Interdisciplinary Collaboration in the Creative Industries

At the Intersection of Design, Fashion and Technology

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ABSTRACT

Due to increased reliance on creativity across industries as well as to the vaguely delineated boundaries of the concept of creativity, new trends have emerged as a way for companies to innovate. One such complex new trend which has received less attention in academia is interdisciplinary work in creative fields such as fashion and design. With its fast-paced dynamics and constant developments, technology in particular constitutes an area of interest for creative professionals. Since collaboration between design studios and technology-related firms is still considered a more unusual way of working, it also presents certain new challenges for experts. Overall, it is not well known nor documented how smooth the collaborative process is or what work practices are common among these different stakeholders. Thus, the current research takes on an exploratory approach and aims to give a more contemporary overview of collaborative work practices in interdisciplinary environments. The research question is formulated as follows: "How do designers experience interdisciplinary collaboration between design or fashion studios and technology-related firms and how does it shape work practices in the creative industries?"

The study employs a qualitative approach through a combination of two data collection techniques – namely, conducting one focus group interview and multiple in-depth individual interviews with interdisciplinary designers. Results and their analysis show that the blend of design and technology is still considered an innovative and highly dynamic type of collaboration. Various aspects that are discussed in a positive light also emerge as possible limitations or challenges that need to be overcome throughout the work process. In particular, the quality of communication between partners from these different fields is deemed as an essential component of collaborative work. The research findings could be especially useful in providing an external overview of designers' experiences in collaborations with technology-related firms or experts as well as in pointing out the main interdisciplinary work practices exercised in such settings.

KEYWORDS: *Interdisciplinarity, Collaborative creativity, Interdisciplinary work practices, Creative industries, Wearable technology*

Table of Contents

ABSTRACT 1
1. Introduction 3
2. Theoretical framework 7
2.1. Creative industries 7
2.2. Creative cities and clusters 9
2.3. Collaborative creativity 11
2.4. Interdisciplinarity 13
2.5. Interdisciplinary work practices in design and fashion 16
3. Research design 19
3.1. Method 19
3.2. Units of analysis and data collection 21
3.3. Operationalization 24
3.4. Data analysis 25
4. Results 28
4.1. Boundaries and new developments of creative industries 29
4.2. Main purposes of interdisciplinary collaboration 31
4.2.1. Criteria for selecting new collaborations 33
4.2.2. Positive effects of collaboration 37
4.3. Work practices in interdisciplinary collaborations 39
4.3.1. New developments in interdisciplinarity 42
4.4. Communication practices of interdisciplinary collaboration 44
4.5. Main challenges of interdisciplinary collaboration 46
5. Conclusion 51
5.1. Limitations and suggestions for future research 52
References 55
Appendix A 60
Appendix B 65
Appendix C 67

1. Introduction

In recent years, terms such as creativity and creative work have largely become buzz words in the business context and are often used to further various arguments about the positive effects of the sector not only on the economy but also on our society as a whole. A significant number of scholars and other professionals from the cultural field have emphasized the potential of the creative industries in improving the overall quality of our life by encouraging people to express themselves and to share this experience with other like-minded groups (Bakhshi, McVittie, & Simmie, 2008). Flew (2011) goes on to credit this allure of the creative field to the workforce to a combination of intrinsic motivators for personal satisfaction, the possibility to increase social status as well as a preference for risk-taking and the generally non-routine nature of the work. In any case, the significance and popularity of similar concepts in the contemporary setting of Western-oriented media and culture are evident. Perhaps due to this increased reliance on creativity across industries or due to the vaguely delineated boundaries of the concept, new trends have emerged as a way for companies to innovate and differentiate from others (Joyce, Jennings, Hey, Grossman, & Kalil, 2010). One such complex new trend which has received less attention in academia is interdisciplinary work in creative fields such as fashion and design.

On many occasions, people have witnessed the application of concepts and ideas from one domain to another completely different setting, resulting in valuable and oftentimes even extraordinary creations. Architectural structures and advances in engineering or technology have manifested the innovative approach of biomimicry where features found in nature are applied to design-thinking methodologies. "If you look beyond the nice shapes in nature and understand the principles behind them, you can find some adaptations that can lead to new innovative solutions that are radically more resource efficient", says architect Michael Pawlyn (Scott, 2012). The example illustrates the possibilities unveiled when one looks outside their area of expertise or at least outside the boundaries used to designate certain decision-making processes. After all, the creative industries are hybrid in nature and the involvement of crossovers and new ways of working is certainly an innovative but not an alienating concept to them (Stimuleringsfonds, 2013). The growing popularity of wearable technology in fashion is proof of the effective symbiotic nature of seemingly incompatible fields of work. Essentially, at the intersection of these two disciplines, both fashion designers and tech experts (in fields such as electronics or

engineering) have the opportunity to discover new solutions and new applications of their work thereby increasing the value they receive from the process as well.

With its fast-paced dynamics and constant developments, technology in particular constitutes a widespread area of interest and research for creative professionals. New media and new technologies have provided us with numerous different channels of communication and moreover, they have vastly changed the way we approach everyday matters as compared to only a decade ago (Flew, 2011). These changes certainly account for curious new ground to explore by artists and designers allowing them to offer their artistic commentary on how our lives have been influenced by technology. Furthermore, and more importantly for the scientific significance of this study, new trends in technology and digitization have provided creatives with the opportunity to delve into previously unexplored directions of artistic work. Essentially, although globalization has made a large part of these new technologies available to so many of us, it has also made innovation solely on the basis of technology a difficult endeavor (Stimuleringsfonds, 2013). This limitation could nevertheless translate into the opportunity embraced by the creative sector to expand towards interdisciplinary practices combining cultural products or processes with new technologies.

In a sense, this type of collaboration constitutes a more unusual "outside-the-box" way of working but it also presents certain challenges as is usually the case with any activity that involves communication. It is not well known nor documented how smooth the collaborative process usually is – it may as well be that due to the varying expertise and knowledge of the individuals, tension occurs within the team. Generally, the difficulties that come with coordination and communication between experts from different industries might be points of interest to consider. Such potential complexity also means that investigating how interdisciplinarity changes or contributes to work practices in a certain industry would be a challenging task in itself. This might serve as a possible explanation for the general confusion with regards to the term and the shortage of more recent in-depth insights from diverse fields. Although some previous studies have already delved into interdisciplinarity in education when doing research and teaching (Chettiparamb, 2007) as well as into technology- and science-related interdisciplinary work (Rafols & Meyer, 2010), little has been written on how creative industries have embraced this concept. Moreover, looking into the current state of the topic and drawing

from recently collected data could offer practitioners a better understanding of the approach and how it could be applied or improved.

Currently, the design industry (with its sub-disciplines) constitutes a significant source of innovation and differentiation among the creative sectors while design as a process is even deemed capable of influencing the entire business strategy of a company (Stimuleringsfonds, 2013). Naturally, different forms of new technology have further amplified the range of innovation that designers strive for. For the fashion industry, progress in technology and science research has meant changes both in the functionality and the aesthetics of garments (Lam Po Tang & Stylios, 2006), yet, these changes have inevitably brought about new challenges as well such as dealing with new textiles and materials but also with new ways of working. In that sense, delving into interdisciplinary work practices from the standpoint of design and fashion experts could not only prove informative but it could also open the grounds for a more rich and critical discussion on the future of interdisciplinarity in the creative industries. In this research, work practices are taken to broadly represent the way that work is carried out by a particular company or brand in the context of collaboration with other parties. Different components such as interdependence and role distribution will be taken into account when examining how interdisciplinarity is manifested through the work of the research participants and how actively they manage such collaboration.

The end product of this research could thus be of particular value to several different stakeholder groups. First and foremost, creative professionals in design and fashion would benefit from a more up-to-date overview of important aspects in the collaborative domain – younger and less experienced designers would hopefully be able to learn more about the current state of collaborative practices with technologists while those who are more experienced would be able to reflect on common procedures or challenges. As discussed throughout the data collection stage, some participants were also interested in extending the research to include the publication of a blog post or article on the same topic. This is a format which may prove more accessible when sharing some of the interview insights as compared to an academic Master's thesis. Secondly, the analysis could be useful to organizations such as Stimuleringsfonds (Creative Industries Fund NL) which support, promote and fund interdisciplinary projects with the creative industries in the Netherlands. Although they themselves contribute significantly to the facilitation of creative

initiatives in the country, their access to external studies on the topic is not clear. Taking into account these arguments, the current research question has been formulated as follows:

RQ: *How do designers experience interdisciplinary collaboration between design or fashion studios and technology-related firms and how does it shape work practices in the creative industries?*

Chapter 2 of this research paper will critically outline the most recent and relevant theory on interdisciplinarity and collaboration in the creative industries. Chapter 3 will explain the chosen methodology, namely a combination of a focus group interview and individual interviews, as well as how it fits the purpose of the project. In chapter 4, the main findings from the data collection stage will be reported and discussed in terms of important patterns that help answer the research question. Finally, chapter 5 will conclude the paper by critically summing up the discussion and the study's limitations and by offering suggestions for future research.

2. Theoretical framework

2.1. Creative industries

Before delving deeper into interdisciplinary work practices and related phenomena, this theoretical framework starts more broadly from the overarching concept of creative industries in order to clarify the boundaries of the sector and how it differs from other terminology. More specifically, what often comes up as similar grounds in discussions is the concept of cultural industries. Making a clear distinction between the two is necessary with regards to the scope of the current study since the term for creative industries covers economic dynamics that terms such as "cultural industries" or "arts and culture" do not fully capture. As Hesmondhalgh and Baker (2013) suggest, the notion of cultural industries seems to refer mostly to the "mixture of commercial and publicly subsidized enterprises" (p. 1) while creative industries encompass newer and broader applications of creativity. Academic literature from the early 2000s has also defined the scope of the latter to include four branches, namely the copyright, patent, trademark and design industries, which could already be regarded as an important expansion of the terminology since it may represent technology-related fields as well (Cunningham, 2002; Howkins, 2001). In short, authors at the time seemed to circle around the definition of creative industries as "the industrial components of the economy in which creativity is an input and content or intellectual property is an output" (Potts & Cunningham, 2008, p. 1).

More recently, due to economic and business developments and shifts in policy-making, new debates have sparked with regards to the range of sub-disciplines and characteristics included in terms related to the creative industries. A large part of the debates revolve around the nature of the cultural goods and services produced in these industries since the product is an essential factor for what is deemed "creative". Multiple scholars agree that what makes a product cultural is whether it competes in the symbolic realm or whether it bears symbolic value (Lawrence & Phillips, 2002; Lazzeretti, 2012; O'Connor, 2010). Goods and services in this creative sector are thus distinguished by their being more than a utility and by being valued as expressive rather than merely functional. In some frameworks, expressive and functional qualities of production are even regarded as closely connected and equally necessary in defining the scope of the creative industries (The Work Foundation, 2007). By that standard, considering their significant contribution for social and creative development, fields such as fashion or architecture

could not be approached as non-cultural since these products not only serve a specific function but they also incorporate a certain symbolic meaning. It is precisely the widespread perceptions of art and design as "expressive" and of technology as "functional" that make the exploration of the blend between the two significant as well as interesting. Discussion of such differences is necessary for drawing up a clearer picture of the interdisciplinary process and learning how it contributes to the current state of the creative sector. What is more, the continuing advances in our media- and technology-imbued economy have meant further transformation of these creative domains making them more complex yet also much more diverse and enriched.

These transformations are also interlinked with the concept of novelty and the ability of creative industries to benefit the growth of the economy by promoting new types of disciplines or market niches and new ways of working (Potts & Cunningham, 2008). Essentially, creative industries could be regarded as a facilitator of new knowledge. This argument demonstrates their potential in expanding further beyond what we are used to approaching as "cultural" or "creative" (such as the way 3D printing technology quickly became a popular means of innovating and bringing creative value previously unavailable to firms) and in introducing new points of engagement for consumers. The trend has been mirrored in the establishment and progress of more and more small and medium-sized enterprises (SMEs) in the creative sector during the past decade (Flew & Cunningham, 2010) and the shift in creative industries becoming global or regional rather than national (Cunningham, 2002). With these changes resulting in an increasingly diversified sector, notions of interactivity, customization and collaboration have emerged as key aspects of this environment (Cunningham, 2002; Deuze, 2007).

Convergence with regards to new media and new technologies is the concept that brings together many of the afore-mentioned arguments accounting for the complex yet curious nature of the creative industries today. The term is generally used to convey the "dissolving distinctions" between certain media industries or media content (Hartley et al., 2012, p. 36). Naturally, this interchangeability of sorts can be a challenge when it comes to regulatory and policy-making practices as well as in characterizing and categorizing the boundaries between platforms. Although in the context of creative industries convergence has meant a growing adoption of or even dependence on digitized products and services by people, Meikle and Young (2011) note that focusing solely on the influences of digitization could be a less useful approach today considering how pervasive and general the label has become. Instead, the authors point out the

significance of "the networked nature of contemporary media" in which consumers explore even newer ways of interaction (Hartley et al., 2012, p. 37).

