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Mapping the interactions between the stakeholders of the circular economy ecosystem applied to the textile and apparel sector in Romania

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Abstract. *The goal of this research is to acknowledge the elements which hinder or facilitate the transition from linear to the circular economy in the textile and apparel sector in Romania by identifying current and desired interactions among the ecosystem's stakeholders. Two strands of literature, one on circular economy and one on the textile and apparel sector, provide the theoretical background for this research. Currently, the way we design, produce, and use clothing has drawbacks that are becoming increasingly clear. The circular economy principles have the potential to transform the way textiles are produced, consumed and disposed of. More and more social entrepreneurs are pioneering the future of the apparel industry by offering sustainable solutions to tackling systemic problems. However, their efforts have to be elevated and amplified, as such to pave the way for creating business models that allow for both economic performance and social impact. A comprehensive mapping of ongoing activities and stakeholders in the textile and apparel sector in Romania is required to understand the roadblocks to industry transformation in the context of moving toward circular economy and to implement envisioned sustainable solutions. In the paper we used a database of 27 stakeholders, developed by applying the snowball method, to investigate current and future interactions between the main actors who operate in the textile and apparel sector. To meet its research objectives, the paper employed a phenomenological research design and built upon a workshop activity. First, we designed an online survey to understand the profile and knowledge of the circular economy of the stakeholders included in our database. Second, we employed the world café method to understand in depth the level of knowledge of the actors who attended the workshop on the circular economy in the textile and apparel sector. Third, we used the structural systemic constellations method in assessing the stakeholders' current and future desired interactions. Last, we formulated conclusions and recommendations about future research needed to deepen the understanding of the circular economy in the textile and apparel sector. Findings showed that there is a vicious circle of different actions feeding isolation and preventing collaboration among stakeholders. Also, we found that there is a lack of collaborative spaces where stakeholders can meet, connect and explore the various opportunities to collaborate, and a lack of general awareness on "circular economy and textile and apparel" and its mechanisms. The intended audiences of the research are decision-makers and practitioners in the textile and apparel sector, as well as researchers focused on the circular economy.*

Keywords: circular economy, social entrepreneurship, stakeholders mapping, textile and apparel, textile waste.

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Introduction

Worldwide the textile and apparel sector is one of the most polluting industries, with a lengthy supply chain, subject to mass environmental and social impacts (Gardetti and Muthu, 2015). Without a fundamental shift in the way goods and resources are consumed, the world faces the prospect of multiple, interlocking global crises for the environment, prosperity and security (World Economic Forum, 2010). Conventional methods of dealing with issues of waste, sustainability, and resource efficiencies have not addressed continuous and rising consumption levels (Smith et al., 2017) nor have developed an overall vision to achieve sustainability (Martin, 2013). By promoting the adoption of closing-the-loop production patterns within an economic system (Ghisellini et al., 2015), circular economy has the potential to solve the gap resulting from natural resource scarcity and global growing population or consumption (CSR Europe and University of Malta, 2018; The European Apparel and Textile Confederation, 2017). To address this, we need to re-imagine production and consumption systems and develop ways to educate designers and consumers to a more circular way of thinking (Smith et al., 2017).

Long-time textile and apparel industry strategists agree that it's a moment ripe for invention and new partnerships aimed at shaping the industry's future and aligning it more closely with human and environmental sustainability, and with the values of new consumers (Forbes, 2018). The need for a circular economy is becoming widely acknowledged across Europe and is addressed by businesses, society, policy makers, media, and universities, as part of their social responsibility dimension to support communities in achieving a sustainable growth (The European Apparel and Textile Confederation, 2017; Ghisellini et al., 2015; Green Strategy, 2014; Păunescu et al., 2017). Businesses will need to define new business models, focused on value creation rather than material throughput and work towards closed-loop systems (World Economic Forum, 2010). In achieving the transition, studies reveal a positive and strong correlation between the expertise of the employees and the level of knowledge and business impact analysis, training and simulation sessions being the key argument in sustaining a reliable business continuity plan (Păunescu et al., 2018). As a result, several global brands are now taking note of social entrepreneurs as valuable partners in sustainable innovation for their core business (Forbes, 2018). In Europe, hundreds of textile sector companies have successfully innovated and adapted their business models to better compete and deal with the change (The European Apparel and Textile Confederation, 2017). A comprehensive mapping of ongoing activities is required to understand the movement towards the circular economy applied to the textile and apparel sector and to quickly identify not only gaps and barriers in any area of action but also opportunities to spark high levels of collaboration (Ellen MacArthur Foundation, 2017).

The goal of this research is to acknowledge the elements which hinder or facilitate the transition from linear to the circular economy in the textile and apparel sector in Romania by identifying current and desired interactions among the ecosystem's stakeholders. To achieve this goal, the following objectives were established: (1) To understand the circular economy ecosystem applied to the textile and apparel sector as it is in Romania; (2) To identify the current interactions between the stakeholders; (3) To understand the visibility of social entrepreneurs in the textile and apparel circular economy ecosystem. (4) To determine the desired interactions between the stakeholders; (5) To identify the barriers and opportunities in moving toward the circular economy in the textile and apparel sector.

The current research entailed: searching the literature for a framework addressing circular economy applied to the textile and apparel sector and existing networks of stakeholders; developing a database with the textile and apparel circular ecosystem stakeholders for Romania; searching the literature for a qualitative method to assess stakeholders' interactions; asking the stakeholders identified to take part in a workshop designed to assess their current and desired interactions; collecting and analyzing the data about the stakeholders and their level of knowledge and interest related to the circular economy; collecting and analyzing current and desired dynamics among the stakeholders, in the transition to the circular economy; formulating conclusions and recommendations for future research.

