique actors in specific areas and noted the importance of networks offered by universities in her work (ibid).

Another student (Personal communication 25th of April, 2023) believes that universities should play a significant role in laying the foundation for such interactions. He proposes a balanced responsibility, with the school setting the initial groundwork and students subsequently expanding their network and contacts (ibid). He further expresses the view that within each course or program, students should engage with partners, tackle real-world problems, and connect with professionals in their respective fields related to external actors (ibid). While acknowledging the presence of some level of interaction in their education, the student believes it could have been more extensive and impactful (ibid). He also states that it is of importance which other actors to involve, looking at their needs for the solutions and how likely they are to participate (ibid). He further adds that a person responsible in an ecosystem for actually having close contacts with actors to see where they're looking into if they have time for this type of ecosystem and roles, their engagement, to have the "best" kind of collaboration (ibid).

"Yeah, I think you need someone to do that research about actors involved and working basically working full time with actors." (ibid)

Another factor of importance according to the student is to have government or government institutions involved, as for legitimacy and looking into what needs to be taken into consideration as a framework working on societal challenges (ibid).

"..... because you know, they will be there forever since they are not going out of business because it's the government. And also, it gives a bit of legitimacy to it, right? If a government institution implements a solution, it's more legitimate and it's more likely to then be something that stays rather than if it's a small company which might go out of business tomorrow, right?" (ibid)

As for the role of actors, all of the informants shared the importance of clarifications on the roles all actors play within an ecosystem. All of the informants shared similar opinions in businesses seeking value for their own businesses in which they mean is natural, but that you often miss out the reasons on why we collaborate within society. A student that also worked within municipality filled in that especially if we're talking about more of these societal challenges for collaboration to work then you have to have clear goals and clear needs that you might want to fulfill together (Informant, student, personal communication, 10th of May, 2023)

“That you don't just do it for the sake of winning for yourself, but maybe more for the sake of the whole or the whole.” (ibid.)

“As a work council, we are a big organization. It's a lot about finding the right contact person and maybe knowing what's out there. So that you can be a part of a network with students, for example. We are a bit divided. I work in the IT department in Stockholm. There is no MDU in Stockholm at all. But there are employees in Västerås and Eskilstuna who work more with... I'm more looking for working with people, like job searching. What I'm thinking about is that for us it's more about who you want to have in the network, what perspective. Do you want people who work strategically or do you want people who work with people?” (Informant from Arbetsförmedlingen, personal communication, 10th of May, 2023).

One of the informants that is a student, municipal employe and teaching assistant also stresses the need of structure and clarity on how a ecosystem with different actors and how it could look, in which we refer to the present situation at MDU nor in the public and private sector in which it is a challenge to look upon what your role currently is fitted into in line with what you do for a living (Informant, personal communication, 10th of May, 2023).

“And then you might withdraw from engaging fully, or to build these relationships, because you don't know what I do as a benefit for the university. It's a bit like what Robin says, you don't really know each other or each other's activities. And then it's also difficult to know what you can contribute with or what the other can contribute with. And then I also realized that now we should have common goals and needs, but it's missing. You run in different directions, I think.” (ibid)

“It feels like many have come back to this, contact tracing, community, collaborations, how to move forward. I agree with Simon in the end, that having some kind of personal contact as an actor is good, because then you know who to contact, and it's much easier. As ABB Sweden, we can help you at MDU, but also MDU can help ABB Sweden. If you have that contact, you can, when MDU is someone who is going to do a similar job, or just a little short job, a lot of different market research, that the person at ABB Sweden could write it out in some kind of forum, and there you can just write in, I'm interested in doing market research here. It's much easier, we don't have to make it so complicated to know what it is. Sometimes I think that we think that the students know too much, and sometimes we think that they know too little.” (Informant from ABB Sweden, Personal communication, 2023).

The informant from Arbetsförmedlingen (Personal communication, 10th of May, 2023) states that a barrier of having boundary crossing is the different ways actors are looking upon solution oriented aspects due to structures. He means that for example academia looks at long-term solutions whereas Arbetsförmedlingen looks at quick solutions even though they might look upon the same problem

formulations as for example Long-term unemployment or low education levels. The informant further extracts that different guidelines and structures to solve can be very different to one another and difficulties to relate to each other and the roles in the thought of an ecosystem.

“I think it's not just about connecting to the network, but also other things like ex-jobs. For everyone's sake, not just for one person's sake. I saw myself when I was a student, you just want to deliver and be good when you get the chance to work for a real company. So it's hard to say no. And then you're sitting there working, or just doing your thing, 14 hours a day, and that doesn't really give my education anything. So I think that, maybe especially because it was... That's why I think that this needs to be organized by some other than students. By some that, I don't know, teachers or maybe even higher up. I think it's not sustainable with students owning the ecosystem. You lose trust in companies, authorities and other partners. So, it needs to be... We're also getting a bit into the financing, as you mentioned earlier. What kind of roles can be important in a network like this? Are you an important actor? Someone who can define them. You don't have to change a lot. They have to be pretty standard. Expectations, , who owns this, who will look at it? I think that's important to have. If it's something that's not just going to be a waste of space and then disappear, but something that's sustainable, there has to be a good basis.” (Informant from Arbetsförmedlingen, personal communication, 10th of May, 2023).

The informant from ABB Sweden, (Personal communication, 10th of May, 2023) discusses that she does not have an insight in the education that is available as for example the students in the focus group that were in from the master of innovation and design which creates an barrier not having information on what different educations actually means.

“Innovation and design. Is that... "What is it?" (Informant from ABB Sweden, personal communication, 10th of May, 2023).

One student developed her field of work for the informant from ABB Sweden, to get a better understanding of the studies field of education and roles possible to contribute to:

“We are not doing a lot of research, but we are doing a lot of processes and development and change work. It's not like we design a lot of products or take forward... It could work on R&D for us, development and how our next robots should look. Is that what we are talking about or how the website should look like that we are working on right now. It's hard for us to know what level we should put on the people we get in.” (Informant, student, personal communication, 10th of may, 2023).

Upon the students' reflection the informant from ABB Sweden (personal communication, 10th of May, 2023) further emphasized that she thinks it is good to have someone who understands the actor, and the university. She portraits it like a portfolio of: *this is what we need, and this is what we have*. She further discusses the role of someone putting this together.

Regarding this another reflection from a student is that there is too little about these relationships with other actors. (Informant, student, personal communication, 10th of May, 2023).

“There's never anyone who understands what we do. And when we are like that, we might look at the work processes a lot. Or how you, like, if we go in and we get a challenge, Robin has been in a course and so on, then maybe you come with a, I remember we worked at Rise, and then they said, we have a problem with them wanting to train through workshops, but they didn't know how to design the workshop or what they would bring out as boundary objects to be able to reach from RISE, to reach healthcare personnel and to be able to train in the digital future.” (Informant, student, Personal communication, 10th of May, 2023).

The informant from ABF (Personal communication, 10th of May, 2023) shared a reflection upon what also could influence the actor in the networks approach to a possible student driven ecosystem:

“I think that, in my organization, we cooperate a lot, and that's the basis of our organization, that we are cooperating partners. But we see each other as resources, and for us, learning is the main focus, and it is not the same competition driven, as for others for example.” (Informant from ABF, personal communication 10th of May, 2023)

The citation above from the informant from ABF(Personal communication, 10th of May, 2023) was explained further from a student meaning that it is an example of the actors seeing it as learning opportunities.

“And together with students. For example, with the informant from ABF we have had workshops with 7 business developers on different ways of working and tackling complex problems looking at methods for design thinking in which the response was really positive. Another workshop we had included international perspectives building on previous knowledge from the first workshop where the business developer saw a positive impact on incorporating actors, in which the problems could be seen in new ways. Also that the participants immediately thought upon different ways of collaborating with our University MDU for social sustainability and including international students, and the need for accessible information on what ABF are doing. So both the learning process and also the educational purpose of the other actors. And what you can contribute to as a Student.” (Informant, student, Personal communication, 10th of May, 2023).

