# COLLABORATIVE DESIGN FOR FASHIONABLE WEARABLES: A FASHION SYSTEM PERSPECTIVE

NEGOTIATIONS, CONTROVERSIES

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## ABSTRACT

Wearable technologies are used by only a small part of the consumer market, and their abandonment rates are still high. Aesthetic value and style are essential for making these devices fashionable, thus facilitating their widespread use. Designing fashionable wearables requires a collaboration between professionals working in technology and fashion fields. Although many studies in the literature indicate a need for collaboration, none explored the attitudes of professionals from these fields towards collaborating with each other. Addressing this gap, we conducted in-depth interviews with 4 fashion designers, 1 fashion editor, 3 product developers and 1 public relations manager working in fashion industry. Based on the insights derived from these fashion professionals, we presented stakeholders that should be actively involved in the collaboration, the characteristics of collaboration environment, barriers for a successful collaboration, and two product development process models driven by either fashion and technology.

## INTRODUCTION

Studies showed that although wearable technologies are quite popular, they do not meet user expectations. Their abandonment rates are high (Ledger & McCaffrey 2014), their technological capabilities are not comprehended well enough, as well as they are not easy to use and attractive to wear (Motti & Caine 2014). Recently, these problems have led to the emergence of *fashionable wearables*, which refers to designed garments, accessories, or jewellery that combine aesthetics and style with functional technology (Seymour 2008). Although there are a few examples from academia (Elblaus et al 2015; Juhlin & Zhang 2015; Lee, Koo & Zhou 2016) and industry (Apple Smart Watch, Project Jacquard), the work on fashionable wearables is still in its infancy, indicating an area for its advancement.

Designing fashionable wearables requires a collaboration between technology professionals (e.g. engineers) and fashion professionals (e.g. fashion designers). A systematic method for realizing this collaboration would increase the number of examples, and serve as a facilitator for the widespread use of wearable technologies. However, developing a systematic collaboration method is difficult, because technology professionals and fashion professionals have different approaches towards wearable technologies.

We believe that a first step for such a method is to understand how professionals from these fields think about collaborating with each other, and what they expect from such a collaboration. This understanding can be acquired by exploring questions like, for both parties, who should participate in the collaboration (i.e. stakeholders), who should lead the process (i.e. drivers), how should it proceed (i.e. process), what kind of environment is needed (i.e. environment), and what kind of challenges would emerge (i.e. barriers).

In this paper, we explored these questions from the perspectives of three major stakeholders of the fashion system: fashion designers, product developers in fashion brands, and fashion media and communication specialists. We wanted to focus on fashion as a system because it is not all about fashion designers. It is a bigger system constituted of various institutions (Kawamura 2004) whose involvement is essential for designing fashionable wearables. To the best of our knowledge, no study has provided a similar exploration before.

## DESIGNING FASHIONABLE WEARABLES

Lee, Koo and Zhou (2016) emphasize the rising consumer demand for wearable technology that looks less like a gadget and more like an aesthetically pleasing accessory, and add that wearable technology and fashion companies have started designing smart clothing to meet this new demand. For example, *Apple Watch Hermes* (Business Insider 2016), *Project Jacquard* (Google ATAP 2016), represent a new line of wearables combining aesthetics and style with functional technology, which require a collaborative design process bringing technology and fashion together (McCann, Hurford & Martin 2005; Mihaleva & Koh 2016). Aside from industry, there are also initiatives and professionals working together to materialize fashionable and technological products in an interdisciplinary and collaborative environment, e.g. *Berlin Graffiti* and *The Marlene Project* (ElektroCouture 2017).

As for the research studies emphasizing the significance of fashionable wearables, one part explores the process of designing these wearables. Researchers argue that, when designing fashionable wearables, fashion designers should be involved in various product development stages including ideation, design, production, diffusion and consumption (Choi & Kim 2016; Mihaleva & Koh 2016; McCann, Hurford & Martin 2005).  In this view, the purpose is to help product designers and engineers using the input from fashion designers during the design process.

However, Juhlin and Zhang (2015) argue that making product designers more knowledgeable about fashion is not enough. Fashion designers should also be *digitized* by learning the nature of digital technologies. Fashion designers know how to make garments fitted for human bodies. People aspire to their clothes and enjoy wearing them. To design wearable technologies, they should also be more knowledgeable about using technologies like computer software, sensors, and conductive yarn and so on. While doing so, they should work together with product designers rather than merely informing them in different stages of the design process.