The remainder of this research is organized into four sections. The first part presents the literature review and introduces the concepts employed in the research, namely: the textile and apparel sector, the circular economy model, the policy on the circular economy, the stakeholders of the circular economy ecosystem, and the circular economy applied to the textile and apparel sector. The second part introduces the research methodology. In the third section, the researchers present the findings related to current and desired interactions between the stakeholders. The last part of the paper provides a discussion about the results and formulates recommendations.

The intended audiences of the research are decision-makers and practitioners in the textile and apparel economy, as well as researchers focused on the circular economy.

Literature review

Globally, the USD 1.3 trillion clothing industry employs more than 300 million people along the value chain; clothing represents more than 60% of the total textiles (Ellen MacArthur Foundation, 2017). When washed, some garments release plastic microfibers, of which around half a million tons every year contribute to ocean pollution. About 17-20% of global water get polluted by using near to 8000 synthetic chemicals for its processing. Annually, about 85% of textiles are sent to landfills covering 4% of the land (Rahman and Amin, 2017). Textiles production generates 1.2 billion tons' greenhouse gas emissions annually, more than those of all international flights and maritime shipping combined. Hazardous substances affect the health of both textile workers and wearers of clothes, and they escape into the environment.

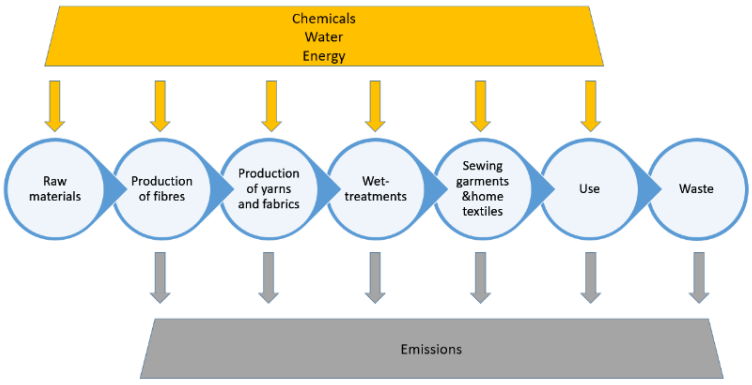

Figure 1. **Linear take-make-dispose model for textile production**
Source: Author's own processing based on Fontell and Heikkilä, 2017.

The current system operates on a predominantly take-make-dispose model as seen in figure 1. This system leaves economic opportunities untapped, puts pressure on resources, pollutes and degrades ecosystems, and creates significant societal impacts at local, regional, and global scales. More than USD 500 billion of value is lost every year

due to clothing underutilization and the lack of recycling (Ellen MacArthur Foundation, 2017). Conventional methods of dealing with issues of waste, sustainability and resource efficiencies are symptoms based and have not addressed continuous and rising consumption levels (Smith et al., 2017). By promoting the adoption of closing-the-loop production patterns within an economic system (Ghisellini et al., 2015), circular economy (fig. 2) has the potential to solve the gap resulting from natural resource scarcity and global growing population or consumption (CSR Europe and University of Malta, 2018; The European Apparel and Textile Confederation, 2017) and offers good prospects for gradual improvement of the present production and consumption models (Ghisellini et al., 2015). We need to re-imagine production and consumption systems and develop ways to educate businesses and consumers to a more circular way of thinking (Smith et al., 2017). Creation of new business model starts with recognizing and identifying the social challenge, determining the type of intervention needed, understanding what works best for both enterprise and social mission up to learning how to create a successful product or service, how to engage the stakeholders throughout the business development, and how to generate revenue (Păunescu et al., 2016).

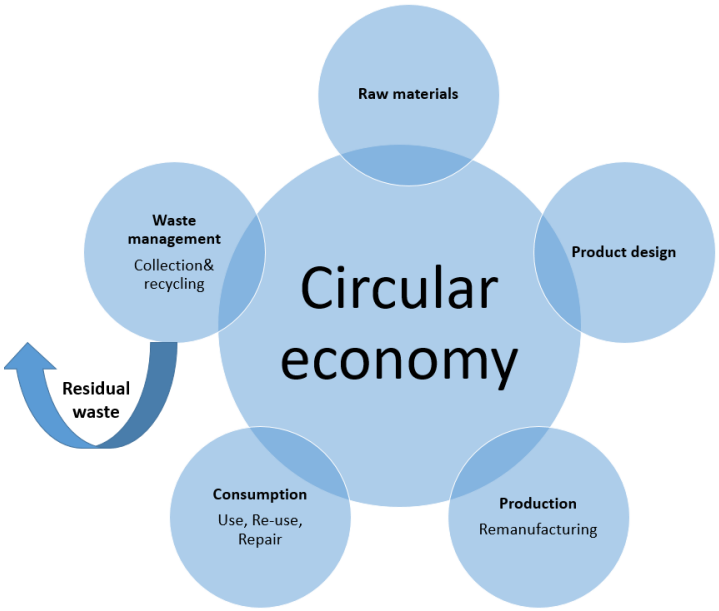

Figure 2. **Circular economy framework**
Source: Authors' own processing based on www.urbact.eu.