2.2. Creative cities and clusters

With trends of globalization across creative industries and various fields where geographic boundaries are no longer a limitation, there exists a paradox of sorts regarding the clustering of similar companies in proximity to each other. Many authors have agreed on the economic influences and benefits of such urban agglomerations and have also reiterated the importance of these processes in the creative industry context. Scott (2008) points out valuable explanations for the clustering of cognitive-cultural production activities referring to the increasing-returns effects and the possibility of appropriating localized competitive advantages while still catering to a global market. In that sense, the nature of this close physical proximity and the possible similarity of the creative hub clustered together are important factors to consider when examining collaborative practices across different disciplines or industries. Hauge and Hracs (2010) also explore this context by looking at how firms might benefit of each other and the localized clusters they inhabit. On the one hand, it is related firms that could be seen as local facilitators of knowledge spillovers thereby encouraging "various forms of adaptation, learning and innovation" (p. 4). On the other hand, it can also be argued that it is rather the "diversified regional economy" (one in which shared competences and proximity facilitate communication and cooperation, p. 4) that stimulates knowledge spillovers and the flow of novel ideas and practices between firms from different industries.

Examining the concepts of clustering and the creative city is important not only due to the multiple competitive advantages and knowledge spillovers taking place but also because these processes in themselves usually lead to new talent entering these hubs of creativity and collaboration (Florida, 2002). For SMEs or independent businesses, the local scene can be an important source of cultural knowledge and awareness making those industry members insiders on the urban regeneration of a particular place. On some occasions, these informal clusters or networks can be just as important in facilitating cultural production as the more formal and institutionalized players of the industry (Hitters & Richards, 2002; O'Connor, 2010) thus increasing the appeal for potential new entrants which may be essential for designers and other creatives. After all, these are professionals who often thrive on fresh opinions and novel

approaches breaking the status quo. In that sense, for city representatives, encouraging flows of creativity between firms with differing expertise represents a valuable opportunity to enrich the so-called local milieu.

Despite the significance of Florida's work on creative cities and clusters, other authors have also offered some relevant critique to his theory considering the contemporary context of various parts of the world and the effects of globalization. For instance, Krätke (2010) points out the necessity to take into account the difficulty in delineating creative activities. Florida's explanation of the creative class as a separate decisive unit for economic development fails to account for a more complex view of the economy and our society in which "nearly all occupational groups are subject to a certain mix of creative […] tasks" (Krätke, 2010, p. 3). Furthermore, one ought to look more critically at the notion that attracting new talent and consequently, facilitating economic growth, are easily applicable to any geographic region or social setting. Rather than implementing solely mainstream and generalized measures of creativity in the process of revitalizing a city or region, institutions and funding should be focused on the individual context where creativity could take different forms (Borén & Young, 2013; Pratt, 2011).

This is also especially important when discussing interdisciplinary endeavors and cross-sector collaborations since such examples typically do not fit into a mainstream model of enhancing the "creative city". These more experimental forms of creativity are thus not paid as much attention in the discourse supported by Florida (2002) and endorsed by most policy initiations. In that sense, the current study could bring attention back to the way certain institutions are traditionally used to approaching the societal need for enhancing the creative industries. By further exploring how the concept of interdisciplinarity is experienced by industry insiders, the benefits of innovative crossover work may become more apparent.

That being said, the Netherlands seems to represent an example of adequate development and embracement of interdisciplinary endeavors taking place on a more local or regional level. The series of publications called "Crossover Works" produced by the Creative Industries Fund NL (Stimuleringsfonds) showcase numerous successful collaborations between creative and more tech-focused firms in the country. Many of these practical examples have taken place in or have been facilitated by what have come to be known as hubs of innovation around the Netherlands such as Eindhoven or Arnhem. The clustering of diverse companies that still share a drive for

innovation and cross-sector exploration is indicative of the relevance of the term today. However, one should also remain aware of the changing face of industries under the influence of globalization, increased access to new markets and the possibility to reach new customers as a result of digitized communication taking place worldwide.

2.3. Collaborative creativity

Another major trend stemming from the different developments taking place in creative industry clusters has to do with collaborations between industry actors. History has witnessed numerous occasions in which collaborative projects have resulted in memorable success stories, often between seemingly unlikely or differing parties. For instance, the gaming industry has been of increasing positive influence on the training provided to surgeons and other medical professionals in the Netherlands. More and more video games or mobile applications are specially designed to help doctors in training to sharpen their skills, make faster decisions or improve communication between them (Stimuleringsfonds, 2015; Ventola, 2014). From a logical point of view, this process unfolds because people are often able to produce better solutions with cumulative knowledge or effort rather than solely on their own (Bronstein, 2003; Sonnenburg, 2004). However, advantages inevitably come along with some challenges and as Babiak and Thibault (2009) have argued, being involved in a partnership with different stakeholders also means that their expectations or priorities could vastly differ. In his study, Sonnenburg (2004) further discusses the notion of collaborative creativity and describes it as a dynamic phenomenon which is unique depending on each context or situation where it occurs rather than a constant factor. What is more, a collaboration is not simply the sum of its parts where each team member contributes to the project separately; rather, one contributor may inspire new ideas that come from other contributors or go back and forth in the process thus making it a complex synthesis of creative thinking (Adler & Chen, 2011). This complexity of the work provides further emphasis for the need to align the stakeholders' expectations of the process and the creative outcome.

With the current pace of technological advances, cooperation between individuals or businesses has become even more accessible while simultaneously making the categorization of collaboration practices more intricate. The phenomenon has evolved from a closed framework where it takes place between co-workers within the same business to an open one where internal and external collaborations come together to create value (Lee, Olson, & Trimi, 2012). This

includes increased demand for consumer involvement in the form of co-creation where not only can the customer be part of the experience, be it idea generation or production, but the business involved can also benefit from the interlinkage of different perspectives (Banks & Deuze, 2009).

Yet, the coming together of different industry members to form a project does not necessarily guarantee its success. To stimulate the capacity for creative thinking which needs to result in satisfactory solutions, the collaborative mindset needs to be properly integrated throughout all stages of the process and among all team members (Bitter-Rijpkema et al., 2011). As Sonnenburg (2004) also reiterates, effective communication is one of the main driving forces behind collaborative creativity which could be argued is true both for smaller and larger teams. Other authors also confirm the significance of communication for partnerships and collaborations by stating that it should be open and honest and that collaborators value each other's input (D'Amour, Ferrada-Videla, San Martin Rodriguez, & Beaulieu, 2005). On the one hand, working with individuals situated far away from each other or with companies that are not part of a particular local cluster could present further challenges to the collaborative process and the communication taking place between the parties involved. Especially considering the global reach of many industries and the expansion of firms into newer markets, maintaining relations that nurture fruitful collaborative outcomes is key. These academic insights make the study of aspects such as the effects of geographical proximity on interdisciplinary collaborations additionally relevant. In a similar context, authors have previously looked at the effect of repeated collaborations on creative output with some of them claiming that team creativity is negatively influenced by repeated collaborations among industry actors (Skilton & Dooley, 2010). At the same time, building trust and knowledge of the available expertise among collaborators may represent an important trade-off. What is more, collaborations between different disciplines – within the creative sector or in combination with other sectors – in the form of interdisciplinarity could also be seen as tricky grounds to cover.

Perhaps due to the complex nature of the term and the multiple contexts in which collaboration could be embraced, there are various aspects or frameworks of collaboration that academics have investigated. Bedwell et al. (2012) have compiled a synthesis of literature and discussions pertaining to the topic in an attempt to make "collaboration comparable across disciplines and to reduce the conceptual confusion" (p. 14). More specifically, they list several collaborative behaviors which shape the performance outcomes of the process such as adaptation

(through which effectiveness is achieved in a complex or uncertain setting), sense making (the way information is processed through shared discussions and interpretations) and leadership ("coordinating efforts to achieve the goals", p. 11). It is to be expected that these behaviors are highly interlinked and perhaps reinforce one another throughout the process – for instance, being able to adapt to an ever-changing environment would be beneficial when having to take on a leadership role within the team. In addition, it is also possible that the degree of flexibility present among team members of different fields is noticeably higher than in more traditional creative environments, thus making adaptation and flexibility another necessary concept to explore. In any case, as the authors suggest, there are always contextual factors that further impact the direction of the collaboration such as the environment where it takes place, the activities being performed or the way time is utilized (Bedwell et al., 2012).

2.4. Interdisciplinarity

Like the previously discussed concepts, interdisciplinarity is not a new phenomenon at all. Yet, it has been studied less in connection to the creative industries while this could be especially useful in today's technologically developed world where creators find it increasingly difficult to innovate solely on the basis of technology (Stimuleringsfonds, 2013). The Centre for Educational Research and Innovation provides a common classification of interdisciplinarity which states that it is "the interaction among two or more disciplines" and that "an interdisciplinary group consists of persons trained in different fields of knowledge […] with different concepts, terms, methods and data organized by a common effort working on a common problem with continuous intercommunication" (1972, pp. 25-26). The term should not be confused with multidisciplinarity which is regarded as the juxtaposition of various disciplines which are not explicitly related to each other.

The occurrence of such crossover work is among the most distinct factors pointing to the level of innovativeness of a company (Joyce et al., 2010). As the authors note, this represents a way of solving new problems or coming up with new solutions which may not have been available before – an argument also prominent in the literature dealing with collaboration and collaborative creativity. Innovative means of expression in the form of interdisciplinarity thus also constitute a way for companies to validate their forward-thinking approach in the eyes of various stakeholders. The globalized and highly competitive state of the market for cultural

products implies that firms need to demonstrate a range of capabilities among which the willingness to be a risk-taker and to come up with and embrace ideas from outside a certain comfort zone. Furthermore, being able to adapt to the fast-changing dynamics of this environment is essential for the long-term progress of a creative business. The arguments made by Hauge and Hracs (2010) go in the same direction by stating that multi-media integration and cross-discipline packaging have become aspects of growing importance to the market for cultural products. In that sense, it seems increasingly beneficial for companies to be knowledgeable of and participatory in contemporary crossovers not only for the sake of the desired end result but also for improving the overall capabilities and the image of the brand.

Although the concept of interdisciplinarity is indeed difficult to dissect and apply in practice, Bronstein (2003) offers a framework consisting of five components that need to be present in interdisciplinary collaboration. Even considering the somewhat outdated nature of her publication, part of the work practices she focuses on are also highlighted among other studies dealing with creative collaborations. Namely, these include interdependence among the collaborators, newly created professional activities that maximize each collaborator's expertise, flexibility, collective ownership for the goals and reflection on the process. In order for the individuals taking part in a project to be interdependent, their tasks need to be clearly distinguished and they should be able to establish a productive and unambiguous mode of communication – an argument which has already been advocated in this theoretical framework. The second component of the framework refers to the notion that collaboration should produce an outcome which would not be possible if only one of the collaborators had worked on the project without the involvement of experts from diverse disciplines. Even though the differentiation between roles is important, being flexible and making compromises throughout the process are also a must – this is what Bronstein (2003) calls "role-blurring" (p. 4). The ability and readiness of individuals to adapt according to the creative task at hand also mean that the relationships between them would be less hierarchical. The "collective ownership of goals" component deals with the shared responsibility for the success or failure of the project and following through with implementation or any other stages involved. Lastly, reflecting on the whole process could be extremely beneficial in outlining what worked well and what did not so that collaborators have the opportunity to improve, especially in case they might reconvene another time.

Jeffcut and Pratt (2002) further relate these complex networks in the creative industries to the concept of convergence discussed earlier. They outline three dimensions of convergence prominent in the cultural context: intersectoral, interprofessional and transgovernmental. The first dimension refers to the convergence between the media industry and the cultural sector which the authors argue is present in all levels of activity. The interprofessional dimension, which is also extremely relevant for the purposes of this theoretical framework, is concerned with convergence taking place between "diverse domains (or forms) of creative endeavor" (p. 3). Jeffcut and Pratt (2002) also explain these changes with the advances in new media technologies claiming that they bring about more opportunities for different disciplines to come together. Considering the year when their academic article was published, one could understand how their arguments hold even more truth and relevance today. As for the transgovernmental dimension, it applies to the creative industries as a policy field bringing together multiple stakeholders and different departments. In line with convergence in a cultural or media context is also the much discussed trend of produsage whereby communities of users take part in the production of content in new ways eventually leading to better and richer content (Bruns, 2008). The author goes on to say that such collaborative content creation ends up affecting not only media but in fact, all social avenues by means of spreading knowledge much further than what we were used to expect. In essence, produsage is among recent trends that have led to the collapse of some established norms of production thus making practices such as interdisciplinarity much more common.

Despite the usefulness of the analyzed studies in offering more clarity and precision on what interdisciplinarity entails, one should also be critical towards the practical applications of the concept. Chettiparamb (2007) suggests that interdisciplinarity is in fact very difficult to accomplish in practice due to the complicated and idiosyncratic nature of ideas. Knowledge and professional experience cannot be organized in a way that simply produces a favorable and novel solution. Moreover, as already stated, even the existing academic publications touching upon interdisciplinarity are scarce in numbers, becoming outdated or do not necessarily apply to the context of a creative field such as fashion or other design sub-sectors.

