

Partnerships for Innovation in Industrial Design Education: An Analysis Using the Triple Helix Approach

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ABSTRACT

This research investigates the partnership between university-industry through sponsored projects within the scope of the Triple Helix Innovation Model. It is specifically anchored in intangible conditions of the model, identified in the existing literature on the subject. The objective is to discern best practices aimed at fostering innovation within the domain of industrial design education. Data was collected firstly through semi-structured interviews, complemented by participant observation and desk research for triangulation. The data were examined by thematic analysis with AtlasTI. The findings reveal key aspects of these partnerships, emphasizing the collaboration and teamwork, a market-oriented culture, involving real-world applicability, general feedback, and early technology access. The students' skill development is also frequently mentioned. Certain aspects such as the involvement of civil society, which is more common in university-government partnerships, and intellectual property protection, appear to receive comparatively less attention in the partnership.

Keywords: Entrepreneurial University, Industrial Design Education, Innovation, Triple Helix Model, University-industry Collaboration.

INTRODUCTION

The partnership between academic institutions, industry partners and government entities, as envisioned in the Triple Helix Innovation Model, has been the subject of research for several years and is solidifying itself as an innovation model with numerous ramifications. In this research, the dynamics of collaboration and partnership through university projects sponsored by industry partners are explored, adhering to the theoretical foundations of the Triple Helix Model. Therefore, we seek to identify how the university promotes innovation through projects sponsored by industry partners. Our main objective is to identify best practices of innovation in these sponsored projects and verify its alignment with the Triple Helix Model, assuming practices consistent with the Model may manifest in this context.

The chosen institution for this study is the Academy of Art University, located in California (US), the focus being on the School of Industrial Design, which is known for its excellence in the field. The motivation is a strategic decision to employ participant observation as one of the research methods, since a member of the research team was enrolled in a Post Doctorate program during the period. This opportunity allowed a deep investigation of the institution's

approach to industrial design education and innovation. To advance the understanding of how design schools can effectively foster innovation through collaborative projects with industry partners, while also remaining aligned with the Triple Helix Model, a case study was conducted. The data collection involved semi-structured interviews with stakeholders, along with participant observation and desk research, providing a triangulation of data to enhance the confidence level in the results. From a strategic design point of view, these partnerships operate as innovation ecosystems where design mediates collaboration and value creation. Strategic design reframes the designer as a connector aligning actors and goals (Celaschi, 2017; Manzini, 2015), extending the Triple Helix framework to design education and innovation practice.

Our findings indicate some of the more prominent aspects in these partnerships, such as a market-oriented culture that involves feedback, real-world scenarios, client needs, and early access to technology, among others; a culture of collaboration over a sense of competition; and a focus on students, their portfolios, and their skill sets. Some less prominent aspects in this university-industry partnership concerns the civil society, which is usually linked to government, and also the intellectual property protection, as the primary focus for both the university and the industry in this context is not centered around monetizing ideas. As a secondary output, this research proposes a prioritization for these best practices, based on the general results, outlining a refined approach for the industry-university relation model in the analyzed case-situations.

1. METHODS

Firstly, to build the theoretical foundations, a metadata collection was conducted on the Scopus database in early November 2023. The aim was to understand the academic research status on the subject. The search string targeted articles and conference papers published between 2018 and 2023 with the keywords “triple helix” and “design,” focusing on related subjects and research areas. This included Social Sciences, Engineering, Decision Sciences, Arts and Humanities, Multidisciplinary, and Business, Management and Accounting. Keywords related to innovation, entrepreneurship, open innovation, university-industry collaboration, and academic entrepreneurship were also included.

This research is an empirical qualitative analysis presented as a case study of the partnership between a university and the industry. The study focuses on the Academy of Art University and projects sponsored by two companies during the spring semester of 2023. The primary data source is semi-structured interviews with stakeholders in various roles within the university-industry partnership.

Five interviews were conducted via video meetings with two master's students, two university faculty instructors (one also being the school director), and one industry partner. The questions were based on “conditions for enabling the Triple Helix Model” identified by Cai, Pugh, and Liu (2015); Ranga and Etzkowitz (2013); and Cai and Etzkowitz (2020). The conditions are market-oriented culture, Intellectual Property (IP) protection, sense of competition, civil society, and democracy in decision-making and they were adapted into questions as shown in Table 1.

Table 1: Alignment of the interview questions with the original intangible conditions

Conditions identified by Cai, Pugh, and Liu (2015)	Interview questions in this case study
Shared beliefs in knowledge as a key to economic growth	What are the key drivers for innovation practices within AAU?
Market-oriented organizational culture	What is the role of a market-oriented culture within the university in shaping innovation practices?
Effective intellectual property protection system	How does the School of Industrial Design address the matter of intellectual property protection? How does the institution balance intellectual property protection while fostering collaborative research and innovation with industry partners?
Strong sense of competition	Does your institution promote a healthy sense of competition amongst colleagues in order to boost innovation? How does it incorporate feedback from external stakeholders and does that relate to this sense of competition at all?
Process management in knowledge production	Removed
Civil society	How does the Academy collaborate with civil society to foster innovation?
Democratic policymaking	What is the role of external partners, students, professors or other stakeholders in the decision-making processes of innovation practices?
	Added: Would you like to comment anything else regarding innovation practices that may not be contemplated in this interview?