Since 2008, serious efforts on promoting circular economy in Europe were displayed by policy-makers under the Waste Framework Directive, which puts emphasis on waste prevention and reuse (European Commission, 2008), and set a legal obligation for the Member States to adopt waste prevention programmes by the end of 2013. In order to close the loop of product life cycles, the circular economy package adopted in 2015 included an Action Plan to support the circular economy (European Commission, 2017a). The EU legislative proposals for waste adopted in 2018 strengthen the "waste hierarchy", and require the Member States to take specific measures to prioritize prevention, re-use and recycling above landfilling, and incineration, thus making the circular economy a reality (European Commission, 2018). An assessment done by the European Environment Strategy in 2017, showcased Romania among the few countries without a prevention plan in place. In January 2018, Romania adopted a National Waste Management Plan and according to the plan, by 2025, 1% of the waste is textile and produced mainly by households.

2017 was a crucial year to develop a policy dialogue with stakeholders and to this aim, the Commission and the European Economic and Social Committee launched a circular economy stakeholders' platform, providing a meeting place for stakeholders to share their solutions and team up to address specific challenges (European Commission, 2017b). Results from a study done by Franco (2017) have shown that the circular economy stands for a system where the dynamics of different actors throughout the product's lifetime, from raw material production to recovery activities, matter. Fontell and Heikkilä (2017) developed a circular business ecosystem applied to the textile and apparel sector (fig. 3), characterized by four hierarchical loops of textiles: maintain and repair, re-use as product, remanufacturing and re-use as material, and recycle.

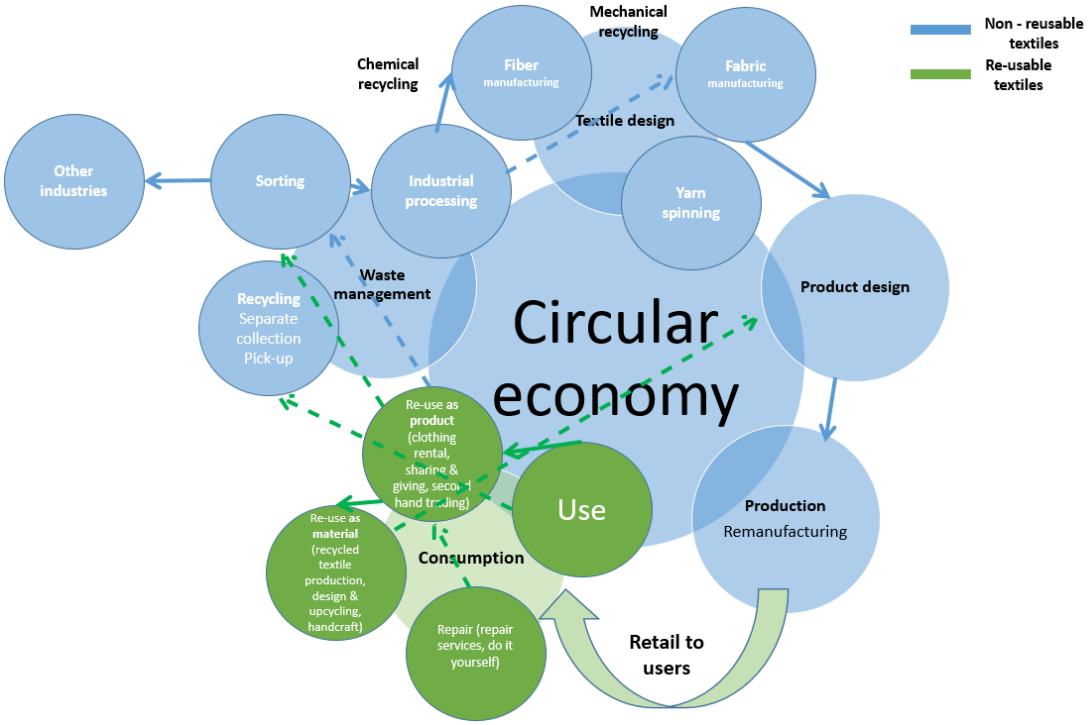

Figure 3. **A circular business ecosystem for the textiles and apparel sector**
Source: Authors' own processing based on Fontell and Heikkilä, 2017.

In this system, the stakeholders – the consumers and the professionals - have a central role in creating closed loops, however, the ecosystems for each differ to some extent, especially in terms of ownership and roles of the specific actors. Going deeper in understanding the stakeholders in the circular economy ecosystem, research by Wicher et al. (2017), identified actors in nine areas of action: policy-makers, investors, academics and education, design, consumers and users, brands or companies, manufacturers, material experts, resource management. The literature on social and environmental problems portrays social enterprises as the most efficient organizations that can solve social and environmental problems in a sustainable way. Some authors stress that social enterprises play one of the most relevant roles in the process of transitions from linear to the circular economy (Stratan, 2017) and that they are pioneering the future of the apparel industry (Forbes, 2018). The 2016 Ashoka and C&A Foundation report, signaled the roadblocks to industry transformation (conditions in forests, farms, and factories are only visible to a few, low-income workers cannot secure long-term wellbeing, consumption habits are hard to shift without easy avenues for change, and the current system discourages value-driven business), and the solutions envisioned by social entrepreneurs to tackling systemic problems: creating new ways

for low-income populations to tap into their collective wealth of information, skills, and income, creating opportunities for workers to become sustainability leaders, rather than merely resources, within the apparel industry, are targeting influencers beyond brands like investors, key suppliers, designers, leading retailers, and consumer communities, powerful stakeholders who can affect the bottom line of companies in the apparel industry, are redefining the value chain as a web of interwoven sectors (Ashoka and C&A, 2016). Social entrepreneurs and their solutions must be elevated and amplified, thus paving the way for business models that allow for both economic performance and social impact (Forbes, 2018). Despite their real weight in the economy and contribution to the well-being of Europe, social enterprises remain invisible for the most part: often they are visible only to specific communities and fail to reach out to a mainstream audience (European Union, 2016).