The student further described open in the focus group upon connecting actors from his perspective extracting that actors often see to its own company and not broadening the perspective of collaboration and the possibilities of dynamics in which he means is something as a student can see (ibid). From his role as a student he continued:

“But then we should put it as a part where it does not go 100% as A part of the process is that it doesn't work 100%. It can fail, it doesn't matter if it fails. If you put it in a process, like design thinking, it's a part of the prototype, it's a part of the testing, it's a part of the information collection. We could say we're trying to build a concept of an automated greenhouse in the countryside outside Skultuna. Skultuna knows that there are a lot of people involved in both ABF and the employment agency, but also in the Ministry of Agriculture. We are building an automated greenhouse. What kind of concept could ABB have that would work there?  
What kind of possibilities could the employment agency see? Is there any kind of small course you could take to start working there? Is there anything that you know that you could have? Here you can think about the future with robots and plants. MDU can look at how one could... There are 100 small projects that you can do that only contribute to getting more knowledge, but that don't fail. And then, of course, you need some actor who is the main actor. and the editor says, well, it's this professor who owns this project together with the individual of this company who then governs, but then you can split it up into lots of small parts.” (ibid)

“So if a professor owns the project, the professor has someone at MDU that he can go to and then have contact with the actors in a network of actors, for example a student driven network as Creative LAB that already starts to have connections that I am in. So that ABB for example and further can connect the work agency or the one that they think is relevant that is of interest and then have a problem in front of you, like the greenhouse. Then we know what to do, and we can say what we can and can't do. If Carbotix can't do anything, then maybe ABB Electrification can do something. And then you can get the contact there instead. To discuss what we can do together.” (Informant, student, Personal communication, 10th of May, 2023).

Another student shared their experiences at the university as an actor in which she perceived that students did not have access to research projects at a masters level.

“I found this as a minus and many of us couldn't experience real-time research projects, like being part of a group that does some, like even a small exercise part of research. So there were not really so many collaborations internally with the university as a student either.” (Informant, student, personal communication 28th of April, 2023)

### **5.2.1 Relational built**

One student (Personal communication, 28th of April, 2023) sees relations as the main key when collaborating with actors in which it provides a fundamental role in the success of projects. In an student driven ecosystem she means that having more focused and intimate meetings that allow for networking and skill-sharing among students and other actors. She proposes open workshops or similar sessions where students can showcase their skills, and various actors can be involved in which relations are built with actors and from there could be further developed due to societal challenges (ibid).

“That's what I think is required, building relationships. Because digitally, it is difficult to build a relationship without that network of contacts with different people, I think that is how personal relationships are built. I don't identify myself as a student. And since I have an experience before studying, the contacts I pick up are them. If I had only been a student, I don't know where I would have gotten those contacts from not having a business network from earlier business life and engagements.” (ibid)

From another student's (Personal communication 25th of April, 2023) perspective, there is a concern regarding the current approach where project selection is predetermined and limited to a set of options. He suggests that a more fruitful approach would be to allow students to propose their own ideas and projects based on their interests . This he means enable students to actively choose a project that aligns with their passion and then seek a partner who shares similar interests that in turn would lead to stronger relationships and more meaningful projects, as they would be driven by personal motivation and shared enthusiasm (ibid)

“By incorporating student interests into the project selection process, there is an opportunity for greater student engagement and the development of innovative solutions.” (Ibid)

He further emphasizes the importance of empowering students to take ownership of their projects and align them with their own interests (ibid). He suggests that a student-centered approach, where students have agency in project selection, can result in more fruitful and engaging experiences (ibid).

One student (Personal communication, 10th of May, 2023) discussed the unique situation of MDU where many students come from outside Västerås or Eskilstuna and leave after their studies, creating a disconnect with the region and non-collaborative efforts in a sense that does not create attractiveness at another regional complexity. He emphasized the importance of building relationships and the limitations of structures and funding for collaborations at MDU (ibid). He suggested the need for a common language to discuss issues and build connections (ibid). He means that challenges of relationship building are connected to the interlinkedness of operations made in relation to different actors in society for example collaborations and the need for a common language to facilitate these kinds of collaborations (ibid).

One student (Personal communication, 10th of May, 2023) described the lack of trust and understanding between the workplace and the academy when it comes to collaboration. She shared an example where there seemed to be a lack of trust in the abilities of those in the academy, as if they were unaware of how to create effective PowerPoint presentations or communicate with people outside of a classroom setting.

“This lack of understanding of the purpose and practical aspects of the academy's work contributes to a difference in worldviews and a breakdown in trust.” (ibid)

The student (Personal communication, 10th of May, 2023) further emphasized the importance of establishing personal relationships and open communication between individuals from different spheres. She noted that currently, there is a fear of connecting and opening up to one another, resulting in a lack of existing relationships (ibid). Further the student shared an example of having a strong personal relationship with a teacher, which makes it easier to communicate and collaborate (ibid). She also highlighted the challenge of building relationships in formal settings where interactions are limited to specific events or meetings (ibid). To address this she proposed the need for spontaneous and informal interactions, suggesting that a meeting place, such as an open campus, could facilitate such interactions and help build relationships, but also points out that building a successful team requires cross-functional collaboration and a deep understanding and trust in each other's roles and purposes (ibid).

### **5.3 Openness**

In relation to diversity and inclusion, it was remarkable that the informants both stated the need for it whilst pointing out diffusion, complexity and more time sufficient efforts to be taken into consideration. One of the students sees it as ground for working with societal issues by having multiple perspectives on a challenge, especially those affected by them/or living in conditions that

considers the societal challenges in their everyday life. (Informant, student, personal communication, 28th april, 2023)

“It's very important because otherwise, how are we going to work with societal issues if we don't work with people who might understand them better. Because the ones, if we're just gonna like really hard, the ones who are working with societal issues, they are not the ones who are affected by them.” (ibid)

Another student (Personal communication, 28 of April, 2023) highlights the importance of being proactive and exploring opportunities as a student in university. The informant encourages students to connect with others and collaborate on projects, as this can provide valuable learning experiences and help individuals gain new perspectives (ibid). The informant acknowledges that diversity in backgrounds can be beneficial for exchanging views and ideas, and suggests that combining this diversity into a project from an ecosystem of actors can be a great way to foster a culture of sharing and learning (ibid). However, she also recognizes that time constraints can be a challenge, especially for those who are juggling a full-time job and family responsibilities.

suggests finding ways to participate according to one's time plan, even if it means taking on a more supportive role in a project (ibid).

“As a student I think the student life or environment can open a lot of doors and a lot of possibilities but you need to be more driven and more explorative when you are at the university. I think it's 100% beneficial to connect to other students and to do something together. Not only you explore, you never know in this setup what door will open, what is the next door. So explorative moments can give a lot of opportunities for the students. But also from a new perspective, we also come from diverse backgrounds. So you come from marketing, the other person comes from an engineering perspective. So you can exchange a lot of views and ideas. Okay, this is how I think because this is my background etc. But then you can combine this diversity into a project that can be good for the students learn from each other right sharing culture” (ibid )

One of the students also pointed out the need for actors thinking on an bigger level than individual and organizational level, and look at a systematic level to broaden the perspective outside the scope of a specific actor, or industry, and that that is a problem in today's society (Informant, student, Personal communication, 28th of April, 2023). In her opinion it could require a certain level of education, for example one that is obtained through university and academia that provides individuals with a wider perspective, allowing actors to think beyond just organizational, societal, or individual levels (ibid).

“So I think that educational background from students, teachers, and professors and having a respect for what academia does to the society, it's very important.” (ibid).

Further another student (Personal communication, 25th of April, 2023) points out diversity and inclusion is important and something that is needed within an ecosystem of actors solving societal challenges.

“If you don't have that, the solutions you come up with are going to be biased to some extent. You're not going to consider the full range of who you're designing for or whatever solution you're coming up with. So I think that is to

be a very key part of the network, making sure that everyone is representative and everyone's voice can be heard. I think that's very important.” (ibid)

One of the students (Personal communication 27th of April, 2023) however shares both pros and cons with diversity from his experience. He thinks that the ecosystem will be a lot more complex meanwhile the opportunities will be bigger, and mainly lies within how the ecosystem is managed (ibid). He means that it shouldn't be based on diversity more towards how it can create value for these collaborations.

“I think this also is related to co-opetition. I don't know if you're familiar with that term. It's when competitors collaborate. I think that would be also super interesting, especially if you're gonna focus on social challenges, and to which extent they are able to collaborate without harming each other's businesses” (ibid).