2.5. Interdisciplinary work practices in design and fashion

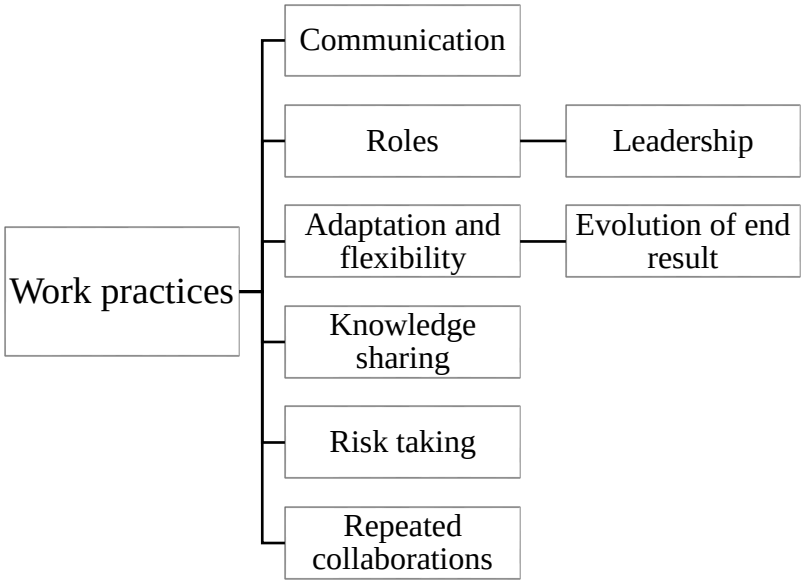
Even though little time has been devoted to address interdisciplinarity as an increasingly relevant concept in the creative industries, it is undeniable that fields such as design and fashion have undergone changes heavily influenced by media and technology. Taking wearable technology as an example shows the great advances that have occurred in the intersection of these diverse disciplines in recent years. In fact, smart clothing can be seen as a perfectly accurate representation of the aforementioned combination of functional and expressive qualities in a cultural product. A garment imbued with an electronically controlled function now serves a different or a larger purpose than simply the act of "wearing" it. Apart from its functionality, it can also be a representation of common issues or it could act as food for thought on various topics – a dress which is designed to visually reflect the wearer's emotions by changing colors, for instance. The ongoing evolution of wearables from bulky, complicated gadgets into useful yet aesthetic products has also attracted the attention of other sectors such as healthcare a long time ago (McCann & Bryson, 2009). In that sense, the current scarcity of any academic resources on wearable technology is surprising considering the booming development of this niche. Investigating the work process and communication practices of creative firms that engage in similar forms of interdisciplinary innovation aided by technology will hopefully lead to more comprehensible insights of this phenomenon.

For that purpose, the general notion of work practices is represented in several aspects informed by the literature review and by the data collection process (see Graph 2.1). Firstly, communication is one of the most important factors to investigate in any work context. Not only have authors such as Sonnenburg (2004) and D'Amour et al. (2005) reiterated the necessity of effective communication in collaborative work environments but its significance becomes even more evident through one of the definitions of interdisciplinarity explained in this research. The Centre for Educational Research and Innovation (1972) has explicitly framed continuous intercommunication as one of the aspects linking a group of interdisciplinary persons together. However, little is known about the way professional relationships are constructed and maintained in the wearable technology field and about the role of digital communication tools or social networking sites in such collaborations. Secondly, as explained earlier in this chapter, interchangeability of roles could have important consequences for wearable tech projects – the extent to which the assigned roles and tasks are flexible among team members may determine the

end result of a collaboration (Bronstein, 2003). Highly related to the concept of role division are also the degrees of adaptation and flexibility practiced in those work environments as discussed by Bronstein (2003) and Bedwell et al. (2012). The latter further list leadership as one of the characterizing aspects of collaboration – the ways in which everyone's efforts are brought together and managed certainly constitutes another branch of work practices.

Two other attributes of work practices which are specifically taken into account include knowledge sharing and risk taking (Joyce at al., 2010). Due to the often highly experimental and innovative nature of the work, there might be different levels of expertise involved as well as a certain predisposition towards exploring unfamiliar grounds. In their investigation of the key benefits and challenges involved in smart clothing collaborations, Ariyatum, Holland and Harrison (2004) concluded that indeed all the various points of view coming from different collaborators are perceived as increasing the potential for new opportunities.

Finally, although not explicitly addressed as pertaining to interdisciplinary work practices, it may also be necessary to inquire about the transition between different collaborations or about criteria that designers may rely on to select new or previous partners to work with. Among many other authors, Skilton and Dooley (2010) have particularly examined how working with the same collaborators repeatedly may have an effect on the quality of the creative outcome. This is an interesting feature of the working process particularly because of the distinct character of the collaborators that would be involved in the same project (on the one hand, designers and creatives and on the other hand, technical specialists). Similarly, the designers' attitude towards the final product or service could also be seen as an integral part of the working process and perhaps a guiding principle in the discussions, meetings or decisions taken within the team. The notion whether the idea for the final outcome is allowed to change a lot or not may also be interrelated with the work practice framed as adaptation and flexibility.



Graph 2.1: Work practices in interdisciplinary collaborations informed by literature

3. Research design

3.1. Method

While examining available literature and opinions on the topic of collaboration and interdisciplinarity, it has become clear that the majority of these studies are qualitative in nature and take an in-depth look at the issue. This tendency could be explained with the complexity of the topic – the various unique points of view that exist at the intersection of different disciplines may indeed necessitate a predominantly qualitative method. It could be argued that the ambiguity and changing face of interdisciplinary work in the context of the creative industries also require a more flexible and "open-ended" approach so that different perspectives could be covered. As experts in the field have explained, qualitative research deals with the participants' interpretations and understanding of the surrounding world – an approach which usually results in the collection of richer and more in-depth data as compared to quantitative approaches (Ritchie, Lewis, Nicholls, & Ormston, 2013). In addition, good qualitative research allows for the uniqueness and nuances of each case or participant to be reflected through the analysis. This characteristic is especially necessary when studying how collaborative projects are conducted considering the diverse nature of the creative companies and stakeholders involved (Sonnenburg, 2004). Their distinct work practices would thus be not only difficult to standardize or quantify but by attempting to do so, the complexity and subtlety of certain aspects would easily be lost during the data collection stage. More specifically, this research paper employs a mixed-method design by firstly conducting one focus group interview with participants from the same studio and afterwards continuing with semi-structured individual interviews with other professionals.

When it comes to the research design itself, the strongest scientific advantages of in-depth interviews are found in people's capacity to tell stories (Seidman, 2013). Their knowledge and experiences can be symbolized in a unique way through language and through each participant's individual answers. The flexible nature of semi-structured interviews further allows the researcher to adapt questions and inquiries according to the participant's specific expertise and point of view while still making sure the direction of the research is not lost (Tong, Sainsbury, & Craig, 2007). In this case, since little is known about the state of collaborations between technology firms and creative firms or the spillovers from one discipline to the other, the access

to individual interviews will help to construct a more concrete and clear picture of the current situation with the addition of specific examples.

On the other hand, focus groups can be especially useful in enabling participants to interact among each other and to encourage new ideas or comments, thus possibly increasing the thematic range of the collected data (Lambert & Loiselle, 2008). Research participants may feel more trustworthy and inclined to share their thoughts since they are in a group with supposedly like-minded individuals (Stewart & Shamdasani, 2014) which would be a strong benefit for this research design. It has also been pointed out that the combination of conducting one-on-one interviews and focus groups for the same research project could be beneficial when used in parallel or for the purposes of data completeness (Lambert & Loiselle, 2008). By means of triangulation, each method could complement the other by contributing information that makes the study more comprehensive. Moreover, since the subjective nature of interviews is often considered a limitation, conducting a focus group session in addition to individual interviews could strengthen the validity of the patterns or themes that may emerge out of the study.

Having mentioned the limitation of subjectivity, it is important that qualitative academic research also addresses matters of validity and reliability. As scholars note, in order to ensure validity (the extent to which the findings are truthful), the data collection method should fit the research question at hand which could be achieved through the type of methodology triangulation explained in the previous paragraph (Morse, Barrett, Mayan, Olson, & Spiers, 2008). Although Silverman (2011) notes that triangulation does not guarantee an objective and "real" perspective per se, he admits that when applied adequately it contributes to the findings with complexity and richness. One also ought to keep in mind that in qualitative approaches, the data collection process is not strictly linear and thus, some concepts, questions or other details may need to be modified as the project unfolds. Apart from this so-called methodological coherence which the authors emphasize, the appropriateness of the selected sample further ensures "the effective saturation of categories" and the quality of data (Morse et al., 2008, p. 6). Therefore, this study aims to make use of a relevant and interesting sample of creative collaborators in order to be able to present data as rich and as reliable as possible.

Besides the external means of ensuring validity through triangulation, qualitative research could also be internally validated in various steps throughout the analysis of the data. One of those steps include the so-called deviant case analysis whereby "deviant cases or 'outliers' are

not forced into classes or ignored but instead used as an important resource" for getting a more complete understanding of the findings (Ritchie et al., 2013, p. 275). In comparison to quantitative research which deems it sufficient when nearly all variance in the data could be explained, qualitative studies need to be concerned with every piece of collected data (Silverman, 2011). In other words, cases which do not fit what is considered to be the norm could be useful in highlighting individual differences or in helping to refine the expectations of the study. This approach has been endorsed as fully as possible by pointing out the conflicting or slightly different opinions that emerged during the data collection process as well as by suggesting how these differences could be examined in future research.

Overall, throughout conducting this study, the transparency of the method was an important factor to keep in mind. As Silverman (2011) points out, devoting sufficient attention to the research strategy and the data analysis and describing them in detail strengthen the reliability of the qualitative work. Reliability is a commonly addressed concept in the social sciences taken to mean whether the research could produce the same interpretations if it is carried out repeatedly or by different researchers. In that sense, details of the entire process from sampling to coding the data and its analysis have been discussed as openly as possible in an attempt to provide clarity of the chosen methodology. Ensuring the study is sufficiently reliable also necessitates that the interview guide and its questions are formulated in a manner in which all interviewees understand the same way (Silverman, 2011). Decreasing the likelihood of having ambiguous questions, for instance, has been achieved through a revision of the initial interview guide and incorporating feedback from people outside of the selected sample. Such seemingly simple actions as receiving external feedback prior to the data collection may have been integral to securing the reliability of the study.

3.2. Units of analysis and data collection

As already briefly stated, this research paper employs the method of individual interviews with experts from the fashion and design fields combined with conducting one focus group with a team of designers or interdisciplinary collaborators. Interviewees are thus individuals practicing as freelance designers or as part of a design studio (in sub-disciplines such as fashion, interactive design or product design among others), all of which incorporate work that draws upon technology in some form. For example, in the case of fashion designers, this interdisciplinarity

could be expressed in the form of wearable technology garment creation. Such professionals operating across different fields are often present or have their work exhibited at well-known interdisciplinary and cross-media events hosted in the Netherlands (such as STRP Festival or Sonic Acts) which provides ample opportunity to gather participants who fit the research criteria. Furthermore, wearables comprise a growing industry in the country where many of the expert or upcoming designers already collaborate among each other and could thus be of help with referrals to potential new participants if needed.

The focus group was strategically conducted before the in-depth interviews in order to be able to fine-tune the themes and specific questions that should be explored further when talking to professionals individually (Lambert & Loiselle, 2008). Although the operationalization of the studied concepts and the interview guide were formulated to a large extent based on the theoretical framework, the focus group was also regarded as suitable in establishing the initial patterns pertinent to the subject matter of interdisciplinary collaborations. Morgan (1996) classifies the nature of conducting focus groups with such a purpose as supplementary or as multimethod. Their supplementary use is typically associated with collecting preliminary data which is then adapted for a primarily quantitative study. On the other hand, multimethod use of focus group interviews implies that they contribute equally to the data gathered via other qualitative approaches. In that sense, the current study employs the multimethod approach to some extent in that both strategies used are entirely qualitative. At the same time, it should be noted that the research design does not fully fit Morgan's (1996) classification either. The purpose of the group interview is not as central as that of the in-depth interviews, but it rather serves as a stepping stone for generating even more useful insights from the participants who were approached individually. Due to the scarcity of academic insights on how contemporary creative studios engage in collaborations, the focus group was helpful in pointing out and confirming the more specific work practices which should be investigated in this context.

In particular, the focus group was conducted with the studio team of a Dutch wearable technology designer based in the country. Although the designer herself was not present, six other members of the studio were able to participate, all of which had different backgrounds, roles and levels of experience within the company at the time of the group interview. Since this is first and foremost a fashion brand, yet one that focuses significantly on wearable technology designs which are almost always produced in collaboration with multiple parties, its profile was

deemed a good fit to the sampling criteria. The label was founded more than 5 years ago and thus has become a quite prominent name in wearable tech circles not only in the Netherlands but internationally as well. These years of being active in the industry hopefully allowed participants to draw on different examples, projects and experiences from the brand's history thus contributing to the richness and exhaustiveness of their reflections.