The first intangible condition proposed by Cai, Pugh, and Liu (2015) is “shared beliefs in knowledge as a key to economic growth” (see Table 1), however, given the study’s emphasis on innovation, the inquiry was rephrased. To avoid potential bias, the explicit mention of the word “knowledge” was omitted. The question was reformulated as: “What are the key drivers to innovation practices at the Academy of Art University?”, allowing for broader responses. The first and last questions of the interviews were open-ended to identify key drivers to innovation from the stakeholders’ perspectives.

The fifth intangible condition, “process management in knowledge production” was also not used. A pilot interview revealed that this subject might be beyond the purview of the stakeholders, which included professors, students, and industry partners. Only one stakeholder (the director) might have relevant insights into this aspect. This decision was based on the need for corroboration from multiple stakeholders or other data collection methods.

The interviews were transcribed and systematically examined using AtlasTI. The analysis followed a three-step process: researchers first identified specific labels, then incorporated labels suggested by AtlasTI’s Artificial Intelligence (AI), and finally merged these labels to increase confidence in the identified labels. Segmentation was performed with labels assigned to excerpts from the transcripts based on stakeholder classification and affinity to intangible conditions, creating a list of subjects.

The data interpretation methodology is based on thematic analysis (Braun and Clarke, 2006), complemented by participant observation and desk research for triangulation within the case study. Participant observation was conducted by one of the authors, who served as a guest professor during postdoctoral studies in 2023. Desk research included diverse data sources such as the university’s website, emails, institutional communications, documentation such as Strategic Plan 2022-2027, and the postdoctoral report from the guest professor. These cross-

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verification efforts enhanced understanding of the phenomenon and bolstered the reliability of the findings.

2. THEORETICAL BACKGROUND

The Triple Helix Innovation Model, initially proposed by Etzkowitz and Leydesdorff (2000) as a framework that describes the interaction between academia, industry, and government as key entities in fostering innovation, has been extensively researched. Researchers have yielded several adaptations to the original model, most notably the incorporation of supplementary helices (Carayannis and Campbell, 2009). In parallel, studies on entrepreneurship in universities are also well represented in the literature. University-industry partnerships are presented as a form of collaboration that facilitates knowledge transfer between researchers and end consumers through the industry (Burbridge and Morrison, 2021). At the same time, it serves as an alternative to offset the reduction in public investments by the acquisition of private investments in partnerships that evolve by means of intellectual capital from universities and corporate strategies and economic resources from industries (Galvao et al., 2019).

Cai, Pugh, and Liu (2015) present a visual synthesis of the Triple Helix Model conditions proposed by Ranga and Etzkowitz (2013), combining them with institutional logic to develop what they call “intangible conditions for the Triple Helix Innovation Model”. Despite the addition of other helices to the original model, Cai and Etzkowitz (2020) justify the need to keep it as originally proposed and to apply it to research in less explored fields of expertise, thus enhancing the original model and helices. An opportunity to study innovation in the field of design is, hence, identified. Therefore, this case study is based on research such as the analysis made by Cai, Pugh and Liu (2015), in which seven intangible conditions for enabling the Triple Helix Model are presented:

- Condition 1: Consensus on knowledge as key to economic growth ties to universities' competence in generating and disseminating knowledge and their ability to meet industry demands.
- Condition 2: Market-Oriented Culture involves tangible aspects like infrastructure, self-interest, and profit-seeking.
- Condition 3: Intellectual Property Protection is linked to infrastructure and support, crucial for building trust in university-industry collaborations.
- Condition 4: Civil Society connects to institutional entrepreneurship and social participation in initiatives, depending on local actors as innovation agents.
- Condition 5: Sense of Competition, like Condition 1, relates to universities' capacity to absorb industry knowledge demands, emphasizing constant feedback for innovation.
- Condition 6: Democracy in Decision-Making reflects the university's ability to address stakeholder demands, ensuring collaboration and influence in decision-making.

Strategic design research views design as system-level mediation among stakeholders (Meroni and Sangiorgi, 2011; Best, 2010). In this sense, the Triple Helix becomes a design-driven collaboration model where universities, industry, and government co-create shared value, strengthening its relevance to design practice and education.

The metadata collection for bibliometric analysis, as mentioned in the methods section, initially yielded 1384 results, narrowed to 459 papers after applying Bradford's law principles as a filter for the most relevant sources (Xu, 2011). According to Bradford (1934), scientific literature is unevenly distributed across journals. A small number of journals produces most papers, followed by zones of declining productivity. Retaining this first zone concentrates analysis on the most influential sources and avoids peripheral noise (Xu, 2011). The refined dataset was analyzed with the Bibliometrix package for R (Aria & Cuccurullo, 2017), which generates descriptive and network indicators such as co-occurrence and thematic maps, providing an accessible visual overview of the field's intellectual structure. The bibliometric analysis shows that the literature on the Triple Helix Model is often the subject of study in Business, Management, Accounting, and Social Sciences, but apparently, there is limited literature on the model within design scope. The basic themes that appear are technological development, technology transfer and research and development. The motor themes are innovation, university sector and sustainability (See Fig. 01).