He further sheds light on the challenges of collaboration, particularly within the context of individuals studying computer science in which he has experience and a preference for independent work (Informant, student, Personal communication, 27th of April, 2023) . He means that there is a need to carefully select team members based on their background and educational standpoint to ensure effective collaboration (ibid). This selective approach in his opinion aims to engage individuals within the network who genuinely seek to gain new perspectives (ibid). He also develops his stand meaning that some projects could be split into diversity and non-diversity in which some aspects could include non-diversity such as education backgrounds as engineering in a project and diversity as a whole in the bigger projects splitting into different sub-projects (ibid). He discusses that you also can support each other in areas not just everyone having completely different educational backgrounds for example (ibid). However, what he wants to underscore is that regardless of diversity, the willingness to collaborate is the key factor for inclusion and effective teamwork (ibid). Without this genuine desire to work together, collaborative efforts may face challenges and potentially create a strained working environment (ibid). And foremost carefully consider the dynamics of collaboration and team formation and a thoughtful approach to assembling teams.(ibid)

### **5.3.1 Willingness**

All of the students in the paper shared a common interest in specifically focusing on societal challenges in a set of networks of different actors working together to explore opportunities in a means to share perspectives, competencies and background to those thought of challenge as a student. It was a high emphasis on societal challenges as the main driver for collaboration and co-production with the university and actors in society in which the informants saw it as a fruitful process to obtain different roles within. Eventhough every student informed that they wanted to have a part within such network, students mention that they have mixed feelings regarding the idea being discussed about



having the network as a student-driven network. Not specifically in relation to the setup of individuals, organizations and institutions that then work together to explore, create and maybe also implement innovative and creative solutions to social challenges, moreover practicalities regarding the formation and practicalities of such a network. To a relatively large extent the informants share a positive attitude towards working with social impact focusing on social innovations that contribute to a meaningful way of working with different actors in society. One student acknowledged the positive aspect of having students build networks in their field of study, as it can be difficult to trust that professors that conducts parts of research or employees that has been delegated partnership with MDU have the same interests as the students (Informant, student, Personal communication, 28th of April, 2023). She believes that students will be able to provide more actuality for themselves if they build their own networks. She was concerned about the quality of the students who will take on this potential task. While there are many driven and motivated students, the student points out that it can vary from year to year, and not all students may be as dedicated building networks as others in which it is of high importance to have some kind of steering through the initiators of such networks to meet expectations and demands. Another student reflections upon not having a network of actors that can work with societal challenges together (Informant, student, personal communication, 25th of April, 2023).

...”Because we don't really have that now in MDU. No. And we see that other universities are trying, but they're not maybe really student-driven often. it's often on a higher level evolving down to students. Yes, which I think if it comes on a higher organizational level, it ends up not being implemented as well because it's not coming from the people who are going to do it, it's sort of coming as a commandment from the top. Whereas if it's grassroots and it's the students themselves that are seeing the need and then implementing, I think that's going to be way more successful. And high importance of engaged students and also actors, because maybe we've seen some actors that are not super engaged.” (ibid)

Another dimension of willingness that functioned as one of the key components in all of the interviews was the engagement of actors involved where students shared different reflections upon experiences:

“Well, the fact that they're engaged, that's very important. Because I collaborated with a collaborator that didn't give any form of interaction or interest. Literally. But oh yeah, you want to find a product you can customize. So yeah, so engagement is important. (Informant, student Personal communication, 24th of April., 2023)

And high importance of engaged students and also actors, because maybe we've seen some actors that are not super engaged. ( Informant, student, Personal communication, 25th of April, 2023)

The major thing has to be the commitment coming from the actors. And sometimes you find that smaller companies or rather startups, companies that are starting up and have like these grand ideas that they want to achieve, sometimes they are more willing and they are more involved in the solutions and you find that more established companies, if we have an established way of working, they are not really concerned. They don't really

want to change, their way is working fine. So they might end up being unengaged partners, which just brings the whole thing down (ibid) .

“And I think just in general there are always people in society no matter what type of work you have that are very engaged in these types of questions. Yeah, but you did and more kind of like the key characteristics but also public and private sector of course and different parts of society but like key characteristics as engagement and yeah, I would say driven people that are driven and really want to to make an impact and help make an impact. Those are really important. But it's also very important that you actually have people who understand things on a systemic level. (Informant, student, Personal communication, 28th of April, 2023)

According to one student (Personal communication, 28th of May, 2023) , there seems to be a lack of immediate success when it comes to collaborative missions with partners affiliated with MDU (the university) based on her experience in the master of innovation and design. She specifically mentions A case of Volvo, where a challenge was presented regarding a lack of time for innovation, in which she means that it was moreover like “here you go, solve this” (ibid). This challenge was addressed in a short 3-point course, primarily facilitated through networking connections of the teachers. She questions the level of commitment from the partners in these collaborations, suggesting that their involvement may be driven more by the management's desire for exchange and financial benefits, or coming up with a challenge just to provide the teacher with help without thinking that students actually could come up with something (ibid). She felt that the role of a student was not seen as a serious actor in that context (ibid) .

Another student (Personal communication, 25th of May, 2023) reflects upon working with societal challenges within courses and outside and the potential different roles as students and actors.

“ You could have projects on societal challenges linked to a particular course for example within challenges in innovation and design, and have like an actual social challenge that you're working on. And you can also have it outside of courses, as just part of university life. Having these things, which sometimes the challenges might be academic, sometimes they might not be. It might just be something that's going on in the street. How do we improve that thing that's going on in the street? So having it in those two areas, I think it's helpful, because having it in a class context helps because you can hopefully apply what you're learning onto the thing and also it sort of makes it compulsory for everyone who's doing it to actually have an experience of working within these networks. And then outside of classes you can have sort of this more social and more like things that anyone or everyone could be interested in solving, larger issues, and then you can have different people across the university coming in and trying to solve those issues.” (ibid).

To which extent engagement can enhance the experiences of collaborating in an ecosystem is something that all of the participants extracts as determinant factors of keeping an ecosystem alive by its nature. Despite that, unclear roles, diffuse purposes, non shared goals, few interactions and a non clear communication path with Academia is something that creates barriers and willingness of being a part of an ecosystem for all of the participants. As all of the informants are reflecting upon, is also the variety of levels in the Academy and students willingness and expertise in a thought of Students as a driving force.

The difficult thing with students is also that you never know who is studying, and what personalities and individuals they actually are. If you look in our class, there are very diverse classes, depending on how involved you are in different projects. Do you do it just to get a certificate and be done with it? Or do you do it because you want to create good contacts? You actually want to do something valuable for the organization you collaborate with in that course. (Informant, student, Personal communication, 10th of May, 2023).

In line with the attitude among different actors the informants from ABF (Personal communication, 10th of May, 2023) have experienced certain attitudes among colleagues within ABF all over the country when it comes to Academia and a learning organization as ABF. She means that an organization as theirs somehow also can be seen as competition towards universities and voluntary learning organizations in which the bigger perspective of exchange and improving each other can be affected negatively (ibid).

“Sometimes we reach out to very similar people. But also that there is a complex of minorities. The academy is doing big things, and thoughts, and robots, and stuff. So when I think about openness and the will to create these networks and exchanges, it's the system and why it's a historical perspective, or the history of education that could be a challenge. Often if we are engaged with Academia, those are things we do in our spare time. If you have worked for a long time in the ABF or are an ABF worker in education, can change the will to see possibilities in such a collaboration with actors, for example” (ibid).

As for actors, the thought of a student driven eco system brings up reflections by the informant from Arbetsförmedlingen (Personal communication, 10th of May, 2023):

“What I'm focusing on, and I think it's the obstacle I'm talking about, it's the budget. I wanted to write a revisionist thought. . If you just take the authorities... So... So, actually everyone works for Sweden AB. You could say. But... We all work for Sweden AB, but not everyone thinks like that. We are expected to deliver results from the different assignments we have. The employment office is more interested in how we get people out of work. While the insurance company, they are maybe interested in something else, they maybe want to reduce the number of medical leave or something like that. That's a bad example, but there are some goal conflicts within the same world that we all should work together for. And that's why I think that it's not about not wanting to be open and willing. I think it's more about what I dare to do, without being wrong. I don't know, it's important to have different tasks and report different types of results. And sometimes it's hard to look up. We work for the same thing, it's Sweden's AB. There should be a government called Sweden's AB. With different departments, instead of different governments. I think that's it. Maybe revisionist thinking” (ibid)

Another view upon experiences with collaborations as an actor towards a student when they felt lack of engagement, that a student shared follows:

“But rather that you are clear with what requirements are in place and that there is someone who can translate what the different steps mean. Because I think that when you go into a company as a student and they have very high expectations of you, then no one will be happy after the result. And that's bad because the company thinks that the person didn't do enough and the student thinks that the company wasn't good because there was no support or anything. Because you want this collaboration to be positive advertising. The students aim to test out how these people actually are and work without having to invest so much in them, except for little time.” (Student, informant, Personal communication, 10th of May, 2023).

## 5.4 Match-making

Some of the students mentioned mentorship as a fundamental role in networks they were previously in other contexts of networks they mean could be of importance when they reflect upon students as a leading role in an ecosystem for innovation.