When it comes to the individual in-depth interviews, eight participants were interviewed following the execution of the focus group. Fifteen was the total amount of people who were deemed to fit the sampling criteria and were contacted. All of them were practicing designers (in fields such as fashion, interactive design or product design among others) whose interdisciplinary approach towards technology was evident through previous projects explained on their official websites or through the way they presented themselves and their own work. All fifteen people were also either currently based in the Netherlands or used to be based and associated with the country which was important with regards to ease of contact, feasibility of recruitment and relevance of the sample. This criterion also positions the research in a more concrete context, possibly making it valuable for Netherlands-based collaborators and for Dutch institutions supporting interdisciplinary practices. Eight out of those fifteen professionals responded positively and agreed to take part in the research while the rest explained they were unavailable at the time. It should be emphasized that these rejections do not seem to limit the quality of the final sample in any way since all contacted professionals evidently had some experience with collaborations and with working with technology-related firms.

Due to the distant location of designers at the time, most of the interviews had to be conducted via Skype instead of face-to-face – a medium which is becoming more and more accepted and common in qualitative research (Hanna, 2012). Interviewees' locations ranged from Amsterdam and London to Tallinn and San Francisco. Nevertheless, with one exception, the conversations took place in calm and quiet environments where both interviewer and interviewees felt at ease to ask questions and share opinions thereby minimizing the possibilities for distraction and ensuring the adequate collection of data. In that sense, the digital connection was not detrimental to the gathered insights. Additionally, two of the interviews were conducted face-to-face and took place at the office of these interviewees since this was usually the location considered most convenient by them. It was important that the focus group in particular is organized face-to-face since the number of participants in this case was larger which required

more intricate moderation of the discussion by the interviewer (which will be addressed in the following paragraph). All in all, the globally oriented nature of these professionals' work and having to travel outside of the country often made it inconvenient to invite them to one and the same location in Rotterdam – such a condition would have complicated the process of recruiting them for the data collection considering their own busy time schedules (Hanna, 2012). The focus group interview took place in the beginning of March 2016 while the majority of the individual interviews were conducted throughout the month of April.

In order to ensure the smooth flow of the focus group and individual interviews, some basic guidelines needed to be revised and followed. One of the main factors has to do with the conversational nature of any interview (Seale, Gobo, Gubrium, & Silverman, 2004). The interviewer ought to keep in mind that a good interview should not sound mechanical the way a questionnaire does but it should rather be a flexible means of acquiring insights. The interviewer (or the focus group moderator) should be attentive to what research participants are saying and when necessary, should be able to probe and ask follow-up questions so as to guarantee that the unique position of each person is adequately recorded (Hermanowicz, 2002). In that sense, although the conversational tone of the interview is indeed a much needed aspect, Seale et al. (2004) stress that the interviewer still ought to exercise a certain level of control. Depending on the specificities of each separate interaction, it is necessary to actively guide the talk according to the aim of the research rather than to let it become too general or even chaotic. When it comes to the focus group interview, it was also particularly important to steer the focus in the right direction especially since there are more individuals, and therefore more opinions, involved at the same time.

3.3. Operationalization

Since the study at hand is of qualitative nature and interviews are the tool at the center of the data collection process, the instrument of analysis is the interview guide (see Appendix A). It is designed in a way that reflects the major themes that appeared most relevant following the review of the available literature and the preparation of the theoretical framework. It was important that these themes pertain to the main concepts formulating the research question, namely "collaboration", "interdisciplinarity", "creative industries" and "work practices". Similarly to the way in which the theoretical framework is structured, the interview guide also

starts off with the theme of new developments in the creative industries (see Appendix A). The broader scope of this topic was purposeful as to introduce interviewees to the research more gradually as well as to allow them more freedom of expression with regards to the state of the creative field and of interdisciplinarity.

In broader terms, the following five topics of the interview guide have to do with interdisciplinary collaborations and the communication that develops around them and were operationalized with the help of four sensitizing concepts. More specifically, one of the main sensitizing concepts that emerged from looking into relevant literature could be summed up as the development of a collaborative mindset. Since implementing a truly collaborative mindset has been deemed a necessary process both for individuals and within teams (Bitter-Rijpkema et al., 2011), its successful integration is also highly related to the sensitizing concept of interdependence. As stated on multiple occasions, the level of interdependence that is required for the establishment of interdisciplinary projects has not been documented in academia thus far. Therefore, operationalization of these two concepts is achieved by inquiring about the selection criteria of new collaborators, the differences of working in smaller or larger teams or about potential challenges along the way.

The other four topics of the interview guide are derived from two more sensitizing concepts broadly termed as "sense making" and "flexibility". On the one hand, sense making is related to the way communication is handled within the project – brainstorming, exchange of insights and overall communication flows could all be regarded as highly relevant to how individuals process information (Bedwell et al., 2012). In that sense, some questions pertain to the role of face-to-face interactions and the role of digital communication tools throughout the working process. On the other hand, sense making is also operationalized through the topic of sharing or acquiring new knowledge from collaborators coming from different, sometimes unfamiliar, disciplines. As for the concept of flexibility, its relevance was tested through questions referring to the distribution of roles within an interdisciplinary team and to the flexibility and evolution of the desired outcome.

3.4. Data analysis

A commonly accepted analytic strategy in qualitative research is thematic analysis which belongs to the general approach of constant comparative analysis. As the term itself hints, this

method entails the comparison of one piece of data, such as an interview, to all other pieces of data which are similar in nature so that conceptualizations could be developed as to how these entities are related (Thorne, 2000). The purpose of comparing all available interviews to each other is to establish common patterns or themes that occur in these accounts which could then themselves be analyzed and compared, as well as the codes are derived at a later stage. Thematic analysis of the collected data in this project reveals what concepts, processes or ideas are considered important when it comes to interdisciplinary work involving technology firms. How the commonly occurring patterns are interconnected is also of significant interest to this study in order to aid in the final discussion and conclusion of the results.

In order to establish and organize the themes, the interviews are first transcribed verbatim. Afterwards, transcripts are carefully coded through repeated readings and by making sure the in-depth qualitative nature of the data is reflected through any patterns that emerge. As Fereday and Muir-Cochrane (2008) state, proper coding ensures that the "qualitative richness of the phenomenon" is preserved throughout the process (p. 4). Themes of importance could be recognized in multiple forms – starting from specific terms that are used and going on to include statements or whole paragraphs of text. Coding the data is also aided by the academic insights presented in the theoretical framework and by the structure and content of the interview guide used in the data collection stage. The coding process of the current study was facilitated by the software ATLAS.ti which is specifically designed for qualitative analysis of large textual data and makes the categorization of concepts and overarching themes more convenient as compared to manual coding by hand.

More specifically, the first step was to engage in so-called open coding where the first few interview transcripts are coded line by line in every way possible and by highlighting every concept that is important and revealing of the topic (see Appendix B). This step is valuable in the sense that codes are saturated thus minimizing the possibility that the researcher misses an important category (Holton, 2007; Walker & Myrick, 2006). With the advancing of the coding, more overarching categories should start to emerge from the data and consequently, smaller concepts are grouped as belonging to a larger theme (for instance, advantages of digitized communication; see Appendix C). In academia, connecting meaningful categories and sub-categories in such a way is known as axial coding (Walker & Myrick, 2006). It is evident that this

is a more advanced stage of the data analysis as the aim is to already understand how categories are interconnected among each other and to go a step further in answering the research question.

The last stage of this three-step process is called selective coding, whereby categories emerge on a more abstract level as a result of establishing the concepts that are most relevant and interlinked in the current context (Strauss & Corbin, 1990; Walker & Myrick, 2006). This is the final phase of refining the categorization of concepts and identifying those core themes the discussion of which would eventually help answer the research question (see Appendix C). Nevertheless, it should be noted that authors who have detailed this coding technique in academia admit that the transition between the three stages may not be as linear and that open, axial and selective coding may even be carried out simultaneously (Strauss & Corbin, 1990). In that sense, although the strategy is useful and necessary for the research at hand, it has been approached as a guiding principle rather than a strict categorization. Additionally, the validity of the overall coding process was strengthened through the visualization of the linkages between themes and patterns. The tool for a network view on ATLAS.ti was helpful in showing how concepts relate to one another and in visualizing their connection to the more overarching categories.

4. Results

The collected insights from the focus group and the individual interviews revealed important interconnected patterns about interdisciplinarity in the context of design and technology but also about the more overarching concepts of engaging in creative collaborations and the communication that goes along with them. More specifically, 64 open codes, 8 axial codes and 6 selective codes were identified after completing the entire coding process (see Appendix C). The exploratory nature of the study was aimed at providing a more overarching and contemporary understanding of this particular kind of interdisciplinary practices which have been somewhat overlooked in academia. To recapitulate, the research question asked: "*How do designers experience interdisciplinary collaboration between design or fashion studios and technology-related firms and how does it shape work practices in the creative industries?"*. Thus, results presented in the following subsections may serve as useful guidelines for experienced designers or as a good starting point for those with less experience in crossover collaborations. Although the reported results progress gradually from addressing collaboration on a broader level towards outlining specific work practices typical for an interdisciplinary setting, it should be noted that themes and concepts are still highly interconnected. The experiences verbalized by participants are indeed relevant for all sections of this study and thus, cannot be entirely separated from the concept of work practices.

The first subsection presents the boundaries of creative industries as seen by the research participants – a valuable and necessary part of the discussion in the sense that designers' work is put in context and their views on interdisciplinarity as a concept are already alluded to. The second subsection delves into the main purposes and criteria for interdisciplinary collaborations in order to outline how designers approach this process from its very beginning. The results and discussion of these two subsections refer rather to the first part of the research question – namely, how designers experience work at the intersection of design and technology. The following subsections address the concept of interdisciplinary work practices more explicitly and therefore, relate more strongly to the second part of the research question. In particular, the central work practices pertaining to interdisciplinary settings are listed and discussed in the third subsection. Findings about aspects such as role distribution, flexibility and proneness to risk taking to a large extent mirror the conceptualization of work practices from the theoretical framework (see Graph

2.1). The final two subsections go a step further by highlighting communication practices and main challenges within interdisciplinary projects.

4.1. Boundaries and new developments of creative industries

Naturally, interviewees had different ways of discussing creativity and framing the boundaries of creative industries depending on their own background or experience. Discussion of such differences may be particularly useful in exemplifying the complexities of crossover work. For instance, a few of the respondents pointed out the difference between professionals whose work is based on people's needs and is thus more focused on the functionality of design or fashion compared to professionals whose focus leans more towards expression or towards design as an art form rather than functionality.

"*I think the difference between an artist and a designer […] is that we look to the future customers or other people more related to the product or service – what are their needs and their desires."* (A.A.; II[1])

This pattern is clearly reflective of the academic debate between "functional" and "symbolic" qualities of creative goods outlined in the first subsection of the theoretical framework (Lawrence & Phillips, 2002; Lazzeretti, 2012; O'Connor, 2010). As confirmed through the overall tone of the coded responses, a distinct delineation between the two characteristics is not easily achievable since representatives of the creative industries relevant for this research often find both to be of similar importance. Although the customer's need matters significantly for the concept of a creative product or service, interviewees also mention the increasing need for visually thoughtful and meaningful design. In any case, the definition of what is considered creative work was revealed to be extremely malleable, with the ability to spill over in different disciplines.

[1] "II" refers to quotes taken from an individual interview; "FGI" refers to quotes taken from the focus group interview

"I think even the high-tech companies… if I collaborate with them, they approach it sometimes so creatively. And they will never fit in the creative industries – they are really makers which fits in the creative industries but these are high-tech industries." (M.T.; II)

Statements such as this are particularly reminiscent of discussions around technological or media convergence and the ways in which these trends have had an impact on creative industries (Hartley et al., 2012). Convergence may thus become an expression not only of digitization's influence on content creation but also a way of pointing out the increasing connectedness between technological and creative sectors. Despite these somewhat different angles of looking at creativity, a common argument most interviewees seemed to circle around was the need or the ability of creative industries to express criticism towards the global socio-economic situation or the established ways of working within and outside these creative sectors. According to them, creative work not only provides commentary on such issues but it goes a step further in its aim to challenge the status quo and bring about more positive change.

"We all work with [our own point of view] about society and we want to criticize [some aspects] or make things better. And that's why we make something creative." (A.S.; II)

This line of argumentation may be valuable to explore in further research since it already fits well within academic discussions about the ways in which creative industries enrich our social surroundings and help grow the economy (Bakhshi, McVittie, & Simmie, 2008; Potts & Cunningham, 2008). In some cases, this urgency for change expressed by interviewees was also linked with their inclination to work with technology. Technology, both as a vast industry and as a tool, was regarded as a possible solution for design and fashion in becoming more conscious of the current issues pervading those sectors and society as a whole. Fashion, in particular, was often discussed in terms of being a very old-fashioned and established field which has been operating in a similar way for decades and thus, has the great potential of evolving further with the implementation and development of new technologies.