The main challenge is to understand how to facilitate this transition when constrained by an institutional system that is aligned with the status quo of a linear economy and particularly to understand the role of inter-firm collaborations in this process (Fischer and Pascucci, 2017). The vacuum of rules and related constraints are the drivers that provoke strategic actors (e.g. firms, policy-makers, consumers) to design new rules and thus to behave as institutional entrepreneurs (Pacheco et al., 2010). Mapping the textile and apparel stakeholders of the circular economy has become a practice as a step forward to prosper in the circular economy by bringing together the existing private and public initiatives, removing barriers, investing to foster technological innovation and stimulating the demand (The European Apparel and Textile Confederation, 2017). Only by acknowledging the elements which hinder or facilitate the transition can support business guidelines and policy proposals be designed to effectively and successfully support the transformation (CSR Europe and University of Malta, 2018).

Methodology

The goal of this research is to acknowledge the elements which oppose or ease the transition from linear to circular economy in the textile and apparel sector in Romania by identifying current and desired interactions among the ecosystem's stakeholders. To achieve this goal, the following objectives were established: (1) To understand the circular economy ecosystem applied to the textile and apparel sector as it is in Romania; (2) To identify the current interactions between the stakeholders; (3) To understand the role of social entrepreneurs in the textile and apparel circular economy ecosystem; (4) To determine the desired interactions between the stakeholders; (5) To identify the barriers and opportunities in moving from current to desired interactions between the stakeholders.

The researchers' core assumption derived from research performed by the Ellen MacArthur Foundation, one of the largest supporters of the circular economy, which argued that a comprehensive mapping of ongoing activities is required to understand the landscape of circular economy and to quickly identify not only gaps and barriers in any area of action, but also opportunities to spark high levels of collaboration (Ellen MacArthur Foundation, 2017). In terms of good practices, Romania is almost absent from the circular economy stakeholders' platform, with a contribution related to food waste and aluminiun recycling. Moreover, if we are to develop a level playing field, it will be necessary to increase the visibility, understanding and recognition of the social enterprises in Europe. The literature sees social entrepreneurs as pioneering the future of the apparel industry. In the pathways to transformation of the textile and apparel sector, social entrepreneurs are offering solutions to tackling systemic problems (Forbes,

2018). Despite their real weight in the economy and contribution to the well-being of Europe, social enterprises remain invisible for the most part: often they are visible only to specific communities and fail to reach out to a mainstream audience (European Union, 2016).

All this determined the researchers to formulate a core assumption that a weak circular ecosystem applied to the textile and apparel sector in Romania is determined by poor interactions among the stakeholders.

Therefore, the researchers assumed the following:

A1: There is a low interaction between the actors of the textile and apparel circular ecosystem and low visibility of what social entrepreneurship stands for in this industry and where they are situated in the value chain.

A2: Currently, each actor of the textile is seeing the world through the lens of their business agenda with not a lot of interest for what the other actors from the value chain are doing.

A3: By creating a workshop to "re-member the big picture of the textile industry" (Whittington, 2016) that will move the awareness from the individual interests to the group interests, that the new systemic awareness and perspective of the whole value chain will stimulate dialogue and create interest and potential opportunities for social entrepreneurs;

To verify the assumptions, the researchers used phenomenological research design and set up a workshop to collect data about the textile and apparel circular economy stakeholders' dynamics. First, using the snowball method (Baltar and Brunet, 2012), and after reviewing the literature concerning circular economy ecosystem stakeholders, the researchers developed a database of 27 stakeholders which included also a wider system of actors such as mass-media and educators, as literature suggested (Fontell and Heikkilä, 2017; Wicher et al., 2017). In creating the database, the researchers initially focused on a few people perceived as potential multipliers: known stakeholders involved in various actions related to circular economy in Romania; stakeholders selected from an existing database of textile and apparel recyclers: "Romanian Up-cyclers' map" (Breniuc, 2017), available on Google Maps with 2353 views; online internet research using as keywords the four hierarchical loops of the textiles circular business ecosystem identified by Fontell & Heikkilä (2017): maintain and repair; re-use as product; remanufacturing and re-use as material; recycle. 27 stakeholders were identified and the number was considered adequate for the research, given that the participant group size, when representing large complex systems, is recommended to consist of 10 to 14 people that can be invited to represent a stakeholder group (Scharmer, 2018). In order to have a wider view of the participants' profiles, knowledge and interest in the circular economy, the researchers designed an online survey based on the literature review. The stakeholders had to fill in the survey prior to the workshop. 14 stakeholders confirmed their attendance at the workshop.

To analyze the stakeholders' interactions, the researchers used a phenomenological research design and organized a 3-hour workshop with the stakeholders previously identified. The workshop was conducted on June 22nd 2018 in Bucharest and was hosted by Atelier Merci, a social business active in the textile and apparel sector. The workshop was audio-video recorded and later transcribed. Each participant signed a written agreement that consented to the audio-video recording, in accordance with the 2018 EU General Data Protection Regulation regulations. One of the two researchers acted as the facilitator of the workshop, recommended by her experience as certified master practitioner in business constellations, systemic coach and learning facilitator.

