0KG: creating and developing an innovative clothing service

J P Bernardes¹, M Nogueira²

¹,² IPAM Lab, research centre for marketing and consumption studies, IPAM Porto, Rua Manuel Pinto de Azevedo, 748, 4100-320, Porto, Portugal, joapopedro_bernardes11@hotmail.com

Abstract: This paper explores the creation, analysis and understanding of the feasibility and potential of an innovative service called 0KG, which focuses on the question: "are people willing to use second-hand clothing and/or leased when traveling?". 0KG is a rental service for the day-to-day, business, and also cultural clothing, depending on the country where tourists are traveling. The main benefit of this service is to be a facilitator in the traveling moment, allowing displacements to be made with greater tranquility, without concern for the luggage and still offering a varied range of clothes to use that normally tourists would not have in their closet. Inspired by the ‘slow fashion movement’, 0KG intends to be an innovation promoting the re-use of clothes. The creation and development of this service happened through the use of various methodologies, such as design thinking and business models. The analysis to these methodologies allows an explanation of 0KG through a process of design thinking and the creation of a business model called Kaleidoscope. Regarding its validation, it was achieved in the format of a questionnaire with 430 responses and a focus group with people of interest. Finally, the paper culminates with the positive response to the problem.

1. Introduction

Society is constantly evolving as a result of the considerable changes in cultural, demographic and economic aspects that are changing and influencing lifestyles, consumption patterns and social paradigms. The tourism sector, in particular, is been experiencing considerable changes in relation to tourists’ demand patterns, namely, in relation to their desire to live new experiences and enjoy high quality activities [1]. Fashion industry is also evolving in a fast pace manner and presently witnessing situations of contradictions in consumer behaviour: on one hand, consumers are becoming more conscious of the impact of their purchasing behaviour, and willing to support a more sustainable fashion industry but on the other hand are complying with unsustainable business models where production is achieved to the lowest price in the shortest time possible. People say they want to become more sustainable but at the same time cannot resist buying ‘cheap’ fashion. In fact, consumers’ attitude and behaviour are in tune with fast production. It is known that approximately 16% of consumers are heavily influenced by media and are likely to quickly adopt the latest fashion trends [2]. Figures from the UK show that people are buying more today than twelve years ago. According to Statista [3], in 2005 consumer spending on clothing and footwear (in million GBP) was 44.4 M, and in 2015 was 66.1 M. Experts blame fast fashion as the reason for the dramatic expansion of our wardrobes, which means that manufacturers are working with shorter production cycles, with some generating up to 15 “seasons” per year [4].

Fast production and fast consumption inevitably lead to the systematic decrease of resources and increase of waste, thus stressing the earth’s capacity to regenerate at a natural pace. This is why the ‘slow fashion approach’ appears as a new model that intervenes as a revolutionary process in the contemporary world. It is focused on its link with human needs, awareness and responsibility. Slow Fashion designs, produces, and consumes in a way that acknowledges its impacts on society and the environment [5]. By using the concept of slow in the fashion industry it is possible to re-invigorate a healthy rhythm of production, meaning that the environment and people could healthily co-exist and the earth would have time to regenerate during production cycles [5]. This research suggests 0KG as a new fashion model, in
accordance to the slow fashion movement because it is a more viable alternative to move the fashion industry toward more sustainable business models. It is a service that allows tourists to rent vacation clothes. This cycle that is created for clothing usage works against the fast fashion movement which means huge quantities of cheap clothes that is produced under an intense time pressure as to the just-in-time principle. This way slow fashion challenge us to strengthen our connections with clothing, their social and cultural meaning and their producers while including values of community, sustainability, and diversity and see it as a reaction against the consumer society of today, where the developed countries consume on the cost of the developing ones.

2. State of the art
This research focuses on two themes that are essential to the development of 0KG project: design thinking and business models. Section 2.1 supports the creation of the service, while the section 2.2 offers theoretical support for the development of a new business model that results from the connections between the two models analysed (Business Model Canvas and McKinsey 7S).

2.1. Design Thinking
Nowadays, design thinking is identified as an exciting new paradigm to deal with problems in many occupations, mainly involving information technology (IT) [6] and business [7]. The definition of design thinking, however, is not consensual and actually confusing [8]. These authors present differences between thinking of, thinking about, and thinking through and suggest that the most accurate definition brings together these three perspectives. They further add that a new way to apply design thinking is emerging – thinking through design – which is to think like designers do. For Cooper, Junginger, and Lockwood [8], design thinking (think through design) involves the ability to quickly visualize problems and concepts, the development of scenarios based on people, and the construction of business strategies based on designers’ research methods. Brown [7], in turn, states that design thinking is about observing an unclear phenomenon and try to look at it away from conventional scenarios in order to preview future scenarios. Hence design thinking allows for a connection between designers’ sensibility and methods that enable to respond to people’s needs, along with available technology, that is appropriate and feasible. In this way, by using an appropriate business strategy, it is possible to turn customers’ needs into value and create a market opportunity. Still according to Brown [7], design thinking is a knowledge creation tool since it becomes an ally in time of more complex troubleshooting and still an agent of change that allows a better understanding of the current global challenges.