Another part of the research studies uses prototypes to illustrate how technology and fashion could be integrated. The first example is *Nebula,* an interactive garment which aims to examine properties of textiles, fashion accessories, and digital technologies. The design process brings interaction designers and fashion designers together to balance the fashion aspect with the technological competence of the garment (Elblaus et al. 2015). Another prototype is a shape changing digital device designed by taking the statements of fashion editors and bloggers' and dynamics of fashion system into consideration during the design process. The concept focuses on making a wearable device part of an outfit and adapt to style changes (Juhlin & Zhang 2015).

One potential direction for advancing this current state of fashionable wearables is collecting insights from professionals working in technology and fashion fields regarding their attitudes towards collaborating with each other.

## METHOD

We conducted 9 in-depth interviews with fashion designers, a fashion editor and a public relations (PR) manager, as well as textile and fashion brand professionals.

Table 1: Participant Profiles.

| Occupation | Task | WT | ST | CO | CO WT |
|---|---|---|---|---|---|
| Fashion Designer I | Designer and creative director of her/his own brand | ✓ | ✓ | ✓ | ✓ |
| Fashion Designer II | Designer, creative director and marketing & communication manager of her/his own brand | ✓ | ✓ | ✓ | ✓ |
| Fashion Designer III | Designer of a fast fashion brand | ✗ | ✓ | ✓ | ✗ |
| Fashion Designer IV | Designer of a fast fashion brand | ✗ | ✓ | ✓ | ✗ |
| Media & Communication I | Fashion editor & brand consultant | ✗ | ✓ | ✓ | ✗ |
| Media & Communication II | Public relations manager | ✓ | ✓ | ✓ | ✓ |
| Product Developer I | Product developer of a fast fashion brand | ✗ | ✗ | ✓ | ✗ |
| Product Developer II | Product and business developer of a fast fashion brand | ✗ | ✓ | ✓ | ✗ |
| Product Developer III | Product developer of a fast fashion brand | ✗ | ✓ | ✓ | ✗ |

WT: Experience in Design of Wearable Technologies
ST: Experience in Design with Smart Textiles
CO: Experience in Collaboration in Fashion Industry
CWT: Experience in Collaboration of Wearable Technologies

We chose to conduct an interview with these stakeholders due to their significant role in the fashion system. Fashion designers are the creative brain of the

industry; the design process starts and continues with them. Product developers are essential in process management, product feasibility and production. They are responsible for receiving the brief from the designer and conveying it to the other departments. Media and PR professionals have a major role in the visibility, diffusion and fashionability of textile products. They form the decision mechanism of style creation process as they can reach masses. They are also responsible for making an issue understandable by the public.

We gave special care to recruit participants who have either worked in projects focusing on wearable technologies and smart textiles, or participated in collaborative projects within fashion industry. Participant profiles are given in Table1.

We structured the interview questions around four themes. We explored 1) the participants' role in the fashion system in terms of material and cultural production of fashion, 2) their previous collaboration experience, 3) their assessment of the current state of wearables, and 4) their expectations of collaborating with technology professionals and companies when designing fashionable wearables.

We voice-recorded each interview, and transcribed the recordings into text for data analysis. Then, we coded the transcripts deductively (Miles & Huberman, 1994) by using four pre-determined categories: stakeholders, process, environment and barriers.

## RESULTS

Experts agreed that collaborative work between fashion and technology is essential to design fashionable, desirable and functional wearable technologies. They stated that they were willing to participate in such a collaboration. They shared their insights about stakeholders that should be actively involved in the collaboration, description of the collaborative product development process, the characteristics of collaboration environment and barriers for a successful collaboration. In the remainder of this section, we present these insights.

### 1. Stakeholders

Fashion designers appear to be the main and creative stakeholder of the process who need to be involved in the entire process. In some cases, they also perform as a creative director, project manager, and art director. Engineers, developers, research and development departments, hardware and software technology companies are other main stakeholders that should participate in the several stages of the process including research, design and production. There are also other stakeholders who need to participate in particular phases. For example, end users should be involved in design evaluation phase so that unsatisfying situations can be solved before the production start and the product meets the consumer. Pattern makers, tailors,

mechanists, material providers (as textile, yarn) should participate in the production phase. Marketing, communication, public relations specialists, journalists and editors should participate in the diffusion phase. Their role is to make the product reach a broader user group. Finally, academicians, universities, state authorities and NGO's should also be involved to enlighten and educate people and mould public opinion. But, the participants did not specify in which stage of the process these stakeholders should participate.