The framework presented in figure 4, an adaptation of the European Commission (2015) circular economy framework done by the researchers in accordance with the literature related to the categories of stakeholders in the textile and apparel circular economy (Fontell and Heikkilä, 2017; Wicher et al., 2017), was considered to be the most practical one for the space and number of participants to the workshop.

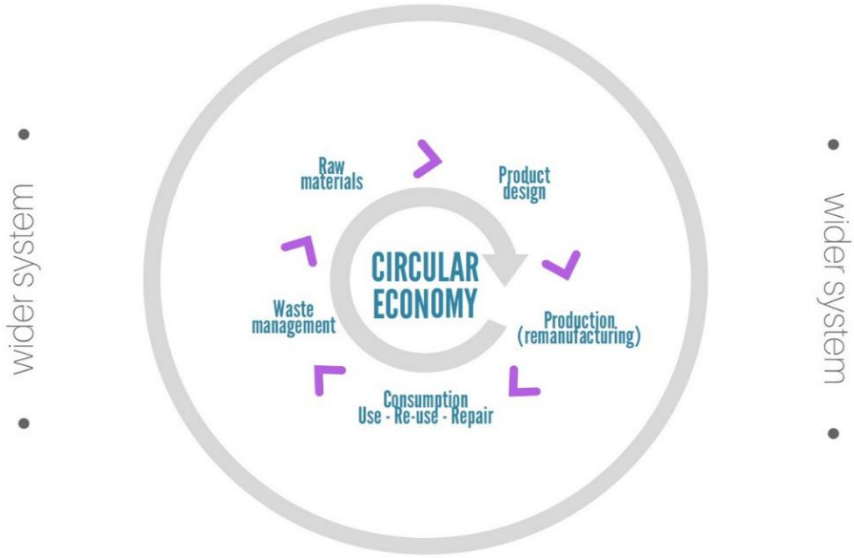

Figure 4. **The textiles and apparel circular economy ecosystem**
Source: Authors' own processing based on urbact.eu.

As the goal of this research was to acknowledge the elements which hinder or facilitate the transition from linear to circular economy in the textile and apparel sector in Romania by identifying current and desired interactions among the ecosystem's stakeholders, the research needed to focus on the whole system view and the system dynamics that act as interferences. As such, the researchers' choices of methodology needed to reflect just this. Researchers consciously focused not on individual perspectives by using approaches such as questionnaires, semi-structured interviews, rather on methodologies that would support the emergence of system dynamics, patterns of interaction and also allow the mental models of stakeholders to surface. In a sense, the workshop and chosen methodologies – world café, stakeholder mapping and structural constellations aimed at making the invisible visible (Horn, 2009) – bubbling up the dynamics that hinder the transition to a circular economy and also possibly indicate the direction of integration and the resources, behaviors, actions that can be put in place within the textile and apparel industry to facilitate this transition.

The workshop was divided into four main sections:

(1) Check-in and setting up the framework for the workshop: the participants introduced themselves, the researchers clarified the workshop agenda, timeframe and have shared with the participants that the results of the workshop will be used to support the current research. It's useful to mention that the participation at the workshop was free of charge and that participants offered to voluntarily participate;

(2) World café: in preparation of validating the assumptions formulated, the researchers used the world café method of hosting conversations about questions that matter. These conversations link and build on each other as people move between groups, cross-pollinate ideas and discover new insights into the questions or issues that are most important (Brown and Isaacs, 2005). Three open-ended questions were addressed to the stakeholders, in the beginning of the workshop to understand the knowledge the stakeholders have in circular economy applied to the textile and apparel:

Question 1: What is your experience with social enterprises active in the textile and apparel industry in Romania?

Question 2: What are the challenges in the textile and apparel industry you are facing with in Romania?

Question 3: What does it mean for you "circular economy" and how does it look applied to the textile and apparel industry in Romania?

The participants were randomly organized in three different teams and were invited to spend 5 minutes reflecting at each of the three questions. Each question was written on a flipchart and the teams were asked to add their reflections on it and also interact with the content the other teams had previously written there. After reflecting in teams, the facilitator read out loud the reflections and clarified with open questions where it was needed – not interfering with the content, rather making sure that everyone has a unitary understanding of what was written;

(3) Mapping the actors in the circular economy: the participants were invited to work in pairs and identify the main stakeholders connected to the textile industry and write them on Post ITs and afterword place them on the hard copy of the circular economy map. At the end of this exercise, a visual map of the stakeholders was available. Based on that list, the facilitator prepared „stakeholder tags" that would be used in the structural constellations (cartons with the stakeholder name and a rope that would allow the tag to be placed onto any person representing that stakeholder). This is also the way the researchers kept track of the dynamic and could easily document it afterward;

(4) Setting up a structural constellation (Livotova, 2015) with the main actors in order to identify current patterns and explore opportunities within the textile industry. The structural systemic constellations method is part of the soft systems methodology approaches (Scholes, 1999) such as Rich picture building (Checkland, 2000) and „systemic mind mapping" (Pop, 2017). In the practitioner literature, this method is described as a constellation (Horn, 2009) or a business constellation (Whittington, 2016). Regardless of terminology, a structural systemic constellation is an attempt to address the complexity of multiple interacting relationships (Checkland, 2000) with the purpose of having more information about the system, information that can be used to formulate assumption about the systemic patterns, archetypes, leverage points and root causes (Senge, 2006). Scharmer uses a similar process to map a system using people as representatives of different stakeholders, elements in the system and it is called 4D Mapping (Scharmer, 2018).