"I turned to technology because I wanted to change something in how we see sustainability in clothing. And because of my technical background, I found that there is an opportunity to see what can we do with technology for that goal […]." (K.K.; II)

4.2. Main purposes of interdisciplinary collaboration

Collaboration in general was heralded as a necessary and enriching approach in achieving greater quality in one's work or in getting access to expertise which is unavailable in a designer's own skillset. Three main purposes were identified throughout the coding process (see Table 4.1) – the need for specific expertise, creating a product of high quality, and getting feedback and the diverse viewpoints of collaborators. The first concept, namely the need for specific expertise in the development of an idea, was cited most often as one of the main reasons why a designer or a design studio would seek to engage in a collaboration. As is the case with most professions, a designer's skillset also has its own limits – some may have a fashion background or education and although they may also possess important knowledge about electronics or other fields unrelated to design, interviewees suggest there is always a need for a truly skilled expert. Moreover, their ambitions to create a wearable tech garment or to realize another innovative concept may be bigger than what their individual skillset allows yet still quite reasonable and achievable in terms of the desired idea or product.

"The ambitions that I have for bringing quite complex products to the world, I'm not capable of doing that myself. And I think that at this level of complexity, no one is capable of doing it by themselves." (M.T.; II)

This notion is especially applicable to the case of interdisciplinary collaborations with technology-related firms or experts since oftentimes, the required types of knowledge in design, technology, science or engineering among others are vastly different. In her framework on interdisciplinary collaboration discussed in the literature review, Bronstein (2003) emphasizes that the cooperation of actors with varying expertise is aimed at achieving a result which would otherwise be much more difficult and unlikely to accomplish. Lee et al. (2012) have similarly noted that due to the market changes and trends occurring on a global scale, developing sustainable competitive advantage based solely on a company's own competencies has become

insufficient. In that sense, collaborative work has long ago emerged as a natural solution for designers who wish to move further in innovation. The way interviewees talked about the decision-making process when starting a new collaboration is that usually they would be the ones with a vision or concept in mind which they could use as a starting point for finding suitable partners and collaborators. More specifically, wearable technology as an innovative discipline which itself combines insights from various fields is particularly conductive to constant collaboration with different experts. For instance, one of the interviewees revealed she was currently working in a start-up involving a diverse blend of specialists such as a mechanical engineer, an electrical engineer, soft goods specialists, an industrial designer as well as physiology and physiotherapy experts.

Furthermore, related to the need for specific expertise is also interviewees' goal to create a product of a high quality or quality which they would be satisfied with – the second concept identified as part of the main purposes to collaborate.

"I'm invested in getting the best version of my idea out there. So I work with other people who kind of share that dream and wanna work with me on that." (M.C.; II)

Despite reiterating the importance of having access to highly-skilled professionals from different fields, simply receiving the collaborators' feedback and the diverse viewpoints that go along with such a process were mentioned as valuable enough purposes of seeking out new collaborative projects. This is the third major concept attributed as part of the theme that covers designers' purposes of collaboration. Indeed, sense making has been reported as one of the main behaviors corresponding to collaboration – a behavior in which information can be processed through the collective discussion and interpretation of information (Bedwell et al., 2012).

"When you explain your idea to somebody else, you can tell when you're explaining it if it just sounds stupid. So having access to feedback and [somebody to hear you out], even if that person doesn't have skills that you can use per se, or that you need, I think collaboration helps to make a stronger product in the end because it has had audience." (M.G.; II)

It is also logical that cooperating with other individuals is usually not a linear or straightforward process, especially when speaking of the creation of a visual product or service – something which has been discussed in academia by Sonnenburg (2004) and Adler and Chen (2011) and corresponds with the findings of this research. There is a lot of going back and forth due to challenges or changes that inevitably come along the way – for instance, working with geographically distant actors may slow down the process or there might be simple miscommunication that creates a new obstacle to take care of. In other words, there is always work that requires smoothing out and in such cases, having a like-minded professional around, who is also sufficiently familiar with the specifics of the project, can be an invaluable asset. Furthermore, interviewees mentioned the advantage of being able to test the product or prototype unofficially throughout the process of making it and perfecting it which allows you to "already have a more mature product than what you would have if you just develop it in a secret cave alone" (K.K.; II).

Table 4.1: Engaging in collaboration

Main purposes of collaboration	**Criteria for selecting new collaborations**
Need for specific expertise	Need for specific expertise
Creating a product of high quality	Understanding the different fields
Value of feedback and diverse viewpoints	Matching expectations
	Smooth and clear communication
	Matching beliefs and goals
	Ability to get along

4.2.1. Criteria for selecting new collaborations

After establishing why collaboration is seen as necessary in the first place, the criteria deemed most important for new collaborative projects need to be addressed in more detail. This is a theme which has not been reviewed by itself in the theoretical framework but emerged as meaningful grounds to discuss with collaborative designers. Six such principles were identified as most definitive throughout the coding process (see Table 4.1) – the need for specific expertise, an understanding of the different fields involved, matching expectations, smooth and clear communication, matching beliefs and goals and the ability to get along. Whether it is important to

work with people and companies who have already collaborated together before may be examined as a seventh concept among these criteria, yet the inconclusive range of answers necessitates that it is researched further with a larger or a different sample.

Here once again the need for specific expertise is most often regarded as the first characteristic to consider when choosing one's new colleagues or partners. This could mean having to "look at the portfolio of someone" or "at the work they've done before" as some participants mention. To some extent, this requirement may have been considered as a given by the interviewees and so, they had more to say about other criteria they found important which revealed interesting patterns in the data.

For instance, a couple of interviewees elaborated on the necessity to collaborate with people who have at least some basic understanding of the rest of the fields they would be working with. In other words, in an ideal scenario a technical specialist would have some understanding of how a creative sector such as fashion or product design operates and vice versa – a designer who is about to work with technology needs to speak and understand the more technical language. Interviewees explain that this understanding does not and cannot represent high-level knowledge but it means project members are still sufficiently familiar with what another person's job entails so that the tasks required from them are not unreasonably difficult. This was seen as an integral feature of interdisciplinary projects and was deemed as common among interdisciplinary designers: "The thing is, the people we collaborate with, and also ourselves, are already multidisciplinary so everybody has a little bit of an understanding of what others do." (E.L.; II).

Moreover, making sure that the expectations of the different parties involved in the project were clear and aligned was seen as extremely important in order for the collaboration to thrive. According to some interviewees, establishing everyone's expectations and priorities earlier in the process could prevent some complications or disappointments later on. It is to be expected that each collaborator would have a different idea of the final outcome in mind – some could be more focused towards getting a new product on the market while others could be interested simply in researching the idea on a conceptual level without producing or selling anything (Babiak & Thibault, 2009). However, finding out about these differences in expectations at an inconvenient time, or when the project has been under way for a while, could prove frustrating and disappointing.

"It could happen […] that actually throughout the communication people's expectations are different but that's always a bit of a risk, in all complications in general. You really have to point out what you exactly mean and what it contains – to define everything well. And not like "Oh, just like this" and you think you're already on the same level but you're not." (J.K.; II)

Another interviewee also explained that the way each project member prioritizes the work is important in ensuring the process flows smoothly. Otherwise, some team members might end up putting much more energy or hope in the value of the project while others would rather consider it as a secondary priority. Overall, the importance of having shared goals and expectations and overcoming those that are conflicting has often been deemed as key in getting a certain level of quality out of the collaboration (Bedwell et al., 2012). The best way to deal with this challenge and to set common expectations according to interviewees was to communicate all parameters of the work clearly and at any stage that this is required.

In general, the quality of the communication was another aspect that appeared to be essential among the criteria used to determine whether a particular collaboration is going in the best possible direction. This finding is also in line with the points made by Sonnenburg (2004) and D'Amour et al. (2005) arguing that effective communication which is open and respectful is one of the drivers for collaborative creativity. People's ability to express themselves freely and to remain open to all kinds of ideas, especially during brainstorming sessions, was cited as a way of establishing good communication in the current study as well. One interviewee also suggested the importance of communicating on different levels since not all individuals approach and consume information the same way. For that reason, she would usually sketch or visualize people's ideas during a meeting and arrange the sketches into post-it notes or any other way that would help the team and herself understand each other better. It is to be expected that communication would be challenging, perhaps even more so in projects relying on different areas of expertise – such potential challenges will be discussed in more depth in one of the following sub-sections.

Much like in any relationship, a strong enough match is also needed when it comes to the beliefs, values or overall goals of each project participant even when the context is professional. Interviewees revealed that if they would be working with a new collaborator, they liked to first get to know if they had shared values at least on a basic level but also to find out what their future collaborator wanted to achieve and bring to the project. In fact, D'Amour et al. (2005) themselves

maintain that any interdisciplinary team is an entity with a common goal and common decision-making process. It could be argued that in order to ensure an alignment of the goals, the participants' values cannot be too divergent either.

The way in which professional collaborations could be analogous to any form of relationship was also pointed out in terms of the ability to get along well with all team members. Being respectful and kind to others as well as open to their input were pointed out as details that play a role not only for the overall positive feeling of the collaboration but also in the extent to which the outcome is successful. As one interviewee put it: "Any kind of business is held by people getting along quite a lot because it's always compromises everywhere along the way" (M.C.; II). Determining whether collaborators would be easy to get along with was often based on an internal "feeling" or personal intuition according to some interviewees. Undoubtedly, building an environment which is pleasant for all its inhabitants is also tightly interconnected with the previously discussed aspects of effective communication and matching beliefs and goals. In that sense, taking as much care as possible about these two conditions when getting involved in a new professional partnership could mean preventing at least some obstacles of the process.

An aspect that was not reported as significant by all research participants but nevertheless, was discussed extensively, has to do with the importance of working with people or firms that have already collaborated with the designers in previous projects. Involving the same parties for a new project could be advantageous in many ways – knowing that person's skillset and how they could contribute to the teamwork and knowing that they could be trusted might be sufficient factors in judging whether to engage in a collaboration. In a sense, having previous experience of collaborating with someone might be beneficial in eliminating some first-time hindrances that might typically slow down the process.

"[…] she and I have quite often come up with very similar solutions but because we haven't worked together, we don't know about each other, we don't know what we've already seen and what we don't know. So, sometimes I will bring in a solution to her and I'll say "Oh, you know, you could do this" and she'll go "Oh, yeah, I did that a year ago in this project". Or sometimes we'd show each other work that's completely surprising and new but a lot of the time, we'll come to the same conclusion." (M.G.; II)

Although established trust between collaborators seemed to be the main point regarded as beneficial when working with the same people, some research participants stated that they did not particularly mind approaching new collaborators that they have not worked with. In fact, some also noted that cooperating with the same group of people over and over again may have the opposite effect by making the process stagnate or by decreasing the flow of creative ideas.

4.2.2. Positive effects of collaboration

There are several other aspects that came up during interviews which were not necessarily regarded as strong enough reasons to collaborate but were nevertheless approached as important and beneficial "side effects" of the process. Positive actions such as acquiring new knowledge from projects, broadening the range of skills associated with various fields, getting inspired or expanding their professional network were addressed in the attempt to shed more light on the flow of collaboration between designers and technologists. The way in which interviewees talked about the ability to learn new skills or become more aware of a certain new field during a project was indicative of the taken-for-granted nature of this learning process. Due to the highly innovative character of interdisciplinary work and the constant engagement of new concepts or areas of expertise, most interviewees maintained that they are continually presented with the possibility to acquire new knowledge.

"So it has become about learning – the one half and the other half need to learn. So it's different people who do the job and then we all gather in the challenge to learn." (P.R.; FGI)

As exemplified through this quote, having to deal with an unfamiliar domain of technology could certainly be a challenge – something which holds true for any sort of learning process. It is a process which usually takes a lot of time and effort and as some of the designers revealed, one needs to try and learn through different methods. Logically, some of these include researching the topic, asking specialists for help and explanation or simply taking matters in their own hands by applying a new skill in practice. Depending on the kind of work a designer is typically involved in, acquiring new skills may be not as easily attainable or not as important – instead, they might gain new "insider knowledge" about an unfamiliar topic which could eventually lead to new

possibilities. In that sense, despite the challenging process of obtaining new knowledge, interviewees did not seem to shy away from this kind of effort.