“...And this mentor can also reflect and guide the students towards the next steps, but also support the students. For example, if you want to do a workshop, then they can negotiate for you with the administration or invite other students like from other groups or other, so someone who plays as a bridge between you and the network, right? Someone who can guide you. And that's the first step, like to found people inside the academia who are open and Collaborative and see potential to do this. “ (Informant, student, Personal communication, 28th of April, 2023)

Looking into the process of choosing different actors when collaborating on challenges, the informants discussed the importance of knowing the conditions from all of the parties involved to understand the different standpoints, perspectives, backgrounds and educational manners. Related to previous experiences on collaboration with students during internship, the informant from ABB Sverige (Personal communication 10th of May, 2023) expresses the problematic to set a “level” for the collaborations. She explains that they have had interns that got big tasks from ABB Robotics Sweden that themselves perceived working there as easy based on that they are so committed to the subject and know everything because of the long experience in the company in which the students did not know that (ibid). Further she means that not knowing the person in advance or their background, competencies and interest creates a barrier for the person doing the internship for example (ibid). However, from a student perspective one student believes that there is a significant challenge related to trust in these situations (Informant, student, Personal communication, 10th of May, 2023). It's understandable that companies may hesitate to engage in student cooperation, as they have no guarantee of the commitment or drive of the assigned student groups she continues (ibid). Sometimes, the random groupings may not work out as expected, leading to a sense of disappointment in which she again highlights, as mentioned before, actors, could potentially be matched with an exceptional group of students. This variation in quality depends on the individuals involved and their level of expertise and motivation, in which the role as a student, relations, and matchmaking is important.

“Which means that students not often end up in a context where they meet someone other than their own course mates, or their own programme mates, you could say. Which I think is difficult, because when you go out and become an alumnus, you might never have those contacts anymore, and suddenly you might need to have contact with other functions. I think the university should be able to function as a platform for the future, if you can say it like that. I miss a lot of this, to get to know other students, to be honest. If it doesn't exist, it should also be a step to create a functional MDU To then be able to meet companies and organizations Otherwise it might be that I know some innovation students Then I will go to them But then I want to meet engineers And then it will be a new journey.”(ibid)

“So, yeah. It's a shame to take it away, because it was really good. In many ways. And I think we can see that quite clearly now in this master program that we're solving. Because everyone has such a mix... Everyone comes from such a mixed candidate program. So there are some engineers, there are more designers, it's very, very mixed, what you can say in our program. And it's exciting in a way because we have so many different inputs. And when we get together and do different tasks, we think in very different ways. Because we have with us what we have learned before, our previous experiences and a lot of theoretical things with us and that gives a lot but I don't think you see that on any other master programme because ours is also so broad, it's innovation and design you can really come in from any candidate, that could be an interesting way of seeing students role as for our master program of innovation and design.”(ibid)

#### **5.4.1 Competence attributes**

One of the students (Personal communication, sees established companies like private companies that are big and established, the one thing they can provide is expertise in an ecosystem for social innovation. He sees them as the people who have been in the industry, have worked there for decades. He explains that it is not necessary to have to test or implement solutions within their own company, but can give other actors such as smaller businesses support together and then go to the smaller company and implement due to specific challenges as an example. He means that it can be a sort of cohesive thing where each partner plays some sort of role and then you have the one concrete outcome at the end together.

According to one student (Personal communication, 28th of April, 2023) there is an acknowledgment of the challenges involved in planning due to the uncertainty of the program of Master of innovation and design and the varied number of marketers, information designers, engineers, innovation, architects etc.

“But what you could focus on more is to try to look at the competences that are and also look, our competences are needed both before and after a product.” (ibid)

She further explains that while broadening the focus allows for a range of competences, it can also lead to a lack of specificity (ibid). She expresses that a more focused approach should be taken by considering the specific competences required before and after the launch of a product or service for students (ibid). She emphasizes the importance of sharpening skills and delving deeper into specific areas of interest rather than maintaining a general approach as a student role (ibid). The desire to become sharper and gain deeper knowledge is a driving factor in pursuing specialized expertise she means are crucial for her individual role in an potential ecosystem, or in general with collaborations with external actors (ibid). She further expresses a desire for assignments within their own field, where they can demonstrate their skills and deepen their knowledge, that the current approach feels broad and lacks the opportunity to specialize in projects with actors (ibid).

"If it were so that we would help you to network with the outside world, both with private actors and with society, then that would be absolutely fantastic, but I don't think it really works that way, at least not in our areas of competence. You have to fish out those networks yourself, on your own."(ibid).

"But it's like, you don't just crash into someone else's workplace, really by collaborating. But at the same time, you need a meeting place that you are going to have. It must be filled with things and who is going to do that and what it should be for things, because it must be relevant so that people feel that you want to take the time from everything else you have to do during your days, both like work-wise and privately. So it must be through values, it must be like educating or feel that you can develop by actually being there, while there is room for these more informal occasions. But also who should be able to take care of it and where do the resources come from and so on. So mine is quite linked to each other, but much of this, I think informal meetings are important to build. It brings more trust to those you know than to those you've never met. And then you become more open and willing to cooperate and share with each other to make good cooperation, as a student and as an actor within a potential ecosystem" (Student, informant, Personal communication, 10th of May, 2023).

## **6. Analysis**

As I delved into the empirical findings, a fascinating narrative began to unfold. It became clear that within the vast realm of the representative metaphors of the ecosystem for social innovation, a peculiar absence lingered – students. They were nowhere to be found, not mentioned nor considered as active participants in this vibrant landscape of change and innovation. This revelation, though not entirely unexpected, raised intriguing questions about the dynamics of collaboration between actors and students. It became apparent that there was no natural synergy between the actors and the students within the social innovation ecosystem. It was as if the ecosystem had not fully recognized the potential of harnessing the power of student involvement. This revelation was not entirely unexpected, considering the lack of mention and utilization of students as active participants within the ecosystem, and further that the metaphors of describing the process of actors functioning in ecosystems for social innovation is not an established way of collaborating with either academia or students in this context.

In this rich tapestry of interactions, a distinctive pattern emerged. The prevailing form of collaboration appeared to revolve around a fascinating dance between actors and students, intricately tied to the concept of challenge and solution. It seemed that actors would present their daunting challenges, while students, armed with their youthful ingenuity and fresh perspectives, would step forward with their innovative solutions. It was a symbiotic relationship, where the actors sought the students' creative sparks to ignite their endeavors, and the students, in turn, craved the real-world challenges that would fuel their growth and learning. However, as captivating as this collaboration seemed, it left a lingering sense of imbalance. The absence of a natural way to integrate students within the thought of an ecosystem created a void, an untapped potential waiting to be explored. It begged the question: Why were students not acknowledged as integral players in this grand stage of social innovation? Were their voices not valued, their contributions overlooked? In the midst of this captivating

narrative, one thing became abundantly clear: The traditional boundaries that confined the collaboration between actors and students needed to be challenged.

From this I have delved into the world of collaborative experiences, seeking to understand the dynamics and outcomes of previous endeavors. Through my interactions with the informants, a distinct pattern has emerged, capturing my attention and driving my curiosity. It is evident that the collaborations in question have lacked the provision of valuable deliverables within a context that the informants perceive as aligning with real-world business practices. Instead, these collaborations have been perceived as fictional for some students, almost detached from the practicalities of the bustling business realm. One interpretation that surfaces is the possibility of a gap or mismatch between the expectations held by the actors involved and the actual outcomes of these collaborative efforts. This finding hints at the need for further exploration, a deeper dive into the underlying factors that contribute to these ineffective collaborations. In my interviews with the students, an intriguing revelation emerges. It becomes apparent that results and deliverables hold significant importance for student engagement. They express a desire for projects that extend both in regards crossing the boundaries of academia or, projects that hold practical relevance for their future workplaces or learning outcomes. They yearn for opportunities where their skills and potential can be showcased, where their contributions are seen as valuable resources. This insight highlights the role that students can play within the collaborative landscape and their sense as perceived actors. By incorporating their perspectives and involving them in meaningful tasks, the actors can create an environment where students feel a sense of worthiness and empowerment. It becomes clear that their involvement goes beyond mere participation; it is an opportunity for them to contribute to the collaborative ecosystem and make a lasting impact. To explore further what role as a student this could be, another dimension needs to be addressed based on the empirical findings.

The insights provided by one of the informants who works in the public sector and is also a student shed light on the value of sharing perspectives with students in her professional endeavors. This revelation aligns with the pragmatic approach, which emphasizes the practicality and usefulness of ideas and experiences. By engaging with students and exchanging perspectives, the informant has gained new insights into the challenges faced by the actors involved. These insights are considered valuable as they contribute to alternative viewpoints and potential solutions. It is important to note that the focus is not solely on presenting students with challenges and expecting them to provide physical products or artifacts as solutions. Instead, the emphasis lies on the practicality and relevance of their perspectives in shaping future perspectives or solutions. What makes this finding intriguing from a pragmatic standpoint is that some students in the study indicate their interest in providing solutions to challenges that can yield tangible products through collaborative efforts between actors. She recognizes the value they can create as students by actively participating in the collaborative

process and contributing to the generation of outcomes that hold practical significance. On the other hand, other students emphasize the value of sharing perspectives and exchanging knowledge within the ecosystem. They view this exchange as an opportunity to enhance their individual networks and engage in the transfer of knowledge and competencies. Their curiosity for learning drives their desire to actively participate in the ecosystem and benefit from the practical insights gained through the exchange of perspectives.