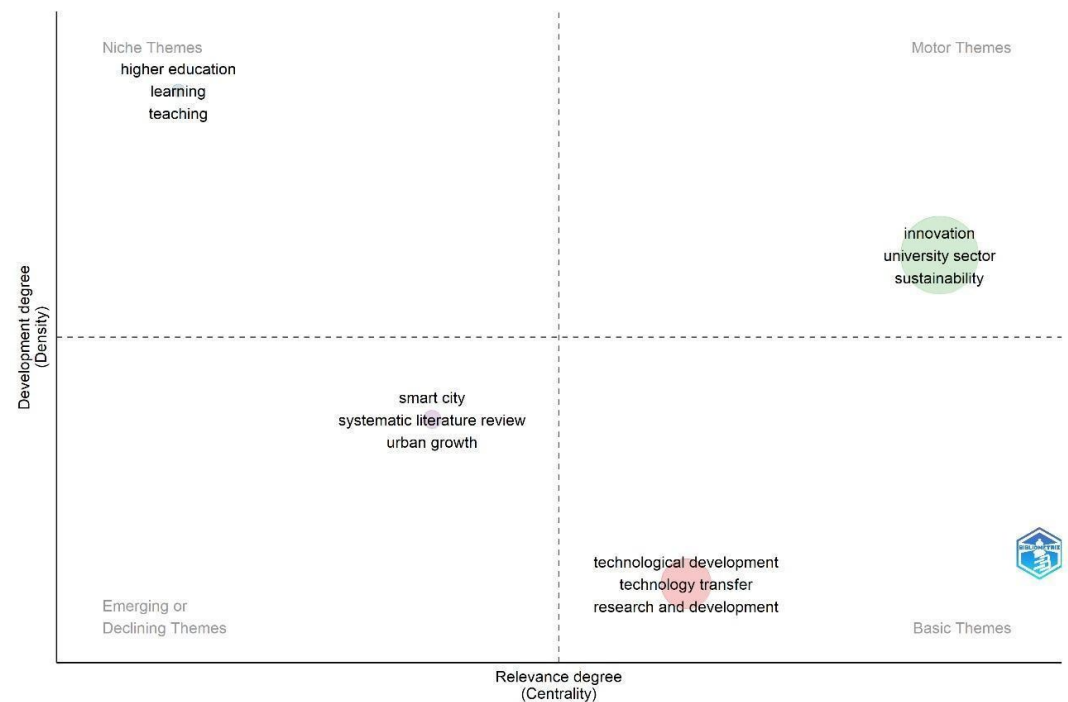


Figure 1. Main themes from the triple helix model in the design field.

3. RESULTS AND DISCUSSION

The interviewed stakeholder's collective perspective identified by thematic analysis is that collaboration and feedback are the central factors of innovation within the Academy, appearing significantly more frequently compared to other topics. The frequency of other topics is lower and covers a range of aspects, from industry-related subjects such as industry partnerships, market focus and client needs, user needs, and real-world scenarios, to topics

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within the university scope, such as skill development, education, and teacher guidance. The labels for the mentioned themes in the interviews can be seen in Figure 02.

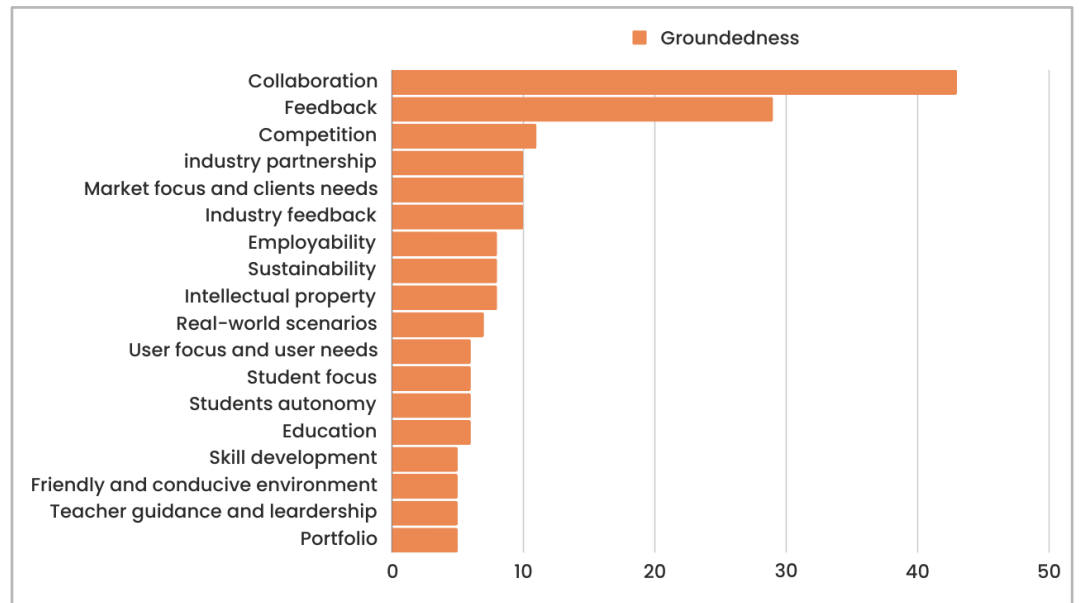


Figure 2. Main themes from the triple helix model in the design field.

The industry partnership by sponsored projects is seen as vital for ensuring students work on real-world issues. As Instructor A notes, “we work closely with industry, and that allows us to work on projects that are deeply rooted in real-world questions,” while also emphasizing that innovation should “impact people's lives in a positive way.” This partnership also provides students access to top technology, as Instructor A explains: “we strive to stay on top of technology, to make sure that we're offering the students the latest technology”, reinforced by instructor B: “It's not just theory, the students are able to explore the new technology, understand how it works, this is one of the driving factors as well”.