Kees Dorst [9] describes a new approach, focusing on problem-solving innovation in organizations: creation of frames. Dorst applies design thinking, but goes beyond the tricks and techniques that normally characterize the term. Creating frames focuses not on creating solutions to the problems, but on the ability to create new approaches to the analysis of the situation of the problem itself. The strategies featured by Kees Dorst [9] are drawn through the consistent practices in several sophisticated and unique layers from top designers, and also through ideas that emerged from 50 years of research in Design. Dorst describes nine steps in the process of creating frames and illustrates its application to real-world problems. It maps innovative solutions and provides tools and methods to implement the creation of frames, that is, it is a way of thinking in design that helps professionals to develop their own approaches to problem solving and creating innovation along with the Design. This way it is possible to see companies as a series of frames: frames for resiliency, Kees Dorst [9]. The 9 steps are: 1-Archeology of the problem (why is it the problem? how did it become a problem? Why haven't been solved? who has this problem?); 2- Paradox (what makes this problem difficult to solve?); 3- Stakeholders (who are the stakeholders?); 4- Problem Arena (what else is part of the problem?); 5- Themes; 6- Frames; 7- Future; 8- Transformations (what needs to change to be implemented?); 9- Connections (how does it connect to the rest of the world?).

2.2. Business Models
Osterwalder [10] states that the word "model" in "business model" refers to a simple way to describe a very complex process that requires a strong design effort, and that the word "business" refers to activities that are connected to supply (goods or services). The two words together form a unit of analysis that can be compared and observed, providing indicators that support decision-making in organizations. Osterwalder and Pigneur [11] report that business models play a major role in how organizations have improved the way of conducting business under conditions of uncertainty. According to Klang, Wallnöfer and Hacklin [12] in the
same way that there is no single concept of business model, there is no single set of components. They argue that each component of a business model can be operated as a building block of logic of organization creating and capturing value. Baden-Fuller and Morgan [13], in turn report that a business model cannot be evaluated and created only by its components, but also by the way the organization integrates and organizes them internally, with a specific goal in mind.

This research was based on two theoretical frameworks aimed at exploring business models: the McKinsey 7S’s model and business model canvas. The central idea of McKinsey 7S’s framework is that managers and leaders should consider seven factors together to make sure that a strategy is implemented successfully. The model demonstrates that the organization is not formed only by a structure, but by seven elements divided into two areas: hard (strategy, structure and systems) and soft (style/culture, people, skills and shared values) [14]. The Business model canvas, in turn, underlines a tool that allows institutions or individuals to modify or even create their own business model [11]. This way they have access to a common language that allows for an exchange of ideas and experiences, with more people who are involved in the same process. The authors affirm that a business model must be a logical description of how a company creates, delivers and captures value. It also works as a guide for the creation and implementation of organizational strategies, systems or processes through nine blocks (Key activities; Key partners; Key resources; Cost structure; Revenue streams; Distribution channels; Value propositions; Customer segments and lastly, Customer relationships). The nine different blocks represent an interconnected scenario where the links and exchanges between the different actors and environments are explained.

3. Research Methods
The research goal is to analyse the feasibility of 0KG and realize the acceptance of this type of service, in order to respond to the problem: "Are people willing to use second-hand clothing and/or leased when traveling?"

<table>
<thead>
<tr>
<th>Specific objectives</th>
<th>Methodology</th>
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<tbody>
<tr>
<td>Creation of 0KG</td>
<td>9 steps framework</td>
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<td>Feasibility of 0KG</td>
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<td>Kaleidoscope</td>
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<td>Validation of 0KG</td>
<td>Questionnaire &amp; Focus Group</td>
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</table>

The methodology adopted in this study (Table 1) is based on a qualitative approach, resorting to the focus group technique. Quantitative technique will also be addressed through the application and analysis of questionnaires, although it only complements the qualitative exploratory research.

4. 0 KG: Towards an innovative clothing service
Respecting slow fashion, and pointing towards the promotion of culture and more sustainable lifestyles, an innovative concept of provision of services is born called 0KG (zero quilos). It is quite simple and easy: clothes and accessories can be rented, online or at a physical store, and then delivered at desired locations (e.g. hotel, hostel, resort, company) or picked up at the store. Besides everyday clothes, 0KG also provides cultural clothing depending on the country to travel. After some research on the subject, the use of rented or second-hand clothes has not yet been given much thought in the moulds 0KG intends to act, so this is a problem that ends up becoming a business opportunity. The type of clothing that is possible to rent are carnival costumes and garments for specific events, usually parties and galas. Thus, the differentiation of 0KG would be in offering all kinds of clothing, with the possibility to also rent depending on the type of country (for example: snow clothes for the Nordic countries). There is also the possibility to rent cultural clothing in order to experience a greater integration into the culture and not be just another tourist (for example: Sari in India). Still, the service offers the possibility of renting clothes for business trips. Looking for a collaborative economy can enter as a solution to the crisis present today, since this is based on economic, social, technological and environmental pillars. And that is exactly what 0KG promotes: an economy in which people are the focus, and the exchange of goods and services between themselves, in this case, clothing and accessories, contributes to a healthy growth, not only mind-set wise but also of economies.

It should be noted that, in accordance with the results of the questionnaires and focus group, people feel awkward in acquiring second-hand products. To overcome this constraint there are various complicated
stages, among which raising awareness to solutions such as 0KG. It is also necessary to ensure total cleanliness and quality of clothes, to try to minimize the stigma about the use of clothes already used by other people. The biggest obstacle to the use of this type of service is the doubt in the consumers’ minds if the clothes are clean enough and ready to use without having to question its cleanliness.

4.1. Design Thinking: 9 steps framework by Kees Dorst
This section presents the application of the 9 steps framework to 0KG:

1. Archeology of the problem. The research question emerged as a problem from the time when a global crisis started, both economic and restraining sustainable development. 0KG encourages a collaborative economy, by promoting sustainability values. It is a problem that was never solved because there is not yet a rental service similar to 0KG philosophy. The main holder of this problem is anyone who travels.

2. Paradox. According to the survey results, this problem becomes difficult to solve because people dislike the idea of using second hand clothes, because they doubt its quality and cleanliness. A change of mentalities and a resistance to leased and/or used clothing is what makes this a complicated problem to solve.