This leads me to the observation that one actor discussed that students should not be the driving force behind the ecosystem, particularly in relation to legitimacy, trust, and policies. Instead, they suggest that students should be a part of it, but the university (MDU in this case) should take the initiative to develop a potential social innovation ecosystem. Examining this subjective experience is interesting from Meissner and Howaldt's (2018) allusion to institutional theory regarding how social behaviors collaboration with students and institutions includes formal rules, regulations, and informal norms in which they, according to his contributions to the field, play a crucial role and interactions within a given context. The discussions of this new phenomenon upon engaging students in a different role than they previously might have, can therefore suggest bigger complexities in the formation of how we traditionally refer to the interaction, developed through social behaviors. But, these perspectives grasp the abstract systemic level that emphasizes the context more than the nodes of how it should be structured rather than how actors actually operate within it. Another intriguing dimension that emerged from the interviews is the perspective of students who believe that students should play a driving role within the ecosystem. This view could challenge the conventional notion of hierarchical power dynamics, suggesting that the student's role should be more autonomous and less dependent on Universities in which interactions are dictated by hierarchical rankings, in which students are in the lower rankings. As an emergence of ecosystems being an ecological metaphor rather than mechanical, the ecological metaphor seeks to understand the patterns, dynamics, and emergent features that emerge from the interactions of the components rather than The mechanical metaphor that aims to comprehend systems by analyzing their individual components, whereas.

My interpretation is that an actor's background and experiences and social behaviors, also can influence how the role as a student is seen in an ecosystem for social innovation. Some informants in this paper seems to mainly have a holistic perspective of systems from my interpretation, taking into account their interactions, relationships, and context in the role for students, as for other informants focuses on more mechanical metaphors system perspective based on fixed rules and systematics in the role of students on a more abstract level. One interesting aspect is that one student has experienced that academia is a lot of bureaucracy, in which they can't do anything without a very long plan and it has to be very well-structured, which he perceives creates a lot of locks. He further discusses that students do not have these obligations, which he means makes it more free. To add on to this



complexity, all of the students do not recognize them as being students, rather individuals that are educating themselves. This led me to delving into the quadruple helix model that the participants were in during the focus group interpreting that everyone somewhat serves within different functions, and that the actors also serves as individuals within civil society outside their function related to their work life.

As one of the actors talks about students included in a potential ecosystem for social innovation with all of the actors involved in a quadruple helix, another dimension adds upon the ecosystem that all actors involved could see it as a learning process. That got me thinking about the previous *concept of challenge and solution* in which the usage of human capital is viewed in a new perspective challenging the dynamics on a micro-level. Some of the students perceive the student's role as being one of active participation and direct engagement with both fellow students and other actors within the ecosystem. Rather than relying on a structured hierarchy, they emphasize the importance of accessible pathways that foster direct connections between students and actors involved in the ecosystem. As most conceptualizations of innovation ecosystems rather contain an inventory of actors, relations and resources or quality that need to be in place for the 'miracle' of innovation to happen as for Moore's (1993) original application, this findings portraits the need about how dynamics can affect the tango (it takes two to tango) in between specific actors. Within the realm of innovation ecosystems, it is common to encounter conceptualizations that focus on enumerating the actors, relationships, and resources necessary to facilitate the occurrence of innovation, much like Moore's (1993) initial application. However, the findings of this study have shed light on a different perspective - the significance of dynamics and the interplay between specific actors. My interpretation is that innovation, much like the intricate dance of the tango, requires the active participation and collaboration of two partners. It is not solely the presence of actors, resources, and quality that leads to the "miracle" of innovation, but rather the way in which these elements interact and influence one another based on the empirical findings. By shifting our attention towards the dynamics within innovation ecosystems, we gain a deeper understanding of the complex interdependencies that shape the innovation process. It becomes evident that it is not enough for actors to exist in isolation; they must engage in a harmonious and coordinated exchange of ideas, knowledge, and resources.

Just as in the tango, where both partners must move in synchrony, innovation thrives when actors engage in a mutually beneficial dance. The success of innovation ecosystems lies not only in the mere presence of actors, but also in their ability to establish meaningful relationships, foster collaboration, and leverage their collective strengths. This perspective urges us to consider the nuances of human interactions and the subtle dynamics that can either hinder or facilitate innovation with reference to Baiyere (2018) regarding theorization of metaphorical definitions. . It highlights the importance of

creating an environment where actors can engage in a reciprocal and productive exchange, where ideas can flow freely, and where trust and mutual respect underpin the collaborative process. We recognize that it is not a static composition of actors and resources, but rather a dynamic network of relationships, interactions, and shared aspirations. By acknowledging the significance of the interplay between specific actors, we could gain more valuable insights into how these interactions shape the innovation landscape and pave the way for transformative advancement, as students of emergence and co-evolution arised from a practical problem in this thesis, whilst not existing literature. From the empirical findings, another perspective sheds light on the potential benefits of empowering students to take a more proactive stance within the ecosystem. By removing barriers and encouraging direct engagement, students perceive that they would have greater opportunities to contribute their unique perspectives, ideas, and expertise within an ecosystem. Even Though this study does not have the aim to remove the barriers by stating them all, this leads me further to think about the portrait of the role as a student in this context as Clauss et al., (2018) portrays the role for students in university as relevant entrepreneurial stakeholders, and that the research stream still remains underrepresented.

This approach could comprehend a more inclusive and collaborative environment, where students can actively participate in knowledge exchange, innovation, and problem-solving. This led me further into looking at how this could compete with traditional power dynamics and highlights the importance of recognizing the agency and potential of students in driving activities. This alternative perspective opens up new possibilities for reimagining the student's role within the ecosystem, emphasizing their capacity to act as catalysts for change and innovation. Further exploration of students perspective, alongside other diverse viewpoints provide valuable insights into the dynamics and effectiveness of student-driven involvement within the technology transfer ecosystem. It offers an opportunity to reconsider existing hierarchical structures and explore alternative approaches that foster greater student autonomy and active engagement in the pursuit of success.

The interviews with the students shed light on their eagerness to actively participate in an innovation ecosystem. They emphasize the importance of having a prominent role within the ecosystem, as they believe it would enhance accessibility and facilitate meaningful interactions between actors and students. According to some students, being in a leading role would not only foster greater

engagement but also improve the accessibility of students who may have been harder to reach previously. The students express a desire to break away from hierarchical structures, where communication and engagement typically flow from top to bottom. Actors within the quadruple helix, share experiences of not knowing who to contact, and what type of students exists within mdu. Instead students envision a more inclusive and collaborative approach, where students and actors have direct access to each other. By assuming a leading role, students share a belief to aspire to bridge the gap between various stakeholders, promoting greater accessibility and exchange of ideas within the innovation ecosystem. Their enthusiasm for a leading role is driven by a shared belief that it would foster a more open and accessible environment, allowing for increased interaction, collaboration, and the exchange of valuable knowledge and insights. The students recognize the potential for mutual learning and growth that can arise from active engagement within an inclusive ecosystem. My interpretation is that they shed light on empowering students to play an influential role in the innovation ecosystem, as it not only enhances their own learning experiences but also promotes a more inclusive and vibrant collaborative space for all stakeholders involved. Even Though these samples serve a limited representation of actors in the quadruple helix, many questions arise with these empirical findings upon existing literature for ecosystems for innovation, my interpretation is that none of these supports the interconnectedness and micro- levels of extracting students. I am thinking about how Granstrand och Holgersson (2020) believes that the new concept is balanced, should they have nuanced the actors more, have they looked upon the academy as a total and made the right decision? Do the students have any specific quality that makes any difference? Simpact (2016) highlights the critical role of education, specifically within the context of universities and academia, in cultivating a broader perspective among individuals. It emphasizes that education and learning are instrumental in fostering social innovation by enabling individuals to gain new insights, question established assumptions, and develop innovative solutions. However, it is noteworthy that Simpact's discussion does not specifically mention students in relation to this process. Within the academic discourse, previous papers have made attempts to contribute to the recognition of students as valuable resources. Researchers have explored the concept of ecosystems for innovation and the quadruple helix model, which integrates the participation of academia, industry, government, and civil society. However, despite these efforts, the specific role and potential contributions of students have not been thoroughly examined or elaborated upon.

As a lot of different dimensions are built up on potential roles students might have in an ecosystem for innovation, the view to look upon students is different and therefore does not support previous research in which they assume that they belong to the university which they don't necessarily do.

## **7. Discussion and concluding remarks**

This thesis started out with a basic and practical question: - What is the role of students in the innovation ecosystem?