The Academy's emphasis on collaboration and feedback enables students to develop their skills and perspectives in team-based environments, which, according to Student A, “allows us to bring diverse work and styles into one class”. This approach, coupled with a focus on market demands, prepares students to create functional, valuable products that will succeed in the marketplace, as noted by Student B: “We want to create a product that looks fresh, is functional, and brings value to customers because your design eventually will go to them”. The industry partner echoes the importance of teamwork, emphasizing that “no industrial designer works alone, they delivered polished results because all projects were team projects, not individual projects”.

3.1. Condition 1: Market-oriented culture

According to the interviewees, industry partnerships are strongly related to the market-oriented culture, since they provide the opportunity to experience real-world scenarios and to better understand customer needs. They also mention that the partnerships offer valuable feedback, enhance students' portfolios and skill sets, and improve their employability with sponsors. Less frequently mentioned in this condition were access to cutting-edge technologies and the role of industry partners in setting constraints and guidelines. Instructor A highlights that working with corporate partners not only leads to employment opportunities

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but also gives students early access to Beta tools, allowing them to "access the latest tools before they are released to the public," thereby their skill sets are much ahead. Instructor B emphasizes the goal of preparing students for the marketplace by maintaining strong ties with industry: "We want to prepare the students for the marketplace" which fosters a "culture around how to work." Students also recognize these partnerships as valuable. Student A notes that the academy bridges the gap between education and the professional world by exposing them to "specific market scenarios," which helps in building diverse portfolios. Student B adds that some classes and projects, which are non-sponsored, may lack feedback from real clients. The industry partner further supports this view, explaining that real-world data and market constraints are essential for guiding innovation, as the market "helps to define those constraints to innovation."

According to Cai (2015), although market orientation may not be determinant towards the Triple Helix Model, it does facilitate organizational learning and knowledge accumulation, eventually contributing to innovation. Market orientation refers to an organizational culture or approach that emphasizes understanding customer needs and preferences (Cai, 2014). In the study, the university connects with the industry through technical visits and classes that relate to real market situations. In unsponsored courses, projects receive less feedback, but the critique from industry partners plays a crucial role in identifying the needs of real consumers, leading to more innovative ideas. For industry partners, a market-oriented culture is evident in industrial design schools and helps direct their efforts towards innovation. This allows students to test products with real consumers and measure the final results. Thus, market orientation is the condition that best suits the Academy of Art in terms of innovation in university-industry partnership. These findings are similar to those found in the literature, (Cai, 2014; 2015) aligning with the concept of understanding customer needs, which is perceived through the bridge with the industry.

3.2. Condition 2: Intellectual Property Protection

In this question, the findings reveal inconsistencies in the interviewees' views, showing greater diversity of ideas and less consensus. Students tend to view intellectual property (IP) as the need to present original works, while other stakeholders see it as the monetization of students' ideas. However, there is consensus that the primary objective of these university-industry partnerships is not to monetize ideas, which may explain why the topic is less frequently discussed. Therefore, the discussion balances emphasis on original work, plagiarism awareness, expert assistance, and a lack of interest in monetizing ideas. Less frequently mentioned are students' rights, Non-Disclosure Agreement (NDA) protection, and open communication about ownership and expectations.

As Instructor A notes, "our focus isn't on monetizing ideas but on giving students the opportunity to work in the studio." The Academy's primary focus is on preparing students for industry work, as highlighted by two instructors. Instructor A also mentions that every semester, an IP seminar is held where a lawyer advises students on protecting their rights, and in industry collaborations, students retain their IP. Instructor B adds that "when the academy encounters things that are really important to the growth of the students, they will bring in people who can help" and "with the Internet (...) it's very easy for people to just grab your things and make something else out of it, or just even just tell you that it has been done by themselves" (instructor B).

From the students' perspectives, Student A appreciates that the academy “is very clear about the line in which you can approach your own work and draw inspiration from others,” ensuring students present their own ideas. Student B notes that regular presentations ensure everyone’s originality, stating, “I think everybody is doing their original work, I never had this kind of issue before.” The Industry Partner highlights that IP discussions are based on “the philosophy of open communication,” with no intent to commercialize the students' ideas.

IP protection within the Triple Helix Model appears to be more researched, comparatively to the other conditions. Some studies such as Borges et al. (2020) and Leydesdorff and Meyer (2006) highlight the importance of patent registration in this context. If the IP protection system is not well-defined, it tends to relate to the statist model of the Triple Helix, opposed to the ideal model proposed by Cai (2015). In this case study, university-industry partnerships do not focus on monetizing ideas. According to the teachers, intellectual property belongs to the students and specialists are called if needed.

3.3. Condition 3: Civil Society

Social responsibility, commitment to enhancing people's lives, solving real-world problems and providing solutions and services that align with society's needs are the most frequently mentioned civil society terms. These are followed by sustainability concerns and human-centered/user-centered approach. Collaborations with local agencies also appear, while Non-Governmental Organizations (NGOs), teaching students critical thinking and usefulness beyond aesthetics are mentioned less often, indicating they are less central to the university's approach.

Some examples are brought by Instructor A: “(the students) are working on projects that affect society as a whole,” by collaborating with local transportation agencies and designing functional solutions like recycling bins and dining tables for refugee families. They also state that “designers have a certain responsibility towards the earth and how it affects society,” (Instructor B), that emphasizes that companies must also focus on sustainability, not just expansion.