Interviews showed that it is highly important to choose the right stakeholder for a successful collaboration. Decisions concerning whom to collaborate mainly depend on the company and brand identity, project goals, harmony of partners, and end-users. Along with these, the existence of highly motivated stakeholders having a common vision was also mentioned as a criterion for selecting the right partner, thus bringing success to the project.

### 2. Process

The results indicated that there can be two collaboration models where fashion designers have different roles. The first model is fashion-driven in which fashion designer initiates the process with ideation and leads the development of new technologies. Their role in this model is to inspire the invention of new technologies, (e.g. inventing a new textile that can transmit electricity). After generating the design idea, the designer brings together the stakeholders required to invent the essential technology and design the product. Personal acquaintances are perceived highly beneficial and rewarding for this phase. For example, two of the study participants reports that self-brand owned fashion designers, come up with an idea and searches for hardware and software technology companies to realize this idea.

In the fashion driven model, the textile company, which has a vision in investing new textile technologies and smart garments, hosts the invited stakeholders and provides all the required material and environment for the realization of the design idea. After a period of research and development, and after all the stakeholders agree on the final prototype, production stage starts. All the stakeholders must attend personally to the stages before this stage, because ideation, development, design and prototyping phases require the collaboration of partners. Fashion designer and product developer can be involved in this last stage as well. Lastly, as this model may require invention of new technologies, the generated concepts are more likely to become haute couture pieces that may never reach to mass production.

The second model is technology driven in which the design process starts after the invention of new technology. In this model, designers are mostly inspired by the technology. An example scenario shared by the participants is that a technology company was in search of a fashion designer to make their wearable

technologies more fashionable and the PR agency introduced two convenient brands for the collaboration. In this model, the main drivers of the process could be the technology companies, brands or other partners as state authorities or NGO's that bring all the stakeholders together for the design process. Aside from fashion designers' initial ideation and research on technology development, this model follows the same steps as in the first one. However, as the participants revealed, the technology-driven model moves faster than the fashion-driven model, because the required technology is already available.

### 3. Environment

As for the collaboration environment, coming together physically is necessary, particularly at the early stages of the design process. In further phases, after the stakeholders agreed upon the concepts and the project brief, they can participate in the process through digital communication methods like e-mail, Skype or through teleconference. Participants stated that they do not use software specialized for collaboration, e.g. designing in a virtual studio.

Another important expectation was that all the stakeholders should participate personally, indicating a need for a collective effort. However, it is neither easy nor common to ensure the active participation of all the stakeholders when the project follows a fast fashion design process – rapid production of garments in response to the latest trends.  When this is the case, our participants indicated that they are used to meet up with other stakeholders only in cases of emergencies and crises. They added that the role of the product developer becomes very important in such cases, as he or she manages the process and reconciles the stakeholders.

Fashion designers who work in fashion-driven model prefer to host all the stakeholders in their place. Other participants advised that the collaborative work environment can be within technology companies. They stated that fashion designers should experience the technology environment, learn about the material possibilities and limitations as well as inspire from them.

Designer's imagination and expectation from the technology can be formalised in short-term and long-term goals. Workshop type of collaboration environment is more suitable to projects with short term goals. This setting can be fruitful to inspire fashion designers and stakeholders, i.e. what can be done with existing technologies and the materials. However, during this process, fashion designer can also trigger new technologies for future design projects and products, leading to a project with long term goals. When this happens, research and development teams, engineers and developers can work on finding the relevant existing technologies or inventing new ones.

Participants believed that big sponsors and brands should finance the process to afford the cost of collective creation process. Opportunities of a big partner can provide better possibilities to the collaboration environment. However, the work environment should be independent from these sponsors and brands to be free from limitations.

### 4. Barriers

The first barrier to the collaboration between fashion and technology is the uniqueness of projects. In fashion industry, every project defines its own route and re-defines it in case of troubles. As there is no tested pathway or method to follow, stakeholders often improvise. The second one is the difficulty in communicating abstract ideas to other stakeholders. Sometimes designers might need to teach non-designer stakeholders how to think like a designer. Yet, the communication problem is not only related with the abstractness of the idea. Each stakeholder tends to see the problem at hand from her/his expertise, and tend to communicate by using their own terminology.