According to Nielsen and Cappelen (2014), student behavior can influence perceived knowledge transfer in collaborative initiatives between students and external actors. According to the author, if students approach the collaborative project with the mindset of working on a school paper rather than as professional knowledge workers engaging with the business, the business partners may regard them as less serious. If, on the other hand, the business partner does not recognize and respect the students' potential to provide significant knowledge, the students are more likely to take the position assigned to them and behave appropriately, according to one of the primary findings in this empirical collection. My interpretation is that ignoring or dismissing students (amphibians) has a direct impact on collaboration in an innovation ecosystem. While the empirical findings speak about students' actual experience, the literature study discovered a void that forced me to rethink my expectations on theory, theorizing and the object of study. In order to answer the question, I first needed to reflect upon the very notion of what we mean by "students" and in which way they actually are - as taken-for-granted in many theoretical frameworks - representatives for the "university" in general.

The empirical study allows for the interpretation that students do not necessarily need to be part of academia, beyond requirements for academic examinations. My interpretation is that students do not necessarily have the same role as the university. Students are not just any actors in the university, perhaps not even primarily associated with the university. According to the Gärdebo & Wiggberg (2012), they are the university's "unspent resource." For starters, students are free, in contrast to other actors within the university. This could further mean that students can be seen as misclassified in established, underdefined system theories, not distinguishing them from the university as a "public administration"

Given this distinction, students are basically representatives of civil society; they are not salaried, contractually obligated, subject to management or time reporting, and do not belong to any profession, among other things. Few innovation models involve civil society (e.g. quadruple helix), and even as they do, students are still misclassified as categorically belonging to the university. The Triple Helix concept, which emphasizes collaboration among academics, industry, and government, has long been discussed in the context of knowledge and innovation. However, the presence of civil society as a significant component in the Quadruple Helix model has spurred new discussions about the classification and functions of individuals within this framework. From a narrative perspective this text

aims to delve into the dynamic character of students' engagement in the Quadruple Helix model, investigating their fluctuating identities and the uncertain routes they follow.

**The Shifting Role of Students;** Students are largely connected with the university sphere in the classic Triple Helix paradigm, generally preferring their academic studies over involvement in the industrial or government sectors. However, a new perspective evolved, challenging the established order and introducing the Quadruple Helix model. This alternate strategy included civil society as a key component, raising concerns about categorisation and the changing responsibilities of individuals within this complex structure. However, an alternate classification emerges within the Quadruple Helix paradigm, implying that students may, in fact, belong to the civil society realm. This viewpoint emphasizes the transient and finite nature of their relationship with the university, despite the fact that Gummesson (eds) acknowledges their knowledge contributions as examination requirements. This acknowledgement reflects the principles of a legal state in which the curriculum defines students' obligations.

**Students and the Civil Society:** Students often take part in activities for personal fun and educational enrichment while satisfying their academic commitments. Nonetheless, it begs the question of where these activities fit into the Quadruple Helix paradigm. Powell's process ontology adds a time component, highlighting that children are continually growing and primarily originate in their homes and schools. Initially, they are considered citizens with particular qualifications who have been allowed entry and the ability to take examinations. As a result, their primary affiliation could also be with civil society. Students can also represent and come from the industry or government sectors if they study and work at the same time or seek online learning while running their own businesses.

**The Uncertain Paths of Students;** Powell emphasizes that students are on a journey with an unpredictable endpoint, which is often unknown even to the students themselves. This idea emphasizes the fluidity of students' identities and the transformative potential that exists within them. Students might discover new passions, adjust their emphasis, or explore new avenues as they proceed through their educational experiences. As a result, their classification within the Quadruple Helix model may shift throughout time to represent the fluidity of their roles and contributions in society. Students have a unique place in the Quadruple Helix model that defies typical categorizations. Their involvement with civil society, fueled by their changing identities and unclear paths, complicates their role within the framework. Students have the freedom to participate in extracurricular activities that coincide with their particular interests and objectives while complying to the legal duties mentioned in the curriculum. Recognizing the multidimensional nature of students' involvement in the Quadruple Helix model leads to a more complete appreciation of their potential to contribute to knowledge generation and societal growth.

Moore's study from (1993) emerged as a potential counterargument to the concept that classification is exclusively based on distinct analytical levels in scholarly debates. Moore pioneered the concept of separate ecosystems, expanding on the traditional viewpoint of collaboration against conflict. According to Moore, an ecosystem is formed by the real collaboration of entities, rather than rigid labels such as "industry," "university," or "public sector." As Moore emphasizes the need of investigating real-world dynamics, this fundamental distinction transforms the issue into an empirical inquiry. From Moore's (1993) perspective, the subject of students' roles switches to a different focus. Students do not appear to be part of any identifiable ecosystem, at least not within the scope of previous investigations, such as Nielsen and Capellen's study in 2015. This observation underlines the abstract nature of generic classifications, regardless of practical facts, as well as the normative aspect, which emphasizes how things should be rather than how they are. This analytical perspective reveals the inherent constraints of the Triple and Quadruple Helix models' broad frameworks.

Researchers get a more sophisticated grasp of classification issues by adding Moore's views into the current dialogue. Moore's emphasis on empirical study urges us to investigate the actual dynamics of collaboration, acknowledging that the entities that actively collaborate shape ecosystems. This viewpoint necessitates a reconsideration of the role of students, who may not fit neatly into preset categories but rather contribute to the ecosystem in unique and developing ways.

As the scholarly conversation continues, researchers try to bridge the gap between abstract frameworks and practical realities, inspired by Moore's ideas. They acknowledge the importance of investigating the intricate interplay of actors and their joint efforts within ecosystems in order to ensure that classifications are founded in the complexities of real-world interactions. The research community hopes to refine and improve the Triple and Quadruple Helix models by embracing the empirical nature of classification challenges, fostering a more comprehensive understanding of the multifaceted roles that students and other stakeholders play in driving knowledge creation and societal progress. Thus, the narrative discussion stretches beyond theoretical frameworks, embracing Moore's empirical essence and inviting scientists to investigate the rich tapestry of ecosystems and their members. Researchers attempt to uncover the delicate relationship between classification, collaboration, and societal growth through this constant exploration, ultimately paving the way for more inclusive and contextually applicable frameworks.

Students have their own ethos. Their freedom and independence - along with other typical characteristics such as youth, limited knowledge/experience, ambiguous/institutionalized roles that may be more akin to subordination, low status, being perceived as someone in need of help, and the expectation to be compliant - give them entirely different conditions compared to those affiliated with the university. Even alumni do

not possess all these characteristics and therefore have a different ethos, which provides different conditions for who they are expected to be and how they are expected to act. Expectations and institutionalized roles influence how one is expected to behave, how they should be treated, and the information they receive, among other things. Students in this thesis share a strong belief of a more inclusive collaboration in which they want to be seen as a resource of impact and interest in a role of legitimate action due to their individual competence and knowledge areas from educational and business experiences with openness for different learning opportunities that arises from engaged actors, that are eager to collaborating among each other, in line with “it takes two to tango” representation.

Regarding the role of students, previous research tends to take the perspective of entrepreneurship and how collaboration can be improved through entrepreneurship education, to make students more qualified and motivated for actively taking part in the innovation ecosystem. However, there is hardly any empirical evidence underpinning such claims. Rather, the empirical evidence of this thesis concurs with Nielsen & Capellen’s (2014) observation that the roles available to students also depend on other actors taking them seriously, and that the reasons for less than optimal exchange between students and other actors deserves further investigation. It is an interesting observation that students fall between the system perspective’s grand theorizing and pedagogics’ narrower focus on education: - So what is the point of pursuing a research approach where either students or ecosystems are not mentioned? There is an obvious gap in where the abstract level of the system perspective, whilst it can serve as an overview of the concept, does not specify actors and misses to provide a micro perspective on what is occurring between actors, that could explain how it all happens. As universities have a function, should students too?

Similar to the practical problem identified by some students who argue that they are overlooked as a resource, students seem to be overlooked theoretically as well, by established metaphors for the ecosystem for innovation. In the empirical data collection, tensions can also be seen in how we think about students, how we use students, and perhaps preferably more identified as individuals. We still want to investigate the dynamics of an ecosystem for innovation. It is evident that students are not hesitant in expressing their thoughts and reflections on how they want to collaborate with other actors, which sets the tone for the empirical material collected for this study. It becomes clear that the representation of the ecosystem for innovation in the existing research on actors' "actual" roles is generalizing in the sense that it has not been enriched with specific contexts and their adaptability to a micro-level. The helicopter perspective hovers over the giants, but it doesn't really tell us how the actors want it to be in the potential ecosystem for innovation they are already in or intended to be part of. It only reveals that these actors in the metaphors are deemed important in previous research. Similar to the informants interviewed, the role is about much more than what they are entitled to. In this study, students are seen as having a commitment to challenges that require competencies other than their own to solve, and their role is primarily driven by individual

engagement, individual competencies, and the attributes through which collaboration mainly takes place based on their interests.