"In a way, all of the projects build your skillset and knowledge as a whole, as a person. […] That's, I think, the most important part of doing all these different projects – that you grow the area where you can work in, and sort of defines the kind of designer, or collaborator, or developer that you become." (K.K.; II)

Inevitably, this represents a rich source of inspiration for interdisciplinary designers since they are so often approached with new requests and less familiar concepts. As a result, their professional network is also continuously expanding into different fields of work and different geographic areas. The number of events and exhibitions focusing on various aspects of design, innovation or implementation of technology among others is also significant, meaning that designers regularly have the opportunity to encounter professionals who are interested in their work. This line of thought is particularly related to Hauge and Hracs's (2010) own findings on interdisciplinary linkages which indicate that networks in the creative field have an almost strategic role. Through expanding their connections, designers are not only able to share information with like-minded and similarly skilled individuals from their own sector but also to seek complementary expertise from other industries. The general consensus was that the network of an interdisciplinary collaborative designer was an important asset in finding new interesting niches and actors to cooperate with.

"I have all the time, every day, one or two people coming over – and it's new people all the time […]. So I think this collaborative work, it also attracts people to collaborate and sometimes, it's a bit too much because you need time to work and you can't always keep communicating and collaborating. But it is also quite interesting and you really don't have a chance of getting stuck in your bubble." (K.K.; II)

4.3. Work practices in interdisciplinary collaborations

One of the main purposes of this research has been to get a more concrete idea of how interdisciplinary collaboration takes place and how these work practices may differ from a more traditional design setting. As a result, there are several aspects that were paid specific attention by interviewees and were identified as distinctive features of interdisciplinary collaboration including freedom of work, individual tendency for interdisciplinarity, proneness to risk-taking, having different backgrounds or expertise, interchangeability of roles and flexibility of end result. Naturally, these features have also emerged as highly interconnected among each other and not as easy to categorize or separate. The last two aspects in particular brought up more diverse opinions than the rest and thus, it is advisable that they are tested in more depth when conducting further research.

In any case, designers' appreciation of the freedom that comes with their line of interdisciplinary work and decision-making was specifically discussed by some of the interviewees.

"I think it's nice that we can bend the rules a bit because you're doing something disruptive which is not fashion exactly. So you can break the ground rules, like, we don't want to participate in fashion shows. It gives you a bit more space to create things the way you like them." (P.R.; II)

Some further elaborated that freedom of work might be seen as the possibility to do freelance assignments "because it helps you create your own time and your own schedule" (A.A.; II) or that it is smaller companies where designers might be able to take design risks or experiment with some concepts. It is important to note that this argument was established even by some young designers who had previously worked at bigger fashion houses whose work process is more hierarchical and more traditional than a relatively small interdisciplinary studio. As one interviewee noted, working for the big fashion labels does not involve as much individual initiative because there is usually somebody who determines what needs to be done next. Perhaps related to this strive for freedom of work is some interviewees' individual tendency or interest in interdisciplinarity. It may often be the case that what shapes these designers' creative direction is

not just the drive to collaborate but an inner fascination and capability to combine knowledge from different spheres and come up with solutions that cross over from one discipline to another.

The ability to overcome some uncertainties and risks in such a dynamic environment was also regarded as an everyday feature of the work that crosses over different disciplines. Although it is a daunting prospect, risk-taking is important at the intersection of design and technology because it pushes the boundaries of these industries and allows for new creations to receive exposure or to be evaluated by various stakeholders. In another sense, agreeing to be involved in a challenging project could be regarded as a necessary risk for designers whose wish is to grow their capabilities (Joyce et al., 2010). Besides creative risks, there could also be many financial or time management uncertainties that need to be considered during the creation of a highly innovative product. In any case, some interviewees suggested that testing and validating the quality of this new product is essential in ensuring that the risk is not too difficult to handle and that customers can trust the designers' work.

An interdisciplinary design studio might also consist of people who all have different backgrounds or expertise. Even in cases when their education is similar, this does not imply that they are specialized in the same sub-field or that their knowledge is comparable. According to one interviewee, being in an interdisciplinary environment means that each team member has something specific to contribute to the work and is thus an integral part of the process rather than a replaceable piece. As suggested by some previous studies, these somewhat differing perspectives are often approached by collaborators as beneficial for locating new niches for creative work (Ariyatum, Holland, & Harrison, 2004). At the same time, collaborating in interdisciplinary settings also requires that team members have developed an understanding of the fields involved in a particular project – an aspect which was also reiterated as an important criterion in deciding on future collaborations.

"I think when everybody plays a key factor in a design agency, the combinations are much more interesting. You get much more interesting concepts, as well, because you have so many different trains of thought." (A.S.; II)

Two interesting features which were discussed in more depth and revealed different layers of the interviewees' way of working include the degree of interchangeability of roles during a

collaboration and the degree of flexibility of the end result. For instance, the expectation that the roles of project members would be very interchangeable triggered by Bronstein's (2003) argumentation was somewhat refuted. Rather, some interviewees pointed out people's roles are fixed by their skillset and their field of expertise which they incorporate in the process. Related to the aforementioned basic understanding of different disciplines, it is beneficial when a fashion designer creating wearables is informed about electronics or when a technical specialist is knowledgeable about textile. However, this does not make either of them capable of doing the other person's job in an expert way.

"I would like to say that they're interchangeable but I've been surprised at how fixed they have to be. […] I'm working with an electrical engineer who has studied this for years and I can't do her job but I can help her do her job. So we're definitely not interchangeable but we can look at something together and I can make suggestions and then she can decide whether that works. But her domain is her domain." (M.G.; II)

At the same time, some interviewees argued that in comparison to traditional studios, roles are more interchangeable in domains that are interdisciplinary. In some cases it is rather the strength of the roles that may change depending on the phase of the project in question. For instance, during the phase of developing the fabric, it is the textile specialists that have a more active participatory role while during software or electronics development, it is the technical specialists that have a more active role. Another interesting point referred to the way roles can change depending on the individuals involved in each different project. When an interdisciplinary designer collaborates with a technical expert, the designer's role could weigh in more heavily towards the fashion- or design-related tasks while if they collaborate with another designer and no technical experts, their role could include more technical responsibilities. In that sense, the interdisciplinary design studio certainly emerges as a setting with a more flexible structure – one which necessitates collaborators' ability to adapt to a changing environment (Bedwell et al., 2012). As the authors point out, routine expertise and routine work practices are no longer sufficient for team members who are faced with changes occurring with the team structure, the frequency and mode of interaction or with the duration of the performance.

Last but not least, the extent to which the desired outcome or product is allowed to change also brought up diverse opinions. All in all, this was seen as a quite flexible concept – most interviewees agreed that it is both difficult and unnecessary to have a strictly fixed end result at all times. Especially when the design process involves experimenting with technology, there is a lot of getting acquainted with how the crossover works and a lot of research that needs to be done before a clearer idea can be shaped. Even on a more traditional design level, working with different materials or collaborating with new partners implies some degree of uncertainty and a willingness to adapt. The research participants seemed particularly keen on the notion that this flexibility allows them to improve the product or service being created and to make the most out of the expertise accumulated through the various collaborating parties. Yet, such flexibility also has its own necessary limits and even though being able to change and adapt was seen as useful, interviewees noted that collaborators need to come up with a more concrete overall goal somewhere in the process.

Furthermore, a difference was established with regards to the nature of the collaboration or the work that has to be done. For instance, a collaboration in which a client is involved could mean the focus is put on a specific "line of products" or it could have an established deadline which puts some limit on the work (as is the case with exhibitions or performances, for example). On the other hand, the approach could be more process-focused rather than product-focused meaning there is emphasis on research and exploration so that designers are able to "see what comes out during the process" (K.K.; II). As mentioned earlier, such expectations should be distinctly agreed upon by collaborators in order to ensure a smoother development of the project and to avoid potential disappointment.

4.3.1. New developments in interdisciplinarity

Designers were also asked to comment on recent more significant changes taking place in their field and with regards to interdisciplinary practices. Several trends, both positive and less so, were identified – for instance, the wearable tech designers confirmed there has been increasing interest in their domain from the fields of healthcare and sports. As one interviewee explained: "I can really see that it could be working [in healthcare]. Because it's not based on producing many of these new wearables in a very fast pace and very cheap. This is not the aim." (E.L.; II). Although this viewpoint concerns wearable technology in particular, it is still indicative of the

growing potential of cross-sector innovations in general in countries like the Netherlands where such practices are encouraged and often financially supported by the government or by funding institutions.

Apart from the possibilities presented at the intersection of fashion and healthcare or sports, the future of interdisciplinarity was regarded to be in the hands of young designers and smaller companies. Interviewees acknowledged the positive changes that have been taking place and the growing interest both by textile and fashion experts as well as by technology-related or science-related disciplines in working together. However, some changes that still need to take place were also emphasized such as the transition to even more open-mindedness in the somewhat traditional creative fields and the necessity to bring innovation in fashion and technology to a truly radical level ("How are our clothes still the same as 40 years ago? Of course, there are some changes but it didn't hit mass market yet.", A.S.; II). This was seen as possible in case those people coming out of university at the moment, who are supposedly much more aware of interdisciplinary developments and who look critically at the state of their industry, are willing to be proactive and apply their own open-mindedness in their work. Generally speaking, the professionals who dare to take risks and push for innovation are those laying the ground work and "creating a culture around these ideas" before necessarily making profits out of them.

"So there's definitely pressure now coming from […] maybe the smaller companies who are trying to integrate, innovate and put the technology into clothing in a practical way." (M.G.; II)

The extent to which current design or even technical education embraces and teaches students about interdisciplinary working methods represents a somewhat unresolved theme. On the one hand, some interviewees point out that current Bachelor and Master students in design start to be much more knowledgeable and experienced with the concept already throughout their courses and as a result, enter the professional field as more predisposed towards practicing interdisciplinarity. On the other hand, others suggest revising teaching methods to also fit into an interdisciplinary approach could be the necessary path to take in the near future.

"[…] schools talk a lot about interdisciplinary cross-collaboration but none of them have really been able to do it very well. So I think that if education focuses on it in a way that is successful, then we'll see a big improvement." (M.G.; II)

An interesting point initially made during the focus group was supported by all of the individual interviews as well – namely, the importance of developing an entrepreneurial mindset and at least basic entrepreneurial sensitivities as a designer. Being proactive and the ability to "push" and promote one's own work were discussed as crucial for contemporary designers considering the growing advances of niches such as the one for wearables. In fact, in a couple of cases it was noted that those activities typically regarded as less creative are just as necessary for the success of a project – those may include taking care of funding, keeping track of documentation or communicating the story to customers and other stakeholders. In other words, it has become increasingly important for creatives "to be able to multi-task and have an understanding outside of only shape, material, color and design language" (E.L.; II). Although Bronstein's framework mentions the case of being adaptable with regards to unfamiliar work that needs to be carried out in a collaboration (2003), the argument on having an entrepreneurial mindset was not particularly prominent in the literature reviewed for the context of this study. Nevertheless, analysis of the research data indicated it as a worthwhile factor to explore further in our contemporary environment.

4.4. Communication practices of interdisciplinary collaboration

When it comes to communication practices in an interdisciplinary environment, they could be discussed in terms of how communication takes place between designers and technologists. The importance of geographical proximity between collaborators, face-to-face interactions and the use of digital communication tools were among the main themes of discussion with regards to how collaboration is managed. One of the main conclusions about being geographically close to the rest of the collaborators is that it is usually more convenient and beneficial for the project if people are indeed situated close to each other, especially since the domain of fashion, design and technology often has to do with physical products. Building an object, whether it is a garment or an accessory or simply the developing of a fabric, involves making decisions with regards to material, color or shape. According to interviewees, those are aspects which are best judged in

person when one has physical access to the object and materials being designed – something that goes hand in hand with the convenience of geographical proximity.

"I think if you do a project and you never meet, I don't really see how that works. At the very least, you need to meet at specific decision-making moments. And especially if you're dealing with physical things, I don't think anybody quite understands what they're making until they have both seen the physical things in real life." (M.C.; II)

However, most interviewees also maintained that they have been or are currently involved in collaborative projects with partners who are based overseas or in different distant locations. Some research participants had ongoing work with companies or individuals not only around Europe but also in the US and Canada among others. The argument here revolves around the notion that even when designing a physical product, working with distantly situated parties is still achievable in case there are more or less regular meet-ups to establish that everyone is on the same page with the development of the project. Having an initial face-to-face contact is seen as beneficial in getting a good first grip of the direction of the work. Furthermore, as one person suggested, the different collaborators also have different expert roles which means that as long as their vision and goals are aligned throughout the process, each of them can be responsible for their own tasks.

The possibility to interact face-to-face was pointed out as highly valuable in communicating enthusiasm within the team and in building stronger relationships with the team members. Staying passionate about the process and keeping up the motivation were mentioned as strong enough reasons to prefer face-to-face interactions rather than constant digital contact. Simple things like getting acquainted with another professional's working environment and establishing that person's values and ideas by meeting in real life were indicated as ultimately influencing the quality of the collaboration. As suggested earlier in this section, the advantage of getting along with one's collaborators is not to be underestimated – something which seems less difficult to accomplish in cases when face-to-face communication is encouraged. Through these discussions covering face-to-face interactions and the alignment of values and goals, the complexity of achieving a particularly satisfactory interdisciplinary outcome comes through (Chettiparamb, 2007).