For students, it is important to “understand our users, our target audience and solve a problem for them” (Student A) as a key component of the design process, ensuring that solutions fit and flow with the group’s identity. Student B shares that when starting a project, the goal is “not only to provide a transportation design with the car itself, but also to provide a new solution for transportation; we were not only designing for the appearance or the look of the car, we want to bring our life easier to another level”.

The civil society aspect is presented as a source of diversity in innovation (Etzkowitz, 2008) and is considered highly relevant in studies on the Triple Helix, being proposed as a fourth helix in some studies. However, for some researchers, civil society plays a role that encompasses the three helices, not being fit for a fourth helix (Cai and Etzkowitz, 2020). Some researchers advocate for maintaining the original triadic model with focus on the entrepreneurial university instead of creating models with more helices (Cai and Etzkowitz, 2020). In this study, civil society appears to be more oriented towards solving real-life problems, enhancing people's lives and addressing societal demands. To a lesser extent, sustainability concerns, collaboration with the local community also emerge. Working with civil society appears to be more common in the master's programs. Therefore, our findings show that civil society is not the focus on the partnership between university and industry.

This condition is better addressed in the master's programs and it appears mostly through local government initiatives with the university.

3.4. Condition 4: Sense of competition

To understand if there is any sense of competition and how the Academy incorporates feedback from external stakeholders, two questions were posed: 1) "Does your institution promote a healthy sense of competition?" and 2) "How does the academy incorporate feedback, and does it relate to the sense of competition?" In this condition, feedback emerged as the most common theme, followed by collaboration over competition, portfolio improvement, and motivators like scholarships, sponsorships, awards, and recognition. Creating a friendly, knowledge-sharing environment was also mentioned, while labels like comparison, inspiration, employability, and encouragement to excel were less prominent.

Although feedback wasn't mentioned in question 1) mentioned above, it surfaced in responses, particularly around collaboration over competition, with portfolio improvement as a primary motivator. Scholarships, awards, and recognition were also highlighted. In the second question, three out of five stakeholders mentioned feedback in relation to competition, even though they didn't always see a direct connection. Moreover, interviewees reinforced the importance of industry feedback, particularly in sponsored projects, which suggests that the Academy's collaborative culture counters a strong sense of competition.

Instructor A noted that the institution "promotes a healthy sense of collaboration, more than competition," where student groups help each other. In the Instructor B perspective, students are motivated by grades, portfolios, awards, and scholarships, but "the competition is not in the forefront, but definitely having that feedback from the clients is very important". Student A described the program as "collaborative and communicative", where constructive feedback from peers and industry clients pushes students to improve, and Student B adds about a healthy environment: "there's competition opportunities like scholarships, but they want all teams to have good work". The Industry Partner observed a sense of competition among students, noting that "healthy competition and external feedback keeps them motivated". This aligns with previous literature which state that positive feedback acts as a catalyst for change, while negative feedback leads to inertia (Cai, Pugh and Liu, 2015).

Therefore, for both instructors and students, there is a limited sense of competition, and the culture at the Academy is more focused on collaboration. According to Galvão et al. (2019), the trends in research within the Triple Helix Model include a greater emphasis on collaborative innovation, the expansion of networks and cooperation partnerships, and the establishment of entrepreneurial ecosystems. In this sense, collaboration may be one of the best practices of innovation within this case.

3.5. Condition 5: Democracy in decision-making

For the interviewees, the focus is on students, emphasizing their involvement and autonomy, while the instructor's role is to guide, and the industry partners provide requirements and parameters. They note that the university provides a collaborative environment, and there is a need to balance students' autonomy and inputs from both instructor and industry partners. Less frequently mentioned topics are divergent feedback, leadership responsibilities, feedback-driven learning and industry insights.

Decisions are made collaboratively, seeking input from instructors, students, and the industry advisory board before implementing ideas: “There’s not one person making a decision. We gather feedback, adjust it, and then implement it, often through soft rollouts to ensure it benefits the students” (Instructor A). To Instructor B, the emphasis is “to honor students’ goals in the first place”, allowing them to make decisions while ensuring their work aligns with design principles and client expectations. “Our role as teachers is to facilitate, guide, and make sure they’re putting their efforts in the right areas” (Instructor B).

The students’ perspectives align with this view, as Student A notes that “the Academy allows us to build our own creative process. They provided us with requirements and parameters of what they wanted to see in our presentation, but ultimately, they let us present the way we wanted to” and “students are leading and doing what works best for them”. Student B highlights the autonomy in decision-making within teams, stating that they consider sponsor feedback only if it enhances their work. The Industry Partner reinforces this, emphasizing that “students should make their own decisions” and that external feedback is just input; “It’s their job to curate that smartly into the right decision, which is crucial for learning to be an industrial designer. My role is to give feedback, not make the decision for them”. The Industry Partner also mentions that having more industry representatives for feedback can enhance the projects.

According to Cai, Pugh, and Liu (2015), the individuals involved in the partnership must have a chance to influence policymaking. In this case study, students appear to be the focal point of the planned policies and actions, although the projects developed benefit from feedback exchanged among other students, instructors, and industry partners.

To represent a visual synthesis of the results from condition 1 to 5, a Sankey diagram was used to show the flow of frequency from one set of items to another. In Figure 3, the red icons mark the themes directly cited by stakeholders in question 1, pertaining to the main drivers of innovation. Unmarked topics were not cited as key drivers, but appeared in other parts of the interviews, suggesting a secondary influence.