3. Stakeholders. The interested parties on 0KG are essentially: designers (national, international and local talent), the community (partnership with travel bloggers; and business partners as advertising agencies), institutions (municipalities, airports and national tourism departments) and lastly, all customers who are able to share the vision of 0KG, and thus join the service. Essentially, it is expected that the adhesion to this service is made mainly by people that show values of sharing and community, which are part of generation Y and support and share this vision of a more collaborative economics.

4. Problem arena. Dorst [9] states that the design problems are open problems and the chosen problems are closed. The construction of a closed problem with an arena of an open problem is not a deduction step, but rather a creative act in itself. Therefore, inherent to the problem of renting clothes, are all the cultural misunderstandings that can arise at the time of a journey to a country with a different culture. 0KG intends to not only facilitate the traveling moment by providing all the clothes for day to day, but also aims to be a link between the tourist and the culture of the country that this will meet. Another issue that is in the problem arena is the luggage itself. The fact that tourists have to pack, causes and inconvenience to the extent that they need to select the clothes they want to take, and later, the psychological cost of a potential loss of bag is quite high. With this service, the tourist’s clothes are "safe and sound" at home, and they don't need to worry at all with luggage. It is only necessary to bring their essentials more geared to hygiene.

5. Themes. In this step, themes start to emerge, and they are the bases for new frames. In this case there are four major themes for the service that make it possible to exist: clothes and accessories; Physical stores, Website and mobile application (app).

6. Frames. The main frame of 0KG is its motto: “Traveling never felt so light”. This is because tourists don't need to take anything with them. They bring home a rich experience and a cultural baggage, that it is only emotional and not physical. This is how 0KG wants to position themselves, because looking at the problem from this perspective, shows that 0KG serves not only to facilitate the travel but to enrich it.

7. Future. Society is changing daily and facing a change of mentality of the population in general. It is possible to witness people being more collaborative with one another, either in the sense of physical goods, experiences and information. 0KG, is just one of the mechanisms of this collaborative economy, where people can share tastes, styles, goods, but, above all, experiences.

8. Transformations. For 0KG to succeed, the mentality of people when it comes to renting clothes that has already been used by third parties, needs to change. 0KG offers an entire structure that ensures comfort and well-being to the users of these clothes, especially regarding cleanliness (hygiene), and not just a store to sell clothes. For this to work a major campaign of demystification of the service needs to be in place, to help people understanding the advantages of a service like this. As shown by the survey results, the question of hygiene and cleaning of the clothes is in fact a barrier and a huge resistance to this kind of services.

9. Connections. If 0KG reaches the needs of the population in general, it has the potential of becoming a social collaboration tool. That way this model can be quickly replicated in other cities around the world, always respecting the way of dressing and the fashions of each culture and country.
4.2. Kaleidoscope: the new model

The model in Figure 1 was derived from two business models: the Business Model Canvas and McKinsey 7S’s. This new model called Kaleidoscope, intends to offer a new and innovative business model, centred on the core and divided into 4 main dimensions: 1- Actuations (Shared values, Personality and Key activities); 2- People (Relationship, Partners and Segments); 3- Resources (Physical, Intellectual, and Financial); 4- Influences (Rivals, Government and Trends); 5- Core (purpose of existence).

1. Actuations represent how 0KG acts, including its core activities, its values, the basis expertise and its personality as a brand. This dimension is thus focused on internal factors and on how 0KG will act towards society, which implies looking at the proper functioning of the website and app; the clothing distribution system; values: social and environmental responsibility; brand personality: being a facilitator when traveling.

2. People represent the human side of 0KG, including its partners, customers and all stakeholders. This dimension not only refers to the people involved, but also to the relationships between them. 0KG promotes a relationship of trust and sustainability with the client, which is any tourist who presents a collaborative spirit. Regarding key partners, they are especially focused on: tourism industries, airports, suppliers, distributors and employees of 0KG.

3. Resources are all physical resources (clothing and accessories, warehouse and stores), intellectual resources (database/patent) and financial resources (inventory, rentals, website/app, digital and physical spaces) that directly influence the operation of the service.

4. Influences represent all external influences that directly or indirectly relate to the functioning and development of the service. This dimension represents the external character of 0KG, that is, its major rivals (competitors), Government (marketing legislation, tax policy, environmental regulations), and trends (focus on fashion developments and the growing acceptance of a cooperative lifestyle).

5. The Core, or the heart, represent the purpose of its existence: being the first store that combines the quality and price to rent second-hand clothes, facilitating the lives of tourist.

![Diagram of Kaleidoscope model]

Figure 1. The new model: Kaleidoscope

5. Results and discussion - Questionnaire and Focus Group

The questionnaire resulted in 430 responses from which important findings emerged. 82.1% of respondents would consider or have used something used/borrowed. The main reason to use something used/borrowed is based on ‘saving money’ arguments, followed by greater variety in clothing and yet because the clothes were for a specific event (short duration). The Focus Group was conducted with 7 people, aged between 18 and 31 years, from different professional areas, because this was the age group with the highest response rate in the questionnaire. The same question "Have used or considered using something borrowed/used?" was then applied, and in general, all elements of the group indicated that they would use or consider using something used/borrowed. When questioned about their willingness to rent or purchase second-handed clothes or accessories, 66.5% answered "Yes". Participants of the focus group also responded positively, and referred as justification: the economic aspect because it allows saving by avoiding ongoing investments in new clothes and still be able to find different clothes, which encourages experimentation. Those who answered "no" to the previous question also justified that they would not to use clothes that were already...
worn by others and because they doubt the hygiene of the items. In order to understand if the “lack” of hygiene and cleanliness would be one of the main barriers to the use of second-hand clothing and accessories, the respondents who replied "no" were asked if it was guaranteed the quality and cleanliness of the clothes, if they would change their answer. An astounding 39.5% of the 144 negative answers, changed their answer. Therefore, only 87 of the 430 respondents wouldn't wear second-hand clothes or accessories.