As discussed by Granstrand and Holgersson (2020), tensions arise in that the ideal picture of representations of metaphors does not reflect empirical observation. It is important to acknowledge the potential value of the text's contribution to the field of innovation ecosystem research; the focus on complementary/cooperative and substitute/competitive relations and the emphasis on the actor system and the artifact system provide a framework that has the potential to enhance our understanding of innovation ecosystems. The text highlights the importance of considering the balance between these competition-systems relations, suggesting that it offers a more comprehensive view of the dynamics within an innovation ecosystem. However, it is crucial to approach this claim with caution. This raises questions about the validity of solely relying on the proposed framework to fully grasp the complexities of innovation ecosystems, since research regarding actors roles within ecosystems for innovation could have an impact on the discussed balance.

There is no direct framework for how to approach students in an ecosystem, and this thesis brings forth interpretive themes that provide a glimpse of aspects that could deserve further exploration. The multifaceted and emergent role of students indicates a richness in potential perspectives - including tensions and contradictions. Further studies may consider different levels and ways of theorizing, as well as their consequences. Systems theory, by definition, is more interested in the relationships between actors rather than the actors themselves, is an alternative to traditional industry classifications, etc. New definitions of the concept "ecosystem for innovation ecosystems should be taken into consideration. From the view of pragmatism, nothing is true until it is proven in practice. As this thesis clearly demonstrates, the layers of concepts developed descriptively as a metaphor and the importance of examining what actually works in practice based on action and results, should go hand in hand.

The role of the student is at the heart of the innovation ecosystem metaphor - that of emergence and co-evolution. Therefore, it should be worth further research, especially as innovation theories at the high system levels that currently exist cannot really explain the very essence of the metaphor that is the basis of the theory. It is no longer just about "technology transfer", but must be more things that are taken into account . This finding highlights the need for further exploration into the factors that contribute to ineffective collaborations to provide valuable collaborations in between actors and the emergence dynamics between them in an ecosystem. It prompts researchers to delve deeper into the reasons behind the perceived lack of valuable deliverables and the discrepancy between the collaborative setting and the informants' expectations. It may lead to examining the specific challenges and barriers that hinder successful collaboration within the context. By delving deeper into the interplay between competencies, collaboration dynamics, and innovation, researchers can contribute valuable insights to enhance collaborative practices and promote impactful social change. In sum, this interpretive analysis emphasizes



the need for a more comprehensive understanding of the underlying factors that influence collaboration effectiveness and the role of tangible outcomes in fostering engagement and value creation. In line with Nielsen & Cappelen (2014) the dynamics of student-business partnership initiatives are critical in defining the perception and effectiveness of knowledge transfer. Students' actions and attitudes might have a major impact on the amount of seriousness provided to them by the business partner. If students display a lack of professional commitment or fail to connect their behaviors with knowledge worker standards, the business partner may view their contributions as less valued. This notion has the ability to impede the overall knowledge transfer process within an innovation ecosystem collaborative framework. Nielsen & Cappelen (2014) highlights the reciprocal relationship between student behavior and the perception of knowledge transfer in collaboration projects involving students and businesses. The way students approach their role and responsibilities within the project, as well as the extent to which the business partner values their contributions, can significantly influence the effectiveness of knowledge exchange. Understanding and addressing these dynamics is crucial for facilitating successful knowledge transfer and fostering a productive collaboration environment where students are taken seriously, fostering; it takes two to tango is therefore an interesting aspect to delve further into. Further research and exploration of strategies to promote a more conducive and mutually respectful engagement between students and businesses are warranted to optimize knowledge transfer outcomes in such collaborative settings. Future research should take this into account and expand the collection of empirical evidence using, for example, observations. This would possibly give a clearer picture of how this organically formed network between society and the students' role looks like in practice and further build a stronger foundation for the study's results.

In the introduction of this thesis, the study was explained using a metaphor: *"Students are like hidden seeds of innovation in the fertile soil of an ecosystem, waiting to sprout and drive positive change."* Based on the empirical study conducted, this metaphor could moreover include civil society: *"Civil society is like hidden seeds of innovation in the fertile soil of an ecosystem, waiting to sprout and drive positive change."* Powell insists on the aspect of emergence, which besides Nielsen & Cappelen (2014) findings about students not being taken seriously in line with the thesis empirical collection also makes me question: Are students rather representatives of the *civil society*, or of what Powell referred to 'amphibians', or representative of nothing but themselves as *individuals-in-the-making*, as a representative of *becoming* itself and *emergence* in itself – through their interaction *on* a campus which they don't own, but inhabit? And what do companies really want when they want to be a campus? What is special about a campus and life on a campus? What is the very essence of it?

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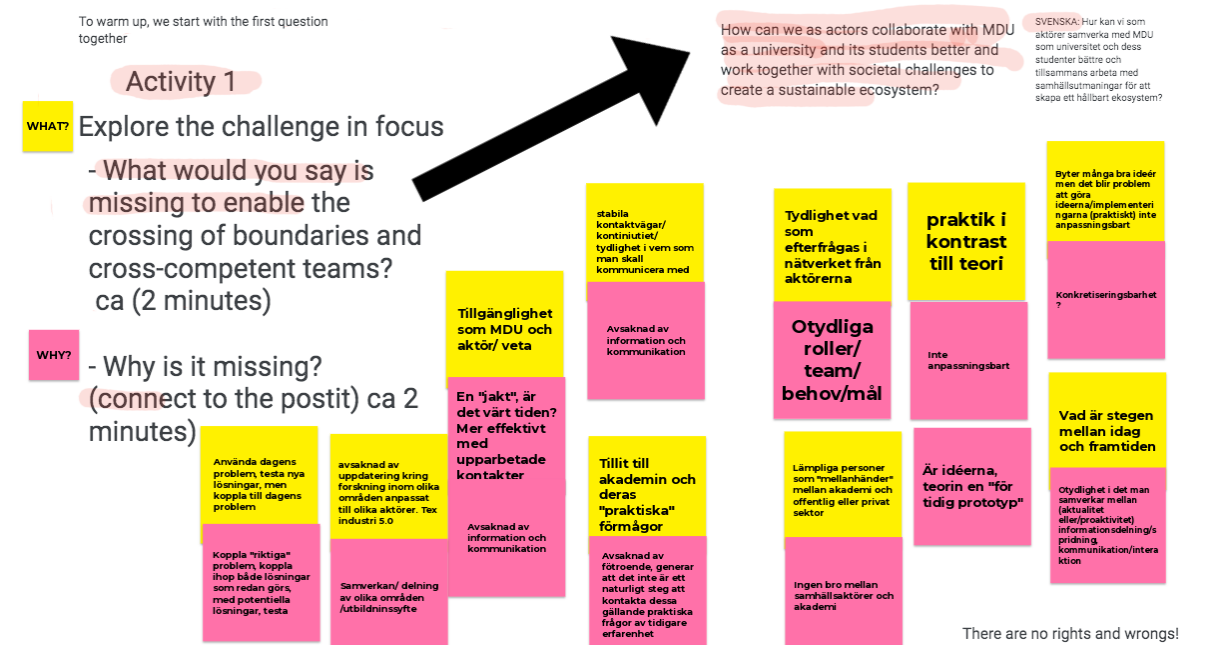
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## Attachments

### Workshop- focus groups

First activity Theme and subtheme; **Crossing boundaries & Cross disciplinary teams**



First activity Theme and subtheme; **Actor of networks & relational built**

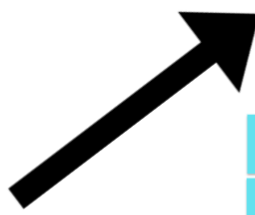
## Activity 1

Take a post it colour and make a minimum of 2 post it notes

What would you say is missing to enable Actor of networks & relational built ?

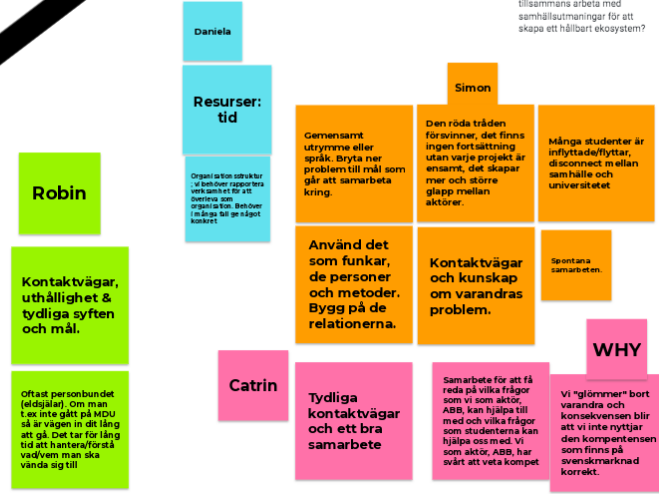
- Why is it missing? (connect to the postit with new ones)

(individually)



How can we as actors collaborate with MDU as a university and its students better and work together with societal challenges to create a sustainable ecosystem?