The first step in this emergent process (Scharmer, 2016) was to invite the participants at the workshop to represent stakeholders from the textile industry and place themselves in relation to one another so that they co-create a map of the current reality of how the invisible relational system looks like (Whittington, 2016) at the present moment between the different stakeholders in the textile industry. The second step was to observe, name and illuminate the hidden dynamics between the various stakeholders. The last step in the structural systemic constellations' method was to invite representatives to make one step towards better and then observe what is the new layout of the value chain and what becomes possible in this new set up of a "possible future".

Findings

In the first stage, 27 Romanian stakeholders were identified. They represented all the nine categories of stakeholders identified by Fontell and Heikkilä (2017) and the number was considered to meet the requirement for representing large complex

systems which had to consist according to Scharmer (2018) of 10 to 14 people that can be invited to represent a stakeholder group. The network was hereafter invited to a face-to-face workshop and to fill in an online survey to determine stakeholders' profile, interest and knowledge about the circular economy. 14 stakeholders answered affirmatively (52%) and based on their responses, the researchers were able to extract the following preliminary findings: fist, all nine stakeholders' categories as defined in the circular network diagram (Wicher et al., 2017) were represented. Some stakeholders belonged to multiple categories and accomplish varied actions, especially in terms of ownership and roles in the ecosystem (Fontell and Heikkilä, 2017; Scharmer, 2018). Second, when the stakeholders were invited to mention the reason for attending the face-to-face workshop, they referred to the following: learning about the circular economy (9 out of 17 answers) and networking (6 out of 17 answers). Some of the stakeholders offered more than one answer.

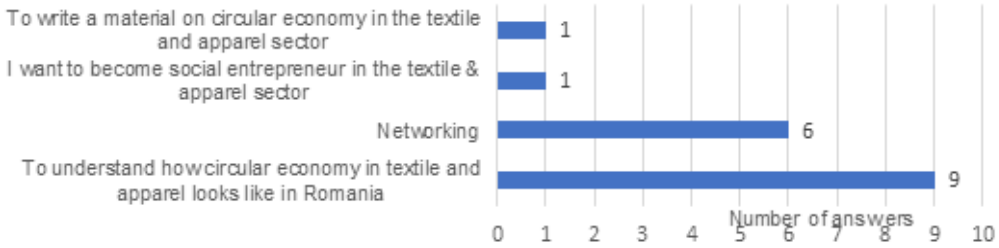

Figure 5. **Respondents' interests in attending the workshop**

Source: Authors' own processing.

Ten of the 14 respondents attended the workshop. The number met the requirement of group size (10 to 14 according to Scharmer, 2018) when representing large complex systems, and all nine categories were represented as seen in figure 6. Some stakeholders belonged to multiple categories and can accomplish varied actions, especially in terms of ownership and roles in the ecosystem (Fontell and Heikkilä, 2017).

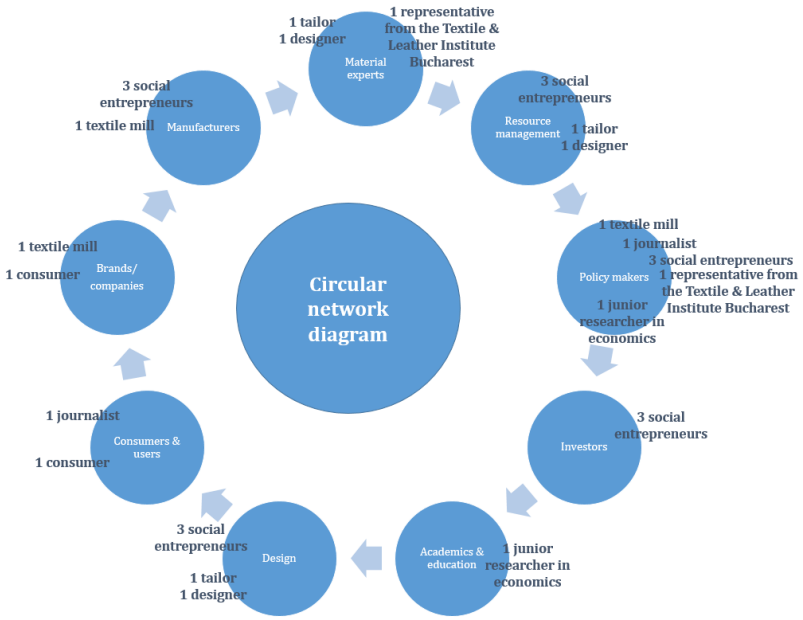

Figure 6. **Workshop participants' profile**

Source: Authors' own processing

Using the world café method, in preparation for validating the assumptions formulated, the researchers addressed three questions to the group. The participants,

split into three teams, were invited to reflect on each of the questions and write their answers on a flipchart.

The first question addressed the researchers' first assumption:

A1: There is a low interaction between the actors of the textile and apparel circular ecosystem and low visibility of what social entrepreneurship stands for in this industry and where they are situated in the value chain.

Q1: What is your experience with social enterprises active in the textile and apparel industry in Romania?

The answers were transcribed in English in table 1.

Table 1. *Visibility of social entrepreneurship in the textile and apparel sector*

Question	**Answers**	**Frequency** (how many of the three teams mentioned each answer)
What is your experience with social enterprises active in the textile and apparel sector?	We don't know their activity.	2
	I have experience because I did a journalist investigation and I have a list of them.	1
	I am a consumer of the products created by social enterprises because I identify with their mission, the quality of the products, they bring added value to the local community.	1

Source: Authors' own processing.