This way, most respondents showed great acceptance of service, and as long as the quality is guaranteed and well communicated few barriers may arise and more and more people may consider joining 0KG. Also after the focus groups it was perceived that 0KG is an innovative service that will be very well received, as long as the partnerships are made intelligently and the quality and hygiene of the clothes, well communicated. In general, all participants showed interest in the service, noting that each one of them would be a customer of the brand.

6. Conclusions

0KG intends to be a new way to promote sustainable systems, encourage alternative ways of critical thinking of consumption habits, and a new approach to a slow and sustainable fashion in the fast consuming world we live today. In general, the initial problem was positively answered. This research proves that people are willing to use second-hand clothing and/or leased when traveling but only if the questions of cleanliness of the clothes are ensured. The creation of the new model was intended to achieve the specific objective of the development of 0KG and it serves as an organizational unit of analysis, allowing the identification of opportunities for change and creation of business strategies, both extrinsic and intrinsic to the organization.

References
[10] Osterwalder A 2004 The business model ontology - a proposition in a design science approach
Postcards from the edge: Trash-2-Cash communication tools used to support inter-disciplinary work towards a design driven material innovation (DDMI) methodology

R Earley and R Hornbuckle
University of the Arts London, Textiles Environment Design (TED), 16 John Islip Street, London, SW1P 4RJ, United Kingdom

Email: r.l.earley@chelsea.arts.ac.uk

Abstract. In this paper postcards from the EU funded Horizon 2020 Trash-2-Cash (2015-2018) project - completed by workshop participants – are presented in three tables with a focus on how they contributed to the building of communication channels, shared understanding and methods in this inter-disciplinary consortium work. The Trash-2-Cash project aims to support better waste utilisation, improve material efficiency, contribute to reduction of landfill area needs, whilst also producing high-value commercial products. Novel materials will drive the generation of new textile fibres that will utilize paper and textile fibre waste, originating from continuously increasing textile consumption. The inter-disciplanarity of the participants is key to achieving the project aims – but communication between sectors is challenging due to diverse expertise and levels of experience; language and cultural differences can also be barriers to collaboration as well. Designing easy and accessible, even fun, communication tools are one of the ways to help build relationships. The cards reviewed were used in Prato (November 2015), Helsinki (February 2016) and London (November 2016). This paper concludes with insights for the ongoing development of the project communications work towards the Design Driven Material Innovation (DDMI) methodology, due to be presented at the end of the project in 2018.

1. Introduction
The aim of Trash-2-Cash is to provide creative companies with new material solutions for fashion, interiors, automotive and other luxury products. 18 partners, from 10 countries – around 50 individual designers, design researchers, materials scientists, social scientists, raw-material suppliers and end-product manufacturers from across Europe - make up the inter-disciplinary and cross-sectorial consortium. The designers lead on the formation of ‘scenarios’ for new material and product futures, defining the desired material properties and developing ways to collaborate with material scientists and developers to further develop the different eco-efficient regeneration processes for cotton fibre, paper/cardboard, polyester and fibre colouration.

The project collaboration is enabled through two-day workshops in different European locations every two to three months. In bringing together designers from academia with designers from industry, scientists and manufacturers, consumer behaviour researchers, and life cycle assessment researchers, the project demands that participants be prepared to challenge their normal ways of working. Indeed, to embrace the ideas of others – the language, methods and processes – and in order to collaborate, the
project requires the participants to consider where their discipline ends and another begins. Participants may well experience a gap here – bridges are needed. It is the role of the methodology team in the project to create tools and opportunities to bridge these gaps.

2. Context

2.1 Partnerships in the development of ‘circular’ textiles

As cotton becomes a more luxury-level fibre the materials world has a new space race on its hands. Regenerated cellulosic fibres are being tipped as the front-runner for future fashion and clothing, but whilst the technology is undeniably exciting and innovative, there are still many challenges around quality, quantity and impacts. The Trash-2-Cash project is bringing new insights around how designers can drive future solutions.

Organisations like The Ellen MacArthur Foundation are beginning to highlight the challenge for designers in working across a number of contexts with business and science/technology fields, towards new innovation models (Maciver et al 2016) [1] for the circular economy. Multi-stakeholder partnerships are recognised as an important precondition for bringing about changes toward sustainability in the fashion and product design industries (Pedersen et al 2013) [2] (Dell’Era et al 2016) [3]. Furthermore, it has been acknowledged in the literature that bringing design and science closer together in material development could be an important contributing factor in supporting an ‘advanced and sustainable textile industrial base’ (Hughes et al 2011) [4]. These partnerships need to explore the edges of different fields and practices, as they currently exist.

2.2 Postcards as tools for collaboration.

One of the guiding principles for creating an inclusive environment for collaboration is surely to avoid alienating any one discipline through the use of discipline-specific language or tools [5]. Finding tools which are engaging, familiar and intuitive for all in a multidisciplinary setting can be challenging. Yet postcards, it could be argued, fulfil all of these requirements; they are a universally understood medium for a message ‘from me to you’. They tend to be informal, associated with leisure-time and communication with friends and family (rather than the ‘serious’ work of an EU project workshop) which potentially allows them to elicit a different kind of response; one of openness.