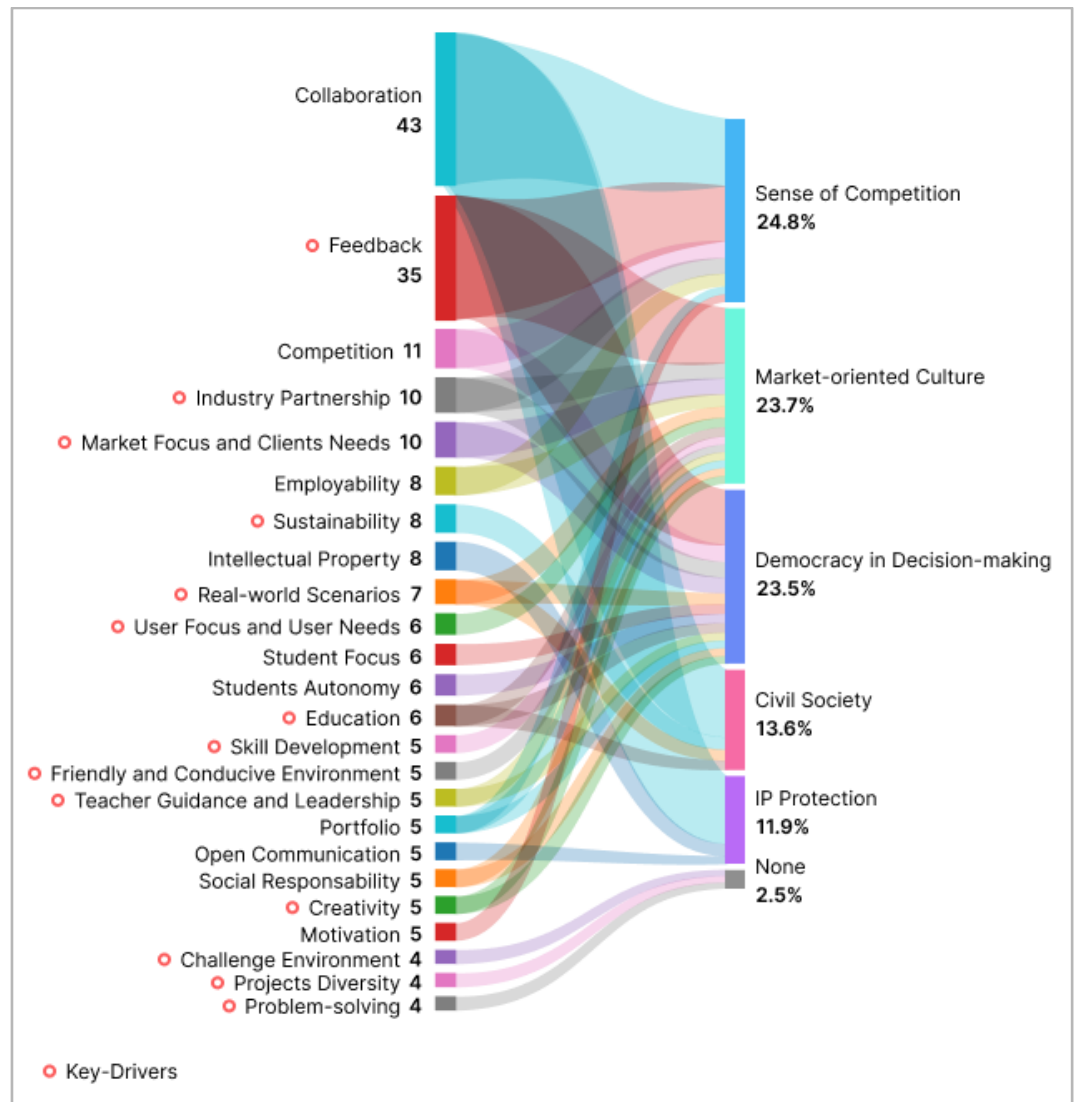


Figure 3. Visual synthesis of the results from condition 1 to 5.

Each label occurrence is counted based on how many times it is mentioned. The labels are linked to relevant conditions based on empirical relationships determined through the research, listed in descending order of their total occurrences to prioritize the most frequently mentioned themes. Each label's full count is allocated to every condition it's associated with, to fully represent its impact across multiple conditions.

The visual representation through the Sankey diagram was chosen because individual occurrences of labels could not be uniquely attributed to a single condition due to theme overlap. The diagram reflects each condition's percentage of the total discussion, highlighting its relative emphasis. The most predominant conditions (sense of competition, market-oriented culture and democracy in decision-making) are connected with almost all the key drivers listed in the figure. Simultaneously, while the label "feedback" relates to the three conditions mentioned earlier, the label "collaboration" is more closely associated with "IP protection" and "Civil society".

The interviews conducted reflect an alignment with the most recent trends observed in Triple Helix and design research found in the bibliometric analysis. For instance, instructors emphasized sustainability, mirroring a trend topic prevalent in 2021, while both students and industry partners highlighted value creation, which emerged as a trend after 2022 (see fig. 04). Other terms that appear in the interviews and are aligned with the trend topics are those related to technology and innovation.