The answers revealed there is little visibility for social entrepreneurs in the textile and apparel sector among other actors in the ecosystem: "We don't know their activity" (two out of the three groups). The little visibility that exists is given by the consumers: "I am consumer of the products" (one of the three groups mentioned it) and mass-media: "I did a journalist investigation and I have a list of them". However, mass-media is part of the wider system of circular economy and not as one of the actors directly involved in the circular process. These results corroborate with the researchers' first assumption. Social entrepreneurs are not necessarily seen as potential business agents by other actors in the ecosystem, rather they are acknowledged for their products (validated by the consumers) or for their social cause (validated by the community). This does present itself with a problem since 57% of the revenue streams of social enterprises come from trading goods and services to other businesses and final consumers (Staicu, 2018).

Another question addressed the second assumption.

A2: Currently, each actor of the textile is seeing the world through the lens of their business agenda with not a lot of interest for what the other actors from the value chain are doing.

Question 2: What are the challenges in the textile and apparel industry you are facing with in Romania?

The answers were transcribed in English in Table 2.

Table 2. *The challenges of the circular economy ecosystem applied to the textile and apparel sector*

Question	Answers		Frequency (how many of the three teams mentioned each answer)
What are the challenges in the textile and apparel industry you are facing with?	Workforce	The diminishing number of qualified workers (lack of schools/education and teachers/specialists).	2
		Lack of opportunities to specialize.	2
		People's negative perception on the domain.	1
	Legislation	No support from the public authorities.	3
	Waste management	Lack of entrepreneurs dealing with waste.	2
		Lack of information about entrepreneurs working with waste.	1
		Lack of centers to collect and process textile waste.	1
	Local production of yarn, fibers, fabrics	Lack of it.	1

Source: Authors' own processing.

The answers revealed that the challenges addressed four large categories: workforce, legislation, waste management, local production of yarn, fibers and fabrics. Going deeper and looking at the challenges identified for each of the four categories, there is a lack of awareness around what circular economy is and how it applies to the textile industry. This is an indication of "a silo mentality" (Senge, 2006) that so often blinds stakeholders from viewing the whole ecosystem that they are part of and corroborates with the researchers' second assumption. Interestingly there was an expressed interest in the waste actors which are reffered to as "entrepreneurs dealing with waste" and "centers to collect and process textile waste" without being divided into specific methods to handle waste. It is possible that there are no other constraints apart from the ones described by the stakeholders, but that is highly unlikely in a system where there is no official functional mechanism to stimulate circular economy given the late adoption by the Romanian government of the National Waste Prevention plan (Ministerul Mediului, 2018).

The answers revealed also there is a good understanding of the common pains and problems that are affecting everyone. For some of the participants the awareness of interdependency showed up in their acknowledgement of constraints (Rahman, 2002): the diminishing number of qualified workers was connected to the lack of schools/education and teachers/specialists. Finding the commonalities offered a meta-view of the industry and made visible the chain reactions that do show just how interdependent stakeholders are. However the word "lack" which appears 7 times out of 13 responses implicitly demonstrates there is a lack of positive perceptions of what being part of the textile circular economy means: there is not a felt sense of belonging to

a larger business community within a common industry that shares a common market/goal, so in a sense everyone is out for their own interest. This corroborates with our initial assumption. The usage of this word also demonstrates what happens when there is a weak sense of connection within a system. Fragmentation, isolation means that stakeholders feel the full-blown impact of problems, but have little faith in their ability to address the problems (Brouwer, 2015). The comment about not having a lot of offers expressed as "lack of information about entrepreneurs working with waste", implied the need for a better connection between existing stakeholders and social entrepreneurs that do recyling or upcycling. It could also mean that there is a need for more actors to serve this function of connecting the communities.

The last question addressed the third assumption:

A3: By creating a workshop to "re-member the big picture of the textile industry" (Whittington, 2016) that will move the awareness from the individual interests to the group interests, that the new systemic awareness and perspective of the whole value chain will stimulate dialogue and create interest and potential opportunities for social entrepreneurs.

Question 3: What does it mean for you "circular economy" and how does it look applied to the textile and apparel industry in Romania?

The answers were transcribed in English in Table 3.

Table 3. *The big picture of the textile and apparel sector in the circular economy context*

Question	**Answers**	**Frequency** (how many of the three teams mentioned each answer)
What does it mean for you circular economy and how does it look applied to the textile and apparel industry?	I don't know what it means.	1
	Lack of offers to recycle waste.	1
	Fast fashion phenomenon.	1
	Waste - raw material - processing - use (in a circular flow)	2

Source: Authors' own processing.

The answers revealed there is a poor understanding of how the circular economy applies to the textile and apparel sector. This was acknowledged by participants themselves through answers such as "I don't know what that means". The overly simplified description of a circular ecosystem being "Waste, raw material, processing, use (in a circular flow)" which was validated by 2 of the 3 groups can also be an indication of lack of deeper knowledge of the system. These answers offer a snapshot of how different stakeholders understand the circular economy in the textile and apparel sector in Romania, and also offer a starting point in the conversation about moving from the current picture of the ecosystem to a desired one.