2.2.1 Previous uses of postcards as research tools.

The use of the postcard as a communication tool is not a new one – the title of this paper references work by Sapsed and Salter (2004) [6] where cards were used as ‘boundary objects’ within a community project. The analysis of photographs used on postcards is also a current area of study (Millman 2013) [7]; as is the act of posting a card as an act of exchange in the 21st century to find out more about how sending a postcard ‘motivates participation in a community’ (Kelly & Gooch 2012) [8] – a time when emailing and texting have made the postcard a redundant form of communication. It is perhaps the appeal of it being such a basic exchange in a technologically advanced communication era, that makes it such a human research tool (Gray & Malins 2004) [9].

3. Research Method

The methodology adopted by the authors in the Trash-2-Cash workshops was similar to ‘action research’ where researchers observe a situation to understand a need then design an intervention and reflect on its impact as Berg (2007) states: “Action research is fundamentally a change-process, where the researcher consciously studies something in order to change or improve it.” [10]. In this case the postcards themselves represent both the intervention and the data collected and analysed.

In this project the postcards were created as an open-ended communication tool, which could be adapted for each workshop. There are three different ways in which the authors have used the postcard format so far within the project; these are outlined in Table 1.
Table 1. Postcard tasks and purpose, by workshop.

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Task</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prato #2</td>
<td>‘Tell us about...’</td>
<td>(a) ‘Getting to know you’ (building internal connections) and (b) To receive leads for building external networks</td>
</tr>
<tr>
<td>Nov ‘15</td>
<td>(Unscheduled: during networking time)</td>
<td>a) To find out more about the scientific processes and (b) To enable a range of voices to be heard</td>
</tr>
<tr>
<td>Helsinki</td>
<td>‘Postcard Q&amp;A’</td>
<td>(Scheduled: standalone task)</td>
</tr>
<tr>
<td>#3</td>
<td></td>
<td>(a) To elicit feedback on the successes / weaknesses of a task and (b) To enable a range of voices to be heard and thoughts to be captured ‘in the moment’</td>
</tr>
<tr>
<td>Feb ‘16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>London #6</td>
<td>‘What did I learn?’</td>
<td>(Scheduled: part of another task)</td>
</tr>
</tbody>
</table>

Each of these three different postcard tasks have been analysed in terms of the purpose, content - what people said – and how we (as action researchers) responded / what happened. The responses were analysed for common themes and the frequency of these themes are presented in the results section below to aid the discussion and conclusions.

4. Experiments & Results
The postcards created by the authors came in two sets – the first had four questions on them (Prato), and the second set were blank and were issued with different questions for the participants to answer directly after a task (Helsinki and London).

4.1 Postcard Task: “Tell us about...” Prato, Italy (November 2015)
The purpose: These were designed as a relationship-building tool, for the second workshop, held in Prato, Italy, and also to collect information that could help us to build networks and connections. (Figure 1). The content: Four questions were printed on the cards, which were completed during coffee break times and pinned to a wall for everyone to read. Participants were randomly given one of the four questions. 25 cards were handed back (a response rate of 71%).

Table 2. Postcard questions from Helsinki (Feb 2016), grouped by response theme.

<table>
<thead>
<tr>
<th>Postcard question</th>
<th>Response theme</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>What’s the most interesting event you attended recently?</td>
<td>Events featuring garments made from recycled materials</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Other cultural events</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Projects involving recycled materials</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>‘All of our projects’</td>
<td>1</td>
</tr>
<tr>
<td>Tell us about a project that crosses over with T2C.</td>
<td>Scientists</td>
<td>4</td>
</tr>
<tr>
<td>Tell us about which partner you are most excited about working with.</td>
<td>Designers</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>End-users (manufacturers / retailers)</td>
<td>3</td>
</tr>
<tr>
<td>Tell us about an interesting conversation you have had tonight.</td>
<td>All partners</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Relating to the potential of T2C materials</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Relating to consumer behavior / marketing</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Relating to impacts in other parts of the lifecycle (use, recycling etc.)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Relating to cultural backgrounds</td>
<td>4</td>
</tr>
</tbody>
</table>
### 4.1.1 How we responded / what happened?

The cards were useful in showing each other (they were pinned up) our broad range of cultural backgrounds and interests - “Basquian food and ancient libraries” – to an appreciation of the expertise in the project, “I’m pleased and excited to work with all the T2C researchers, because I consider the overall team very efficient and well-skilled”. One card noted the need to find “a common project language”.

It was also clear from the responses that partners were excited about the prospect of working with other disciplines and that the potential of the materials were already at the forefront of discussions taking place in the social times of the workshop. The authors fed the responses back into the forward planning as using the cards gave ‘voice’ to individuals at busy and noisy project events. The reflective act of writing a single thought down appeared to enable participants to think though what to share or ask, and become more focused at key points during the two-day workshop meetings.

![Figure 1. Prato, Italy (November 2015) – each participant had one of four questions to answer.](image)

![Figure 2. Helsinki, Finland (Feb 2016) – questions were written on a postcard for the lead scientists to answer.](image)

### 4.2 Postcard Task: “Postcard Q&A” Helsinki, Finland (February 2016)

The purpose: The aim was to give all the participants a chance to ask questions to the fibre scientists, in a session chaired by a facilitator (Figure 2). Participants filled the cards out during the lunch break. The content: The cards were changed to blanks, so that participants could write questions on them for the scientists to answer. 20 cards were handed back (a response rate of 56%).

<table>
<thead>
<tr>
<th>Questions about...</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regeneration potential of fibre</td>
<td>8</td>
</tr>
<tr>
<td>Fibre technology</td>
<td>7</td>
</tr>
<tr>
<td>CEL Fibre Performance</td>
<td>3</td>
</tr>
<tr>
<td>PES Fibre Performance</td>
<td>1</td>
</tr>
<tr>
<td>The Project</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 3. Postcard questions from Helsinki (Feb 2016), grouped by theme.