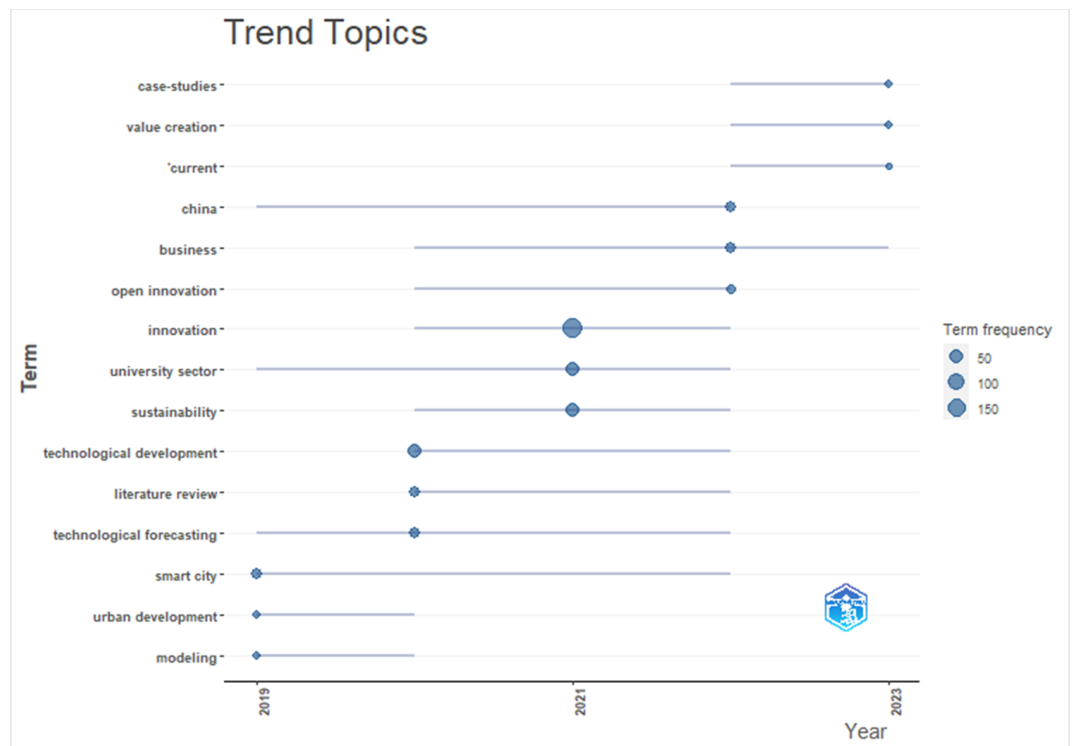


Figure 4. Triple Helix and Design Research trend topics

This observation suggests that the discourse within the interviews resonates with the latest research in the subject of Triple Helix and design education, underscoring the contemporaneity of the insights provided.

Figure 05 provides a comprehensive visual synthesis of the analysis conducted. This graphical representation illustrates the relationship between the conditions and its proximity to the Triple Helix model. Therefore, the figure aims to represent the conditions' proximity to each helix as perceived by the researchers during the interviews. The proximity, in this representation, refers to a helix's context, interest, or benefits derived from the partnership.

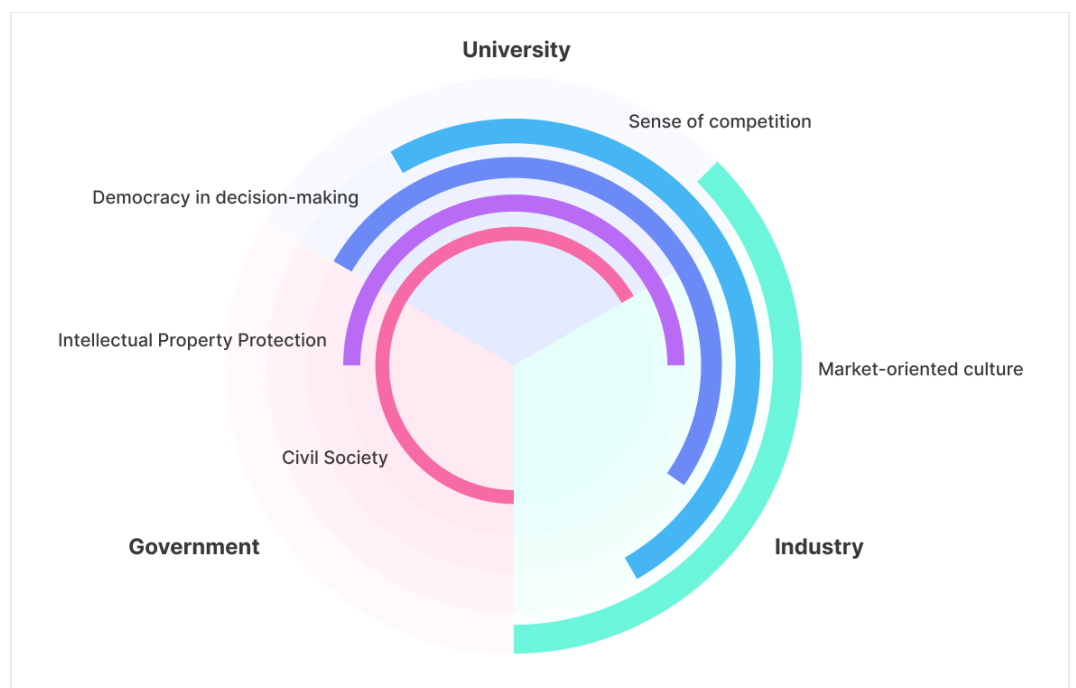


Figure 5. Visual synthesis of the relationship between the conditions and the Triple Helix model identified through the interviews.