The validation of the third assumption continued in the third part of the workshop. The first step in addressing the third assumption, which supports the goal of the research "to acknowledge the elements which oppose or ease the transition from linear to circular economy in the textile and apparel sector in Romania by identifying current and desired interactions among the ecosystem's stakeholders", was to ask the participants to work in pairs and mark the stakeholders on the circular economy map. In marking the stakeholders' interactions, the framework in figure 4 was considered to be the most practical one for the space and number of participants. During this activity there was expressed discontent from participants that were saying that „they know all of

this" and asking what the point of such an activity was. This shows that this level of cognitive understanding about the stakeholders' relation to a circular ecosystem, although new in a sense, for these participants had not done this exercise before, does not necessarily shift their perspective. Appealing to information that they already know maintains people in their own mental model (Senge, 2006). In this case, it meant that even though the people do have an intellectual understanding of the circular supply chain and of the different stakeholders being connected with each other, that is not enough for people to truly grasp the significance of interdependence and in practice it maintains an artificial distance, a silo mental model to which Senge (2006) refers as systems ignorance.

The second step in identifying current patterns and exploring opportunities within the textile and apparel sector was to set up a structural constellation with the main actors. Structural constellations are a way in which we can deal with complexity. Complexity science is not an applied science; it is a science that leads to insights or understandings that have been applied to real-world problems (World Economic Forum's Global Agenda Council on Complex Systems, 2013). In this case, representing different stakeholders from a highly complex ecosystem, such as the textile and apparel sector, allowed the researchers to see the manifestation of a complex web of relations and the subsequent dynamics. Using this framework for addressing complexity achieved two important things: participants had a sense of "we are all in the same boat" and it offered valuable insights about what is causing lack of connection among the stakeholders and what are the steps towards better in the current relational system.

The current dynamics within the textile and apparel industry was showcased by the positioning of the actors on the circular economy framework. This immediately showed that social entrepreneurs were not represented in the structural constellation, confirming their lack of visibility in the industry and corroborating with the researchers' first assumption. Nevertheless, the event was hosted by a social enterprise activating in the textile field and people were invited to interact with the space and the products made from upcycled materials. This indicates that although the different actors in the textile industry do not really know what social entrepreneurship stands for in for this industry and where they are situated in the value chain, social entrepreneurs do have their place in their value chain and it is a place from which they can support the movement towards a circular economy.

When the representatives for different stakeholders were asked what they noticed from their current position within the structural constellation, the responses invariably showed their orientation towards their own agenda. These findings were supporting the second assumption of this research "Currently, each actor of the textile is seeing the world through the lens of their business agenda with not a lot of interest for what the other actors from the value chain are doing". Their participants comments supported the assumption: The fashion industry representative: "I am setting the tone"; The raw material supplier representative: "I am caught between the designers and the manufacturers – they all want different things from me and I don't know what to do about this"; The manufacturing representative: "I am interested in the consumer". These insights are a very good starting point for creating a strategy to support the movement towards a circular economy, as they offer a good indication of the leverage points (Senge, 2006) within the system.

The step towards a circular economy was showcased by inviting the representatives to make a step towards better, towards a circular economy. By taking just one physical step from their previous position, the representatives were now standing in a circle, as the metaphor for a circular economy. In taking this step, the

participants had to overcome the obstacles they signaled as blocking their movement towards change (fig. 7) between step 1 and 2.

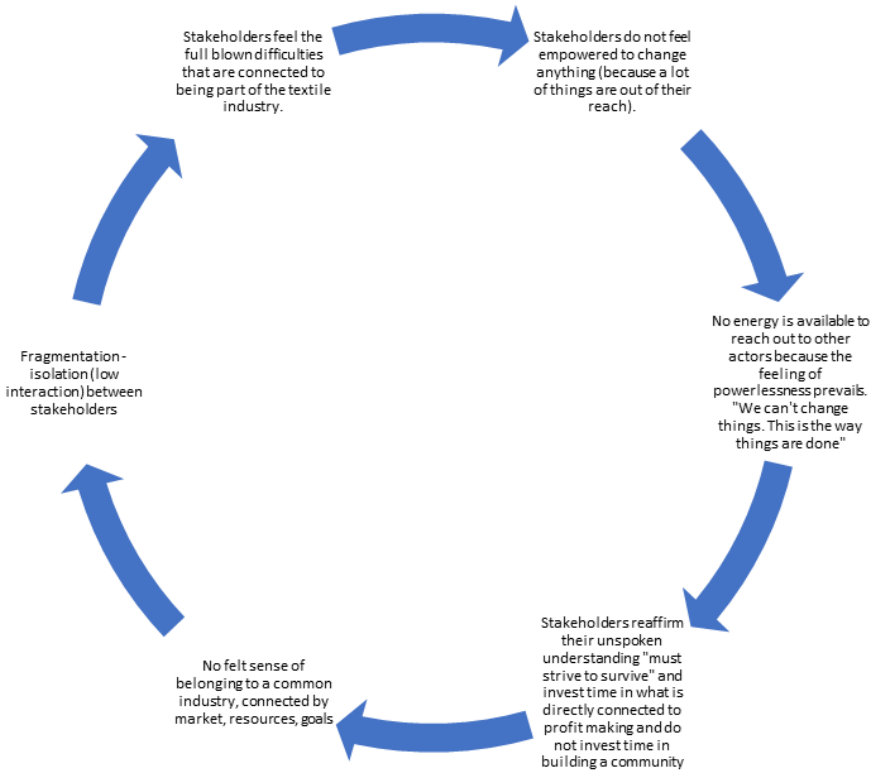

Figure 7. ***Map with the elements which hinder or facilitate the transition to circular economy as signaled by the participants***

Source: Authors' own processing.

The step towards better made possible three important shifts:
(1) The public authorities became part of the circle wanting to support change, but needing guidance from the other stakeholders because public authorities lack textile related expertise; (2) The waste management approached the consumer and the fashion industry and a meaningful conversation about responsible consumption