### 4.2.1 How we responded / what happened?

The question postcards provided the participants with the opportunity to ask any question of the experts. The authors noticed that some people asked questions...
who had not ‘spoken up’ in the previous workshop session and also that the postcards enabled some common themes to be raised which then led to a more open discussion between the scientists and other members of the ‘audience’. They questions also revealed some grey areas – a lack in the technological knowledge - which the methodology team were able to address in the subsequent sessions by arranging further more focused knowledge exchange opportunities.

4.3 Postcard Task: “What did I learn?” London, United Kingdom (November 2016)
The purpose: In London the blank postcards were used again but this time to receive feedback on the successes and weakness of a workshop activity; immediately after the session participants were given a postcard and asked to write something in response to the question ‘what did you learn?’. Participants filled in the cards over lunch and then handed them back to the facilitators.
The content: From 27 participants 12 postcards were returned (response rate: 44%).

Table 4. Postcard responses from London (Nov 2016) grouped by response theme.

<table>
<thead>
<tr>
<th>Response theme</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning generated by the activity</td>
<td>5</td>
</tr>
<tr>
<td>Suggestions for how to improve the activity</td>
<td>3</td>
</tr>
<tr>
<td>General suggestions for the project</td>
<td>3</td>
</tr>
<tr>
<td>Other indicators of success</td>
<td>1</td>
</tr>
</tbody>
</table>

4.3.1 How we responded / what happened? From the responses received it is clear that the postcards enabled participants to express their opinions on the task, with some suggesting improvements as well as others answering the question ‘what did you learn?’ more directly. This allowed the session leaders to understand if the activity had been successful as well as enabling them to make improvements to the activity. Where the responses revealed a misunderstanding of the task, an adjustment was made to the way the activity was briefed and explained. Participants also used this opportunity to reflect on the workshop and the project more generally, which shows the value of having this moment for reflection within the workshop itself as well as in hindsight using the post-workshop survey. The low response rate also led to a realisation that this postcard task might be better carried out within the scheduled space of the workshop so that participants could dedicate time and thought to the task without the distractions of lunch. This was undertaken in the following workshop (Forli, Italy) and the response rate increased to 87%.

5. Conclusion
We have presented three different uses for an open-ended communication tool – the postcard - to help support large multi-disciplinary projects. The aim was to demonstrate how this tool can be used to enable ‘voices to be heard’ as well as gaining insights into expectations, how people are responding to the project, its activities, and the other partners. The importance of this particular medium – the postcard – is its familiarity across disciplinary boundaries, its association with sending and receiving messages with friends (rather than just colleagues), the immediacy of the feedback ‘in the moment’ and the short response which requires minimum time and effort. This elicited responses which demonstrated a genuine openness and freedom of expression.

One of the successes of the exercise was the way that we were able to use the tool to ‘grow’ our relationships and connections in stages, from focusing on ‘getting to know you’ at the beginning of the project, moving on to ‘asking an expert’ to enable more focused exchange related to the conversations that had already begun and then a reflective task asking “What Did I Learn?”.

From a practical perspective it is apparent that the postcard tasks are even more valuable if you give people a specific moment within the scheduled time of the workshop to reflect on their response.
The postcard will continue to be used as a communication tool within the current project, for similar tasks to those presented here but also expanding, exploring and experimenting with other potential uses which build on the existing work.

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References
Innovation, entrepreneurship and textiles

A Blanton Godfrey1 and Samaneh Pourmojib2
1Joseph D. Moore Distinguished University Professor, North Carolina State University, College of Textiles, Textile and Apparel, Technology and Management Department, 1020 Main Campus Drive, Raleigh, North Carolina, 27526, United States of America
2Ph.D. Candidate, North Carolina State University, College of Textiles, Textile and Apparel, Technology and Management Department, 1020 Main Campus Drive, Raleigh, North Carolina, 27526, United States of America

E-mail: blanton_godfrey@ncsu.edu

Abstract. Innovation and entrepreneurship have become increasingly important parts of economic development in almost every country, region, and community. In this research we investigate the reasons people become entrepreneurs in the textile and apparel industries and compare entrepreneurship in these industries with other industries looking also at the success factors for start up companies. During our research we found many disrupters, people entering the textile and apparel industries from outside often having no prior experience in textiles or apparel. We also investigate the impact of government intervention on entrepreneurship. In recognition of the large economic impact entrepreneurial companies have on economic development and job growth, almost all federal governments, regional governments, and community governments have created support for innovation and entrepreneurship.

1. Introduction
Almost every country, region, and community now have innovation and entrepreneurship as a priority [1]. In the U.S. between one-third to one-half of economic growth can be attributed to innovation. There are national and world innovation indices, conferences on innovation and entrepreneurship, and numerous articles about the importance of innovation and entrepreneurship in driving economic development [2]. Although innovation and entrepreneurship have been studied extensively, very little research has focused on the textiles and apparel industry. The few published articles on innovation and entrepreneurship in the textiles and apparel industry have not elucidated differences with other industries that have been far more extensively studied.