The conditions in the figure are ordered by importance from the center to the borders, based on the qualitative perception of the interviews. It is important to note that the order and

proximity of the conditions to each helix in this representation is a perception based on this case study, and should not be interpreted as a restricted model. However, this relationship representation also has the potential to serve as a diagnosis tool to analyze the status and balance of Triple Helix partnerships.

3.6. Desk research results

Some key aspects found in the desk research include real-world scenarios, employability, hands-on learning, industry collaboration, communication, and professionalism. The university's emphasis on career makes it market-oriented, industry-based, and focused on facilities and technology. According to the Strategic Plan 2022-2027, facilities and technology are crucial, not only for acquiring new technology but also for ensuring its security and reliability. One of the main objectives in the Strategic Plan is to create an environment where students can interact with industry partners, enhancing their experience. The postdoctoral report analyzed for this study highlights the market-oriented culture:

... Academy of Art University facilitates the entry of talents into the job market by offering them the opportunity to obtain temporary work authorization or internships during or shortly after the course" and "Regarding support for better professional placement, it is noteworthy the possibility of creating courses focused on employability. For instance, preparing [the students] for job applications in relevant companies within their respective fields of study or for starting their own business. (p. 47)

This quote, along with other data, increases confidence in the evidence of a market-oriented culture. Other significant topics in the documentation, particularly in the postdoctoral report, include best practices in project development and innovation promotion; models and practices of partnerships with the productive sector; impacts and results of established partnerships; and partnerships with international companies and universities. Highlights in the documentation include encouraging students' autonomy to explore diverse perspectives, methods, and approaches; engaging students in complex problem-solving; interdisciplinary collaboration and cross-teaching; academic flexibility; and project-based learning. Institutional notifications consistently reinforce the benefits of industry partnerships, as seen in email quotes such as:

... congratulations to Team Vitality for the scholarship they received yesterday and for their outstanding collaboration. However, it is crucial to understand that this accomplishment does not define the individual efforts and worth of each team. In fact, when it comes to judging your work, there are various criteria at play, and you never know what factors influenced the jury's decision. (Claudia Dallendoerfer, personal communication, May 19th, 2023)

These partnerships also bring benefits like scholarships, which motivate students. Such rewards are not always achievable solely through university resources.

3.7. Participant observation

The participant observation reinforced several previously mentioned characteristics, such as hands-on learning, real-world application, employability, industry collaboration, market orientation, industry-based approach, and emphasis on cutting-edge facilities and technology.

Interdisciplinary collaboration, notably observed in sponsored projects, enhanced students' skills and fostered innovation. This approach, involving students from various design disciplines, facilitated the exploration of diverse perspectives and methods, enriching their professional repertoire, improving their understanding of the creation process. Problem-

Based Learning (PBL) in sponsored projects facilitated active learning by placing students at the core of practical challenges. Instructors, acting as mentors and facilitators, encouraged students to develop solutions to real-world problems posed by sponsoring companies.

This experience promoted student autonomy and responsibility, as evidenced by their active participation in project planning and execution. This engagement aimed to cultivate critical thinking and prepare students to navigate future challenges, fostering a mindset of lifelong learning in their professional journeys. These aspects align with the findings observed in the desk research.

4. FINAL CONSIDERATIONS

This research paper provides an analysis of the university-industry partnership between the Academy of Art University and industry during the 2023 spring semester. Through a qualitative case study, we have examined how key conditions presented in the literature relates to this collaboration, including the influence of a market-oriented culture, intellectual property protection, engagement with civil society, the sense of competition, and democracy in decision-making.

Our findings reveal that the partnership is characterized by emphasis on feedback and collaboration over competition, with the collaborative model being favored as an effective approach to innovation. Stakeholders highlight the importance of providing students with real-world experiences, since one of the main objectives of the Academy is to prepare students for the market as was mentioned in the interviews and in the Strategic Plan. The democracy in decision-making within this partnership is primarily student-focused, with instructors guiding and industry partners providing requirements and parameters.

This study highlights the particularities of university-industry partnerships and how they can be influenced by various conditions. The partnership between the Academy of Art University and industry reflects a commitment to skill development, collaboration, and engagement. Understanding these dynamics may help the stakeholders and others in enhancing the effectiveness of such collaborations and fostering a conducive environment for learning and innovation. As illustrated in Figure 5, the visual model summarizes how each condition relates to the university, industry, and government helices, serving as a diagnostic overview of the partnership.

The results also enrich strategic design debates by showing how design education mediates innovation ecosystems. Practices such as collaboration, feedback, and user-centred learning embody strategic design's core capabilities, translating institutional interaction into actionable innovation (Manzini, 2015; Meroni and Sangiorgi, 2011). For future research, replicating the model across additional case scenarios would be ideal to assess its efficacy in determining key drivers for new partnerships. While the insights presented offer valuable indications of how university-industry collaboration supports innovation in design education, the limited scope of the study, covering only two projects over one academic semester, does not allow broad generalization. The findings should therefore be interpreted as exploratory, illustrating tendencies rather than definitive patterns. This limitation also highlights opportunities for future research to validate or contrast these practices across different institutional and cultural contexts. It is important to emphasize that this study analyses specific sponsored project cases. Therefore, if the same visual representation model were applied during the winter semester, with projects sponsored by other partners such as NASA,

the semicircle representation might differ due to NASA's status as a governmental institution. If extended to multi-case studies, the average representation model could better reflect the university's reality, a potential avenue for future research.

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