On the other hand, when interaction in person is not possible or not entirely necessary, digital channels of communication serve as useful substitutes. In fact, being active with digital means of communication may have several advantages including efficiency, ease of discussing new changes or keeping a backlog of what has been accomplished so far. In a sense, online tools such as Skype or email "force you to be more straightforward and […] you focus on the things that are important enough and not so much on all the things you can think of" (A.A.; II). They take away from the necessity of keeping up with the social etiquette at all times thus, helping to speed up the process and to address what is on the current agenda more efficiently. Documenting ongoing changes in written or visual format (e.g. via email) also helps in having constant easy access to how process developments have been discussed which otherwise may not have been recorded as precisely during a face-to-face meeting. One of the interviewed designers gave the example of making process pictures of the product being developed and exchanging them with collaborators via WhatsApp which was useful in keeping a log of how the work evolved.

What seems to be a growing trend in the way communication occurs online is the use of WhatsApp in this more professional or collaborative context. Although one focus group participant specifically stated the preference to keep interaction with technical specialists on a more formal level via email instead of WhatsApp, the direct messaging platform has emerged as a simple way of staying in touch with coworkers and studio members. Similarly, Facebook was mentioned by some as an appropriate channel for keeping an online thread of ideas and inspirational content in a more informal manner.

"[…] when the company is smaller or when working with freelancers, we also communicate with WhatsApp. It's quick and easy compared to email where you have to write everything and sometimes they would read it later." (J.K.; II)

4.5. Main challenges of interdisciplinary collaboration

At times, interviewees were themselves explicit about the challenges that come along with interdisciplinary collaborations. As a result of the coding process six concepts were identified as composing this particular theme – those include working with technology, working in a large team, dealing with a client's restrictions, retaining ownership of one's work, having diverse viewpoints or expectations and managing time and finances.

For instance, the challenge of working with technology was mostly discussed in terms of the uncertainties involved when designing products and services at such an innovative intersection. Essentially, even technologies which may not be new by themselves are being utilized for new purposes more and more often (Jeffcut & Pratt, 2002). However, these less traditional combinations of design thinking and technology also mean that the end result is not always as expectable or easy to anticipate. Although applying technological properties in different scenarios in design or fashion certainly represents a niche for new opportunities, the other side of the coin is that designers are forced to deal with technological aspects over which they have less control. The dual nature of the discussion seems to be in line with academic argumentation on the advances that have taken place with regards to textile and new fabrics thanks to technology over the years (Lam Po Tang & Stylios, 2006). In that sense, technological cross-sector innovation could certainly come at the expense of some additional limitations. According to a couple of interviewees, even something seemingly trivial as lack of fitting terminology could turn out to be challenging when engaging in collaborations with technology experts.

"And we also don't have words to describe some of the things we are doing. Because it's new, because we're putting technology onto textile, there are some parts that might have been done before in different workshops but they're not common so we don't have words for them yet." (M.G.; II)

In other cases, being part of a large team for a particular project is also a challenge in itself. Although all the different collaborators involved would be contributing to the work with their own expertise and diversity of ideas, this could naturally create a more chaotic atmosphere or present some clashing opinions. The majority of interviewees touched upon this difficulty and agreed on the importance of making sure that such projects are managed proportionally – partners need to be aware of potential disagreements and need to engage in some degree of planning. Furthermore, one participant noted that being in a smaller team might mean "more room to experiment and try things out" (E.L.; II) while in larger teams, this is not as practical and each member needs to be responsible for their own part in the project. It is through such discussions that the value of clear communication is highlighted once again – talking things through and

making sure people are on the same page becomes even more essential within larger collaborations (Sonnenburg, 2004).

A third problematic aspect may come from the client's side or from the production facility involved – this type of collaborators may have strict demands for the way the project should be executed or their approach may turn out to be too closed-minded. According to a couple of interviewees, a company's demands could be restrictive depending on the specific field they are coming from or on the company's characteristics. For instance, the healthcare field is one that inevitably needs to impose specific standards for the execution of certain products and services with regards to hygiene or safety. In some cases, such restrictions are necessary but in other cases, they may be due to characteristics of the field which have become too old-fashioned or too narrow-minded. Considering that academia has essentially dubbed the creative industries a facilitator of new knowledge (Potts & Cunningham, 2008) and a promoter of innovative and highly inclusive practices such as interactivity and customization (Cunningham, 2002; Deuze, 2007), the challenge of working with more closed-minded firms as outlined by some participants is perhaps easier to understand. This line of argumentation by participants is thus related to their criticism towards the more rigid parts of the system and the need for some industries to open up towards new ways of working.

Situations in which the ownership of a designer's work is respected by collaborators, especially when bigger brands or firms are involved, were seen as becoming more and more important by the majority of the interviewees. Naturally, this is a complex endeavor since there are often many different parties associated with one and the same project and each one of them has their own aim to succeed or get recognized for their work. Most of the designers who participated in this research are currently not part of global corporations or big brand names but are rather committed to having more control over their work even if production and promotion happen at a smaller scale. In that sense, it seems important to be able to find the balance between sharing credits among all team members equally while also accomplishing the goals set for a particular project.

"What happens quite a lot is that one person in the project gets asked to do an interview on something. And what happens inevitably is that even if they constantly provide everyone who's worked on the project, they just tend to make it about this one-hero story which means that everyone else just gets put on the sidelines. So part if is making sure that all the people that you have involved in your project are equally committed to promoting everyone." (M.C.; II)

As pointed out several times, lack of balance in the recognition shared among collaborators could be a consequence of choosing to work with a much bigger company. In such cases, the big company's main goal may be to swallow up the smaller brand or the independent designer for their creative ideas and then end up getting significantly more credit in the eyes of stakeholders. Although the reviewed literature on collaborations and interdisciplinarity does not specifically cover issues relating to small and big companies working together, authors such as Bronstein (2003) have certainly suggested the importance of sharing responsibility for the project's initial goals, their development and eventually, their accomplishment.

"It's difficult to work with big brands because they easily steal your job. Because we're a start-up company and they're like the big tough guy. And what is dangerous in the contact when you're in collaboration with them is that you tell them too much about what you can do and they sort of memorize it and say: Okay, nice meeting you, bye!" (P.R.; FGI)

Furthermore, concepts which have already been discussed as part of the rest of the themes also emerged as potentially challenging – namely, the category of dealing with diverse viewpoints and differing expectations. Most interviewees already pointed out that there are always numerous opinions being formed before and throughout the collaborative process and thus, it is of little surprise that some particularly emphasized the challenges that come along with those different opinions. A person's background or expertise in a specific field is in itself a premise for the formation of somewhat conflicting viewpoints which nevertheless need to be overcome at important decision-making moments. Although authors covering the topic of smart clothing collaborations have argued that different standpoints and different approaches often result in locating valuable new opportunities, this inevitably goes hand in hand with a more complicated exchange of ideas (Ariyatum, Holland, & Harrison, 2004).

Last but not least, a major challenge that was outlined by most interviewees has to do with the financial expenses and time management of creating these products or the efforts around marketing them. In the context of wearable technology, there was some degree of doubt expressed in the possibility to make profits out of such garment creation. Besides the financial constraint of having a specific budget to fit in, two of the interviewees particularly talked about the difficulty of making profits solely based on the creation of products and services in this sector. In that sense, it was pointed out that usually a wearable tech designer engages in additional activities such as consulting to be able to sustain their work with wearables.

"*It's very difficult to develop a business around this. It's very useful when you work in a technological center or when you have a company based on university input so you collaborate with the university. Or if you are a consultant, this is also possible but then you don't develop anything, then you let the bigger company develop."* (E.L.; II)

Dealing with time management and with projects that go on more slowly than usual was a difficulty of similar nature as budget restrictions. Although deadlines were seen as a common part of the work process, they were also described in terms of making team members feel more pressured and having to take into consideration the time everyone needs to set aside for their individual contribution.

5. Conclusion

Although there are always more concepts and more issues that could be researched, the exploratory characteristics of the current study encouraged the consideration of a relatively broad spectrum of themes. Although the main focus lies in interdisciplinary collaborative practices, conclusions on the more overarching concept of the creative field are not to be neglected. As confirmed through the research at hand, the boundaries between creative industries are certainly not easy to establish (Krätke, 2010). This trend of interconnectedness seems to be further reinforced by all the new interdisciplinary projects and collaborations taking place which themselves often produce a creative outcome that is difficult to put in a single box (Banks & Deuze, 2009; Lee, Olson, & Trimi, 2012; Stimuleringsfonds, 2015). It is still unclear whether being able to place this outcome as belonging to a distinct field of work makes any crucial difference for the public. On the one hand, a clearer conceptualization may be useful for providing potential customers with a less ambiguous product or service. At the same time, consumers may not particularly mind how the characteristics of that product are communicated as long as it satisfies their need.

In any case, the findings successfully provide a more contemporary and relevant perspective of collaborative aspects and interdisciplinary practices exercised among designers and technology experts. Overall, the intersection of design, fashion and technology appears to be heavily saturated with features which act both as potential avenues for innovation and as obstacles that need to be overcome. Since it is to be expected that an individual or company involved in an interdisciplinary project would lack sufficient knowledge or skills outside of their own area of expertise, the situation inevitably brings about the challenge of dealing with less familiar domains. Although such challenges emerge in traditional settings as well, their complexity certainly amplifies along with the increased number of stakeholders involved and their diverse backgrounds, goals and expectations. At the same time, it is often the case that unfamiliarity with a discipline would serve as a source of inspiration for collaborators and would urge them to develop a deeper understanding of that discipline. Being exposed to different domains gives creative professionals the opportunity to expand their specter of knowledge or skills which in itself may result in applying this newly acquired knowledge in other scenarios such as technology or science (Ariyatum, Holland, & Harrison, 2004).

It is to be expected that working simultaneously with design and specific types of technology such as electronics or certain computer software requires advanced skills as well as dedication and responsibility. Perhaps it is partially this inner drive of some designers and their individual tendency to interact with both fields that contribute to the development of interdisciplinary endeavors such as wearable technology. It seems the innovative and somewhat experimental nature of the work to a large extent shapes the ability of designers to independently take care of an entire spectrum of non-design tasks (such as financing or PR). In that sense, as the findings point out, having an interdisciplinary mindset as an individual and a hunch for entrepreneurship are aspects not to be neglected for the future development of the field. At the same time, it is the act of collaboration that emerges as the most natural and effective way for professionals who wish to create a high-quality yet innovative piece of work. When approached with the necessary dose of attention and commitment, interdisciplinary collaboration can be a rewarding experience in itself and can yield results otherwise impossible to produce.

Taking into account these remarks, the theoretical and practical significance of the current research could be outlined more clearly. In an academic context, the study has managed to draw a more holistic view of phenomena that thus far have been researched only as separate concepts. Furthermore, the experience and expertise of the interviewees when it comes to interdisciplinary work practices should be recognized as a major strength of the paper. Such a contribution from the point of view of creative professionals certainly deserves a more dominant contemporary focus in academia, especially considering the growing relevance of wearable technology and other crossover projects. In that sense, the study offers a strong collection of initial insights on the topic. In a practical context, the implications could be recognized by interdisciplinary designers or technologists themselves if they wish to get an external overview of their field of work. The findings could be especially useful in providing professionals and stakeholders, such as funding institutions or local governments, with an impression of what others consider to be beneficial or challenging to accomplish at the intersection of design, fashion and technology.

5.1. Limitations and suggestions for future research

As previously stated, the broad scope of the research which was defined early on in the process encouraged the investigation of a wider range of themes in order to determine their importance to interdisciplinarity. Due to the scarcity of academic publications on the topic,

especially in terms of design or technology, this broader scope was somewhat of a necessary prerequisite. At the same time, the rather exploratory nature of the study could also be seen as a limitation in the sense that some concepts may not have been covered in as much depth as possible by interviewees. It is possible that themes such as the use of digital communication tools could turn out rather important and could have been described from more angles. In that sense, although this study is a first necessary step in bringing more attention to the topic, the analysis of some aspects deserves a more focused and in-depth approach in future studies.

Other potential points of improvement have to do with the way the focus group and the individual interviews were conducted. The focus group in particular was composed of designers from one and the same studio who had different levels of expertise and experience in the field. Although the fact that they were mostly familiar with each other's way of work was helpful in stimulating comments on joint projects, a focus group composed of designers from different studios may have resulted in the accumulation of more diverse examples. Additionally, some of the participants of the focus group had joined the company very recently and in fact, had less professional experience at the intersection of fashion and technology and with interdisciplinary projects in general. Perhaps due to this more limited first-hand acquaintance with such practices, the younger focus group participants might have still lacked a wider range of experiences to share and discuss in comparison to participants who had spent more time in the field. Nevertheless, even with less experience in wearable tech circles, interviewees still had a favorable predisposition towards the topic and could discuss the changes taking place in fashion with regards to new applications of technology.