There are many definitions of innovation. In our work we have used a modified definition first proposed by Mervin Kelly of Bell Labs in the early 1920s. Innovation is a fundamental breakthrough in science and/or technology, followed by a reduction to practice, followed by a practical and economical means to produce the innovations in products or services, followed by a widespread acceptance in the marketplace of the products or services [3] and [4]. There are also many definitions of entrepreneurship with many of the older definitions focused on the desire to produce a profit. We find that newer definitions that include goods, services, raw materials, and organizing methods fit our findings better [5]. Definitions that include social entrepreneurship and including pursuing opportunities without regard to resources that the entrepreneur controls also seem to fit current entrepreneurship better [6]. Our working definition for our research thus includes the creation of any business, for profit or for common good, without regard to resources under the entrepreneur’s control, in order to seize a new opportunity for needed or wanted products, services,
materials or business models. What we found in our research is a willingness to identify opportunities made possible by new technologies to create entirely new business models. In the past, many fortunes were made in textiles and apparel by sourcing globally and selling locally. An easy example of this is the growth of enormous department store chains such as Macy’s, Target or Wal-Mart in the U.S. Many new textile and apparel companies are turning this totally around and producing locally and selling globally using the Internet and existing package delivery services such as FedEx and UPS as their distribution channels. We find other entrepreneurs putting together app technologies with sensors, LEDs, new fibres, fabrics, and materials to create innovative products and services.

2. Basic Research Questions
There are three major research questions that are our primary focus. What are the critical success factors for entrepreneurial companies? What are the major disruptions driving innovation and entrepreneurship today? What is the impact of government interventions in stimulating innovation and entrepreneurship? For each of these basic questions, we are focusing our research on the textile and apparel industries.

Are the success factors for textile and apparel companies the same as for companies in other industries? Are the success factors the same for apparel companies as they are for textile companies?

What are the major disruptive factors driving innovation and entrepreneurship in textile and apparel companies? What are the major factors underlying these disruptions? Who are the primary players in creating successful, start-up entrepreneurial companies in the textile and apparel industries?

How are government interventions changing the landscape of textile and apparel innovations and entrepreneurship? What is the impact of these government interventions in stimulating innovation and entrepreneurship in the textile and apparel industries? How can we measure the impact of these interventions?

3. Research Methodology
In addition to reviewing the existing literature on the basic research questions described below, we are basing many of our preliminary conclusions on our review of personal interviews of over 400 entrepreneurs conducted by our colleagues, in-depth studies of over 50 textile and apparel entrepreneurs, and data collected by our state government of over 400 other entrepreneurial start-up companies in North Carolina. Our research is U.S. focused and for the most part, North Carolina focused. In the future we plan to compare our findings with similar research in other countries.

In this paper we describe the success factors that have been mentioned by the entrepreneurs in our review of the interviews. We have supplemented our personal reviews by using Nvivo, a qualitative data analysis package, to identify success factor frequency in our data set of personal interviews. We are testing our preliminary findings and conclusions through personal in-depth case studies with a smaller number of successful start-up companies in North Carolina. Some of these companies are quite new but have already created strong economic gains for their regions with several hundred new jobs. Others are just beginning to grow and build local, national and international markets.

4. Literature Review
In addition to our findings based on our primary sources, we have conducted a review of the literature on entrepreneurship. Research in this field has received much attention in recent years. Qualitative research is the most popular method used in the field and is based on surveys, interviews and case studies.

On entrepreneurship definition, Gartner [7] used Delphi method to construct a series of three questions to produce definitions of entrepreneurship. In conclusion, the author indicates that the definition of entrepreneurship has yet to emerge [7]. There are many definitions of entrepreneurship in the literature. Kirznner defines entrepreneurship as a mechanism to discover and reduce inefficiencies in the economy [8]. In another study based on collective theory, Shane and Venkataraman introduce a
framework to study entrepreneurship. In this article, entrepreneurship is defined as a mechanism by which society converts technical information into products and services. The authors also claim that entrepreneurship in a capitalist society is a main engine of innovation. The field of entrepreneurship is defined as the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services and discovered, evaluated, and exploited [9].

Most studies about disruptive change and disruptors in the entrepreneurial world have been conducted in the last decade. Christensen, Cook and Hall discuss the challenges of disruptive change. They argue that you build a brand by “attaching the customer to products” that mean something to them. They discuss how to create these products and finally, they describe how new, valuable brands can be built to truly deliver sustained, profitable growth [10]. Later, Baron discusses behavioral and cognitive factors in several key behaviors of entrepreneurs by reviewing entrepreneurial theory and investigating the context [11]. Dyer, Gregersen, and Christensen develop a theory using exploratory interviews and active experimentation, that innovative entrepreneurs differ from executives on four behavioral patterns through which they acquire information: (1) questioning; (2) observing; (3) experimenting; and (4) idea networking [12].

Chandra and Yang developed a theoretical framework by deep study and literature survey using content analyzing tools, which explains disruptive innovation as a co-evolutionary entrepreneurial process at the firm, product, and customer level. This framework offers a set of testable propositions to advance theory and practice in the field [13]. Another qualitative study is about understanding of both disruptive innovation and the nature of opportunity generation [14]. An innovation becomes disruptive when the basic opportunity has a certain demand [15]. The importance of innovation, data mining in innovation, and also why and how customers need the product are discussed in this article [16]. Christensen and Overdorf define disruptive innovation in its core, which is about competitive responses to innovation [17].

There are few entrepreneurial studies in the literature focused on the textile and apparel industry. Yusuf determines the South Pacific entrepreneur’s critical success factors for small businesses. He concluded that both individual factors (such as having a certain skills and good character) and environmental factors (such as government support, political and traditional demands, and the need for balancing these demands with business commitments) are critical to small business success [18]. Hardill and Wynarczyk inspect the relationship between technology, entrepreneurial human capital, and company performance in a sample of textile and clothing SMEs in Great Britain [19]. Their findings are based on computer network usage in 1996. Yu discusses success factors of Hong Kong entrepreneurs in the textile and garment industry [20]. This study suggests that Hong Kong’s industrial vitality mainly depends on a large number of adaptive entrepreneurs who are continuously aware of opportunities, keep a high degree of flexibility in their production, and embrace change rapidly. Based on this research the textile and garment industry firms in Hong Kong survived by pursuing a product imitation strategy, operating at a small-scale, extensively utilizing subcontracting networks, producing customer label garments as well as performing 3-D arbitrageurship [20].