The third barrier is time. Designing wearable technologies is a race against time. Technology is moving fast. Similar projects are being performed around the world simultaneously. Value of time planning and being strict to it has utmost importance for a company. But, fashion industry and institutions of fashion system is distinctive than technology companies. They mostly deny corporate rules, want freedom and uniqueness. This might negatively affect collaboration process for projects where time is one of the major concerns.

Finally, power relations in a collaborative environment are hard to manage. As participants also emphasized, fashion system considers itself as privileged among other industries. Therefore, time-management, team management and negotiation are crucial. For example, stakeholder adding the most value to the collaboration, desires to be in the spotlight, giving her/his name to the project. Plus, each stakeholder wants to see himself or herself as the person in charge of the project. Thus, assignment of the project manager or the coordinator of the collaboration is also highly critical.

## DISCUSSION AND CONCLUSIONS

In this paper, we presented the insights of the three major stakeholders of the fashion system regarding collaborating with technology professionals. The results indicated that the experts we reached for this research were already motivated for such projects, and all had a positive attitude towards collaboration with technology professionals. They indicated that strong collaborations are performed with individuals who have a personal and professional interest in working with technology. Thus, stakeholders' willingness to participate is essential for a successful collaboration.

The results indicated several barriers for successful collaboration. A collaboration between fashion and technology professional would not be easy. Most of the

experts we interviewed considers her/himself as the coordinator of the collaboration. This might create power conflicts in collaborative design environments to handle. So, human resource management of the stakeholders appears as one of the most critical aspect of collaborations for fashionable wearables. Furthermore, the involvement of various stakeholders in the collaboration makes coming together physically very challenging. A creative director or a coordinator, who is experienced and capable of managing fashion and technology teams, might perform as mediator, interpreter and director to overcome this barrier.

We identified two collaboration models derived from analysing the results. These models are technology-driven and fashion-driven. We argue that a third model, which is driven by the equal participation of each stakeholder, would be much more useful in designing fashionable wearables. The results showed that collaboration between fashion and technology is bigger than bringing fashion designers and technology developers together. For example, in an ideal scenario, academicians, sponsors, NGOs, and state authorities should also be involved in the process (Figure 1). These parties should actively participate in all stages to educate producers and consumers, to pioneer collaborative projects, to mould public opinion, to motivate individual participation, as well as support reformation in the industrial dynamics if necessary. Furthermore, users should be involved in early stages of the process and participate not only as evaluators of concepts but also as active contributors to the design and ideation.
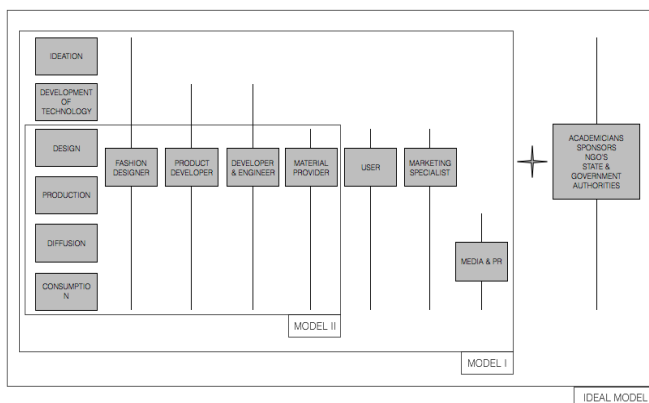


Figure 1: Fashionable Wearables Design Collaboration Model

Technology-driven and fashion-driven models can provide an opportunity to design more desirable and usable products. However, active and equal participation of each stakeholder in a collaborative design process would not only empower different parties but also offer benefits beyond facilitating their widespread use. Such a model could contribute to a more responsive and sustainable fashion system by extending the product life-cycle, e.g. garments and accessories that can adopt themselves to the changes in trends, contexts and user requirements.

This study is the first part of a bigger research project, which aims to collect insights from professionals in both fashion and technology for collaborating with each other. In the long turn, we plan to conduct interviews with technology professionals and compare diversities in approaches to collaborate with fashion professionals. We also plan a collaborative method based on the result of these stakeholders and existing co-design methods (Sanders 2000) in the literature.

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