SVENSKA: Hur kan vi som aktörer samverka med MDU som universitet och dess studenter bättre och tillsammans arbeta med samhällsutmaningar för att skapa ett hållbart ekosystem?



## First activity Theme and subtheme; Openness & Willingness

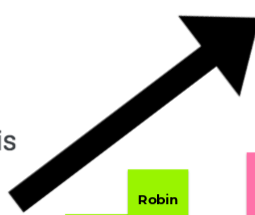
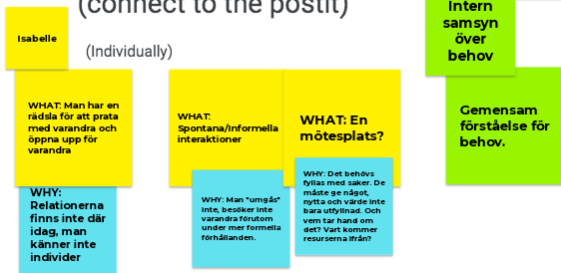
## Activity 1

Take a post it colour and make a minimum of 2 post it notes

-First: What would you say is missing to enable the Openness & Willingness?

-Second: Why is it missing? (connect to the postit)

(Individually)



How can we as actors collaborate with MDU as a university and its students better and work together with societal challenges to create a sustainable ecosystem?

SVENSKA: Hur kan vi som aktörer samverka med MDU som universitet och dess studenter bättre och tillsammans arbeta med samhällsutmaningar för att skapa ett hållbart ekosystem?



## Second activity, idea generation based on challenges found in first activity

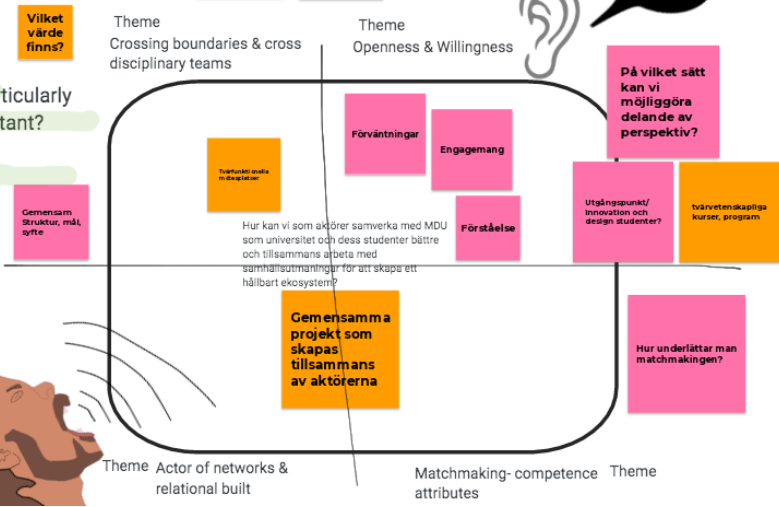
In what way do we want to use the "network" of sustainable ecosystem to solve societal challenges?  
 missing elements around for the themes be facilitated?

In what way do we want to use the "network" of sustainable ecosystem to solve societal challenges?

Matchmaking kompetens - en "speaking partner" så att vi som aktör ABB kan söka in en fråga / problem. Idag är det lätt att vi går till vår kontakt exempelvis Robotik fast egentligen

- Vad erbjuder man?
- ENGAGEMANG
- Ska lärarna vara involverade? Forskare? etc
- Hur kan man arbeta med ämneskunskap?
- Vad bidrar man som aktör med? Som student?

- Are there any actors that become particularly important? Which roles can be important?
- What resources are required?
- How can we utilize these resources?



Discuss together, use, more pages, the old post it notes, pictures, arrows, text, explanations that you consider appropriate,



## Interview guide

### Interview questions- Cornelia Alenbring; Master thesis

#### Welcome to this research interview!

As the researcher conducting this study, I value your participation and trust. I want to assure you that your confidentiality and anonymity are of utmost importance to me. Your personal information and responses will be kept strictly confidential and will only be used for the purpose of this study. To ensure that your participation is safe and ethical, I adhere to responsible research practices. This means that I respect your right to make informed decisions about your participation, and that your participation is voluntary. I will explain the purpose and procedures of this study clearly, and will answer any questions you may have.

Furthermore, I will ensure that your anonymity is protected by assigning you a pseudonym or a code that will be used instead of your name in any publications or reports related to this study if you would like. This will ensure that your responses cannot be traced back to you. Once again, thank you for your participation in this study, and I look forward to a fruitful interview while ensuring confidentiality, anonymity and responsible research.

The purpose of the study i am doing is to explore opportunities for social innovation in a quadruple helix model that is student driven looking into what preconditions are necessary to facilitate an ecosystem for the stakeholders involved in the quadruple helix network model. In my interview I use the word network frequently and to clarify, in this study it refers to a group of people from different businesses, parts of society and industries that are operating with each other to work on specific tasks together (forming kind of a community one could say)

1. What is your educational background and where did/do you study?

(what is/ is it a practical program with focus on business life, or more theoretical based?)

2. What is your experience of networks with different external actors studying at university?

/if not.. wasn't it networks?/no interest, not enough resources etc

3. Did you have contacts/collaborations with other actors during your period of studies? if yes, in what ways did you collaborate, through assignments etc?- What type of actor?

( If not, was that something you missed when you studied? - Could things have been different according to you?)

4. Were you responsible for contacts with collaborators or were you given partners for specific tasks in courses?
5. What are your thoughts about collaborations with external partners outside university and with the university?
6. In what ways do you think a network with different actors in society could be used for you and other students with a thought of working together?  
(within different areas related to your field of studies?)  
What benefits could it have for your studies, worklife?
7. What are your thoughts about having a student driven network of individuals, organizations, and institutions that work together to explore and create, maybe also implement innovative and creative solutions to social challenges?  
- (informal, formal) in courses- outside courses
8. What would you say could support such a network in a student environment for you to commit or participate?  
- (informal, formal) in courses- outside courses, (are there any key characteristics?)
9. What is your experience/thoughts with such a network? Have you participated in or led any initiatives within such networks? If so, can you describe your involvement? (have you had experience?) (if yes delve into it, if not jump over)
10. What do you think could be some of the challenges and opportunities that exist within networks for social change that is student driven? (If you reflect on your own studies) (In what ways could these challenges and opportunities affect the success of initiatives aimed at social change?)

(If you reflect on your own studies) (In what ways could these challenges and opportunities affect the success of initiatives aimed at social change?)

11. What actors/stakeholders do you perceive as important for universities and students if they would work towards challenges with social change?  
(For example businesses, civil society and academia, communities)

12. If we look at what roles different actors/ stakeholders could play within networks for social change, in what way would you appreciate collaboration and contribution to the network? - in what way linked to university/courses would it be beneficial for you?

13. If you were likely to be in a network with different actors, in what way linked to university/courses would it be beneficial for you?

- Explain diversity and inclusion if they do not understand it related to the context

14. If there is diversity and inclusion within a network, how would you perceive that as a student?

15. What role in a network as a student have you had, or in a network as a student how would you want to have it? What is important to you?

16. Looking ahead, what do you see as the future of networks for social change?

- What trends and developments do you anticipate?

- What do you think about these in relation to students and universities as the main actors?

17. Do you feel like you would like to add anything more? Feel free to share

## **Creative Lab**

Creative LAB is a student-focused innovation lab created by Simon Lindblom, Inés Acinas and Anna Khofman during a course in master program of innovation and design in the autumn of 2022. As a student-run, bottom-up organization with students as the primary stakeholders, the Creative LAB was developed within this framework. This generates a wider range of platforms for various projects and collaborations for the students as well as the university. This enables them to take charge of their education and engage in active learning. Along with allowing students to meaningfully develop their talents, it also promotes creativity and teamwork. Students are inspired to think creatively and innovatively as a result of this. Students can explore, experiment, and hone their abilities in a secure atmosphere provided by the lab. No matter what their major, all students are welcome to use the lab to further their creative endeavors. The lab is made to give students a place to experiment with and practice addressing problems creatively.

Currently the platform has proceeded with multiple collaborations and co-production with businesses as ABF, PMU second hand, Mimer, The main goal for a creative lab is collaborations in a low barrier environment enabling collaboration with both local and international contacts supporting an

innovative and creative climate with students as the main steerer wheel in the thought of network. In the start of Creative Lab seeking co-production and collaborative partners, a range of both regional and international businesses has shown a high interest in collaborating and engaging academia in different sections of their organization due to lack of competence, resources, time, experience within innovation and design and explicitly demonstrated an interest in increasing the attractiveness of the city through an exchange of cooperation. As they see themselves as both students but also civilians, they have discussed their role within a quadruple helix in civil society, due to the still non-fundings, and the minimum of regulatory aspects of involving this network system into actors as university constraints, the choice is mainly strategically and still under process.



*Creative LAB logo, Simon Lindblom 2022*