5. Our Findings
The reasons people become entrepreneurs seem to be similar across all industries. The success factors are also similar. True passion seems to be a universal success factor. Many of the entrepreneurs in our interviews just want to get their idea into the marketplace successfully no matter what it takes in hours per day, days per week or even years. Whether their original intent is to make money, to provide job independence for themselves, to create employment for the people in their community, or to turn their idea into a practical business, these entrepreneurs have a true passion for what they are doing.

The differences we find between companies in the textile and apparel industries and other industries appear to be far more due to the costs of creating a business and the existing regulatory environment. For example, start up companies in the medical device industry require considerable capital for laboratory space and equipment and even more for the animal and clinical trials required for
regulatory approval before entering the market. On a smaller scale, starting a textile company versus an apparel company often also involves far more capital. We have found successful apparel companies starting with only a few hundred dollars of person investment being able to use existing resources and equipment, go “viral” on the Internet, and grow quickly investing revenues into the business as it expands. We have also discovered three major shifts in textile and apparel entrepreneurship. In the past, many textile and apparel companies, especially in retail, became successful importing globally and selling locally. The Internet seems to be flipping this completely. New companies are manufacturing locally and selling globally.

There have been many studies about disruptions in almost every industry. For many years existing, often family-owned, textile and apparel companies expanded internally or by acquisition of other companies. Today, outsiders – disrupters – are creating many of the new, rapidly expanding textile and apparel companies. We find that disruption is a major factor in entrepreneurial textile and apparel entrepreneurship. Many of the new, successful companies are being created by people far outside the textile and apparel industry, many of these people having absolutely no prior experience or even education in textiles and apparel. How textiles and apparel are sold is changing rapidly. In the first week of 2017, Macy’s, one of the leading retailers announced it was closing 100 stores, and Sears, another icon of American retail, announced it was closing over 150 stores. The 2016 holiday season Internet sales were up 17%, but both of these major retailers had disappointing sales in their stores.

Another type of disruptions are created by people with existing brands capitalizing on these “brands” or name recognition to enter the textile and apparel markets. Historically, textile and apparel companies spent many years building a brand and brand loyalty [21]. These new entrepreneurs have created their name recognition through cinema, television, books, sports, music or even as a swimsuit model to build large textile and apparel businesses. Kathy Ireland’s home furnishings offerings are now an over two billion dollar business. Martha Stewart has parlayed her catering business, books, and TV shows into home products revenues of over a billion dollars. Venus Williams spent over eleven years getting her fashion and textile degree part time during an extremely long and successful tennis career to build her athletic wear apparel line.

The question of whether government interventions are having an impact can be answered with a resounding yes. Our review of over 300 companies supported by federal grants and matching state funds shows clearly that for many entrepreneurial companies these funds were absolutely critical for their success. In the U.S., the federal government created the Small Business Innovation Research (SBIR) program in 1982 with the purpose of strengthening the role of innovative small business concerns in Federally-funded research and development [22]. The last data available indicates over 112,500 awards have been made totalling more than $26.9 billion. The State of North Carolina provides partial matching grants to companies receiving SBIRs that provide further funding for turning these research ideas into viable businesses. In addition to the SBIR program, the U.S. government also created the Small Business Technology Transfer (STTR) program in 1992 to facilitate the transfer of technology developed by a research institution through the entrepreneurship of a small business concern. Many communities in the U.S. have created entrepreneur spaces (incubators) to further facilitate the creation of new companies. In North Carolina over 300 start-up companies have space in American Underground in Durham, over 70 are in the Innovation Quarter in Winston-Salem, and more than 50 in American Underground and Raleigh HQ in Raleigh.

At the national level in the U.S. the best-known program is the National Network for Manufacturing Innovation now known as Manufacturing USA [23]. The National Manufacturing Innovation Institutes (NMMI) are a collection of nine industry-academic partnerships focused on key technologies for the near future bringing together significant federal and industry funding supporting research, development and commercialization of new technologies to rebuild the manufacturing base of the country. While the goals are far broader than supporting entrepreneurs, many believe that the technologies coming out of these institutes will form the backbone of new entrepreneurial activities for many years to come. In the textile and apparel world, the most relevant of these institutes is the
Advanced Functional Fabrics of America (AFFOA) led by the Massachusetts Institute of Technology. AFFOA’s mission is to enable a manufacturing-based revolution by transforming traditional fibres, yarns, and fabrics into highly sophisticated, integrated and networked devices and systems [23]. At the state level there are also many programs led by many different entities. For example, in our state the North Carolina Board of Science, Technology and Innovation produces a tracking innovation report [24], develops policies and methods to support entrepreneurial growth, and administers the state’s One North Carolina Fund providing matching funds for entrepreneurial start-up companies. The state of Rhode Island voters recently approved borrowing $45.5 million to finish building a new engineering school at the University of Rhode Island and to fund a new innovation campus. This new affiliated innovation campus will pair cutting edge research with private sector investments to create the jobs of the future [25]. Understanding how to measure the impact of these programs is part of our continuing research.

Entrepreneurs need far more than space, funding and friendly networks. They need a variety of support services. Many universities are moving quickly to provide academic courses, consulting services, laboratory space, and professional networks providing in-depth workshops on critical issues. For example, North Carolina State University has a Learning and Living Village for entrepreneurs, a “Garage” open 24/7 with well-equipped labs, and a number of special events supporting student and other entrepreneurs. Other universities have created similar programs. The Winston-Salem Innovation Quarter brings together over 7,000 students from six universities with more than 3,000 employees from 70 entrepreneurial companies [26].

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