In some measure, wearable technology also ended up taking a more central role in this research due to being one of the current hypes with regards to technological developments and interdisciplinarity. The sample of individual interviews is also highly representative of this particular field which certainly reflects the growing relevance not only of smart clothing but also of the importance attributed to collaborative practices that facilitate innovation. That being said, the experiences of an interdisciplinary designer or artist, whose scope of work covers directions other than fashion and wearables, might be different from the insights shared by the current participants. A background in a creative field such as product design or art that is inspired by and uses new technologies might be revelatory of work practices and challenges of collaborating with technology-related firms which were not covered by this paper. Although the current sample is

sufficiently diverse when it comes to interviewees' education, experience and emphasis on technology in their own work, future research might benefit from exploring innovative intersections other than wearable technology.

Notably, the scarce academic focus on interdisciplinary collaborations in itself provides new grounds for research. For instance, what emerged as a potential challenge, especially among wearable tech start-ups and independent designers, has to do with the extent to which communication is efficiently managed. As some interviewees pointed out, facilitating interaction can be difficult in newly formed teams or in cases where collaborators are dealing with a geographic barrier. Discussing such scenarios further might be an important next step in diminishing the obstacles of communication, be it face-to-face or online, and in determining what practices work best in such specific forms of collaboration. New research could thus specifically ask how newly formed interdisciplinary teams communicate among each other on a daily basis or how geographically distant collaborators build relationships and communicate during their projects.

Earlier in this paper it was also pointed out that two other aspects were discussed inconclusively by the research participants, namely role interchangeability and the flexibility of the end result. Perhaps precisely the fact that designers had diverse opinions on the subject matter is indicative of the significance of those concepts for interdisciplinary collaborations. The interchangeability of roles within a project refers to the degree to which collaborators have skills that are of a similar nature as well as how flat the structure of the team is. While some interviewees contended that such innovative intersections of work are indeed quite flexible in terms of people's professional responsibilities, others thought roles are mostly fixed by the specific skillset of each team member. Although this is arguably a difficult concept to measure, conducting an experiment or including observation in the research design might be other methods to consider. Similarly, the extent to which the idea for the end result is allowed to evolve is a topic that depends on specific circumstances. Dedicating more time to explore the presence and importance of these two aspects in collaborations might result in even more useful guidelines for professionals and may reduce potential misunderstandings throughout the work process.

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Appendix A

Interview guide

INTRODUCTION

- Welcome and thank you for being a part of this interview
- Introduce interviewer briefly
- The purpose of this interview is to get insights on how collaboration happens between creative firms and technology firms. Interdisciplinarity in the creative fields, especially in design and fashion, has not be studied as much so your answers and the discussion will be very useful for filling in this gap in research.
- There are no right or wrong answers – please, share any opinions or thoughts you have during the discussion. Feel free to comment and elaborate on what the others have said.
- What is discussed here remains confidential – it will be used only for the purposes of my research. If you wish, any personal information such as your names will be altered or omitted in the written document.
- Ask: The focus group will also be recorded to make sure everything you share is captured properly.

OPENING QUESTIONS

How long have you been practicing in this creative field?

How did you decide to get into that kind of work?

I. BOUNDARIES AND RECENT DEVELOPMENTS WITHIN CREATIVE INDUSTRIES

1. How difficult is it to distinguish clear boundaries between creative disciplines?
    a. Is that actually necessary? Why or why not?
    b. Have you observed if there is a debate going on about this? How do your colleagues approach this matter?
2. How have the creative industries changed in the past years from your point of view?
    a. With regards to structure, work practices, etc.?
    b. How important (and how popular) is it to have an entrepreneurial mindset in the creative industries and in interdisciplinarity?

Expectations:

- dissolving boundaries between industries
- increased knowledge spillovers due to digitization
- interlinkages between firms and industries have positive effects for innovation

II. Flow between different collaborations

3. How big a part of your work is based on collaborations?
    a. Why are they important to your work?
4. How do you decide when a collaboration is needed? How does the process start?
    a. Does it matter for you if you have already worked together with a certain studio or individual before? Why?
    b. Are there certain criteria you use when you decide to engage in a new collaboration? Are there "do's and don'ts" when it comes to collaborators?
5. How does the process of collaborating change if there are more than two different parties involved?
6. What challenges have you experienced as a creative professional in your industry?
    a. How do you usually deal with them?

Expectations:

- important to work with people with varying expertise
- when collaborating, it is important to share the same overall purpose and point of view about the project and the way of working
- there are always risks involved when working with new collaborators
- changes are not happening fast enough – there are flaws in the fashion industry system
- challenging to fund projects or find sponsors

III. Communication, relationships and social media presence

7. How does communication between collaborators take place?

a. Issues of proximity – What is the role of geographical location among collaborators? (How important is it for collaborators to be geographically close to each other?)
b. How important is it to be able to work "face-to-face" or have "physical" meetings?
c. Role of digital communication – How do digital tools (e.g. email, social networks, messaging apps, work-oriented digital platforms) affect the work and the communication flow (positively and negatively)?

8. Is it possible to have an unproductive or frustrating collaboration which still results in a satisfying outcome? Or vice versa – an enjoyable process that doesn't yield the expected results?
9. What other challenges (that were not mentioned) are involved in such communication practices? How do you deal with them?

Expectations:

- "face-to-face" communication is still important due to the physicality involved in creating fashion products
- digitization has helped make much of the communication easier when working with internationally-based collaborators
- very fast-paced and constantly changing type of work; many aspects to consider which are not necessarily design- or fashion-related (such as PR or financing)

IV. INTERCHANGEABILITY OF ROLES

10. How does your work process as an interdisciplinary studio differ from one that fits more strictly in a traditional discipline?
11. In what ways are your interdisciplinary projects different from each other?
12. How clearly distinguished are the roles of individual participants in a project? Is there an interchangeability of roles?

Expectations:

- more open to new concepts than traditional non-interdisciplinary firms
- the work process and the role definition depend on the scale of the project

- individuals mostly have clearly set roles but in some cases, this can change if the team is pressed by time or other circumstances

V. KNOWLEDGE SHARING AND RISK TAKING

13. What does working with technology bring to the table for you as a design/fashion brand?
    a. There has been a lot of research on convergence which deals with the way technology or media start to merge and become more of a network rather than separate entities. Have you observed such a change? Has convergence between different disciplines or media outlets influenced creative work?
14. How important (or how inevitable) is it to be able to take on risks in your industry?
15. How do you approach collaborations where you have very little knowledge of the technology that is involved?
    a. Could going into "the unknown" be a positive aspect rather than starting something you are extremely familiar with? Why or why not?
16. Has it ever happened that you (or the team) are able to acquire new technical knowledge as a result of such collaborations? How important is this to you?
    a. Or: have you been able to use knowledge or experience from one project and apply it to another one? Examples

Expectations:

- technology can offer many solutions where least expected
- creative fields have been strongly and mostly positively influenced by media and new technologies
- experimenting with new technologies is essential in interdisciplinary work
- a lot of research and learning are involved throughout this process

VI. FLEXIBILITY AND PRODUCT INNOVATION

17. How does the idea for the final product evolve during the work process?
    a. To what extent is the idea allowed to change?
18. How difficult is it to classify where the final product belongs – is it more of a design product or more of a technological one?

a. How difficult is this to explain or sell to audiences and customers?

Expectations:

- the evolution of the final product depends on each individual project
- because there is a lot of experimentation taking place, changes often happen which can be disappointing or it can turn out for the best

WRAP-UP

19. How does the future of interdisciplinary collaboration look like to you?
20. What changes and improvements would you like to see happening in the coming years? Who holds/shares the responsibility for making these changes happen?

Appendix B

Open coding – excerpt from Interview No. 6

Z: And what about having to work with more than two, or basically, a bigger team of people? What kinds of challenges come along with that?

M.G.: That's exactly what we're doing now. So we have a mechanical engineer, electrical engineer, we have two soft goods specialists so they work with bags and upholstery and that kind of stuff, we have an industrial designer, we have me, and recently we're adding people who have more expertise in muscles and physiology and physiotherapy. So, it's a really interesting group. I think, fortunately, we're pretty respectful of each other's disciplines. I remember one of the first weeks I was there, I was drafting a pattern and I do this on paper with a pencil and it's very "old school". And the mechanical engineer comes over to where I'm working and she goes "Oh, this is engineering!" But you know, it's what I learned in fashion school. But she immediately saw it as engineering because I'm squaring out lines and I'm measuring and calculating and she was really interested. And with the engineering aspect, I showed her some of the drafts and she was like "Wow, that's hard! Interesting!" So she was really open to that, somebody else might not have been. So, when we're all working together, I think there's a lot of positive stuff that comes out of it. *[Fragment coded as "Being able to get along well" and "Negative-Challenge of a large team"]* One of the dangers is if… people still like to feel ownership of their expertise. Especially with mechanical engineering, it's really easy to look at it and go "Oh, yeah, I understand how that works" and then maybe you make suggestions or think that you have the sort of genius stroke, that you can think of something that she didn't think of. But I think it's really important to be respectful because you know, she has PhD in that area. So, yeah, collaboration, you have to know when to make a suggestion and how and then, when to be careful with making too many suggestions like "Yeah, of course, I thought of that". *[Fragment coded as "Challenge of a large team" and "Challenge of retaining ownership of one's work"]* Also, I think being responsible to each other in a collaborative environment is really important with time. If you're under time restriction, then you have to leave room for everybody else to do their part. So if you have 2 weeks to do something, you can't take 2 weeks to do your thing because 2 weeks to do the whole thing… Everyone else needs to find the time to do their parts. Especially when we're all working on one thing together. *[Fragment coded as "Challenge of time management"]* Like with the

electrical engineer I work with now, she needed information from me before she went further with her circuit design and so, I had to make sure that she had that in time so that she enough time to go further with her work. So I think respect is probably the number 1 thing. *[Entire passage coded as "Challenges of interdisciplinary collaboration"]*

Z: So how do you manage that kind of organizational… making sure that everybody's on track?

M.G.: That's a very good question! We're a new company so we've looked at a lot of organizational tools in the beginning. We've looked at Jira and Asana and just Google Docs. We looked at sticky notes and white boards so everything to try and get everybody on the same page. We're still experimenting with some of those, the sort of project management tools. *[Fragment coded as "Digital communication tools"]* I find that the best thing is, we have daily standups so every day at 10 o'clock we go around and tell each other what we're working on. And then, we all work in one big room which is great for just being able to grab somebody and say "Hey, I'm doing this, what do you think?" or "Hey, have you got this for me?" *[Fragment coded as "Importance of face-to-face communication" and "Importance of geographical proximity between collaborators"]* But it also means that it can be difficult to concentrate sometimes, right? Because collaboration isn't always one big group of people cooking on one barbeque, so to speak. So, we are still actually trying to figure out how to separate the time of working together and individual work. That's really, really hard. I think that's probably easier in an established company because people feel more ownership of their own workspace or their own domain but for us it's still a challenge. *[Fragment coded as "Negative-Importance of geographical proximity"]* And it will figure itself out but it's still definitely a challenge.

Appendix C

Appendix C1: Coding table

Open coding	Axial coding	Selective coding
Definition of creative industries	Boundaries	Boundaries and new developments of creative industries
Criticism from creative industries; Creative industries as a game-changer for economic and social environments	New developments	
Need for specific expertise; Quality of product; Diverse viewpoints; Value of feedback; Reaching out to new audiences or customers; Availability of a combination of skills		Main purposes for interdisciplinary collaboration
Building a network; Getting inspired; Acquiring new knowledge from collaborations; Applying new knowledge in projects	Positive effects of collaboration	
Matching beliefs and goals; Understanding of the field; Being able to get along well; Smooth and clear communication; Personal intuition; Importance of working with the same collaborators; Trust between collaborators; Matching expectations		Criteria for selecting new collaborations
Proneness to risk-taking; Individual projects; Spotting opportunities; Parameters for success	Importance of entrepreneurial mindset	

Individual tendency for interdisciplinarity; Benefits for technology firms; Freedom of work; Ability to understand different disciplines; Different backgrounds or expertise; Bringing in fresh ideas; Negative – Importance of working with the same collaborators; Flexibility of end result; Negative – Flexibility of end result; Interchangeability of roles; Negative – Interchangeability of roles	Aspects that attract professionals to interdisciplinarity	Work practices in interdisciplinary collaborations
	New developments of interdisciplinarity	
Importance of geographical proximity; Negative – Importance of geographical proximity; Communication with the public or customers; Importance of the process; Letting the public experience the project; Importance of classifying an interdisciplinary product or result; Negative – Importance of classifying a product or result; Need for testing a product; Importance of face-to-face communication; Physicality of fashion; Communicating enthusiasm and motivation; Building relationships; Digital communication tools		Communication practices of interdisciplinary collaboration
Backlog of accomplishments; Efficiency; Ease of discussing changes	Advantages of digitized communication	

Client's restrictions; Financing; Time management; Closed-minded company; Lacking specific knowledge; Working with technology; Large team; Negative – Challenge of a large team; Entering a market; Getting the desired result		Challenges of interdisciplinary collaboration
Product-focused approach of big companies; Process-focused approach of big companies	Retaining ownership of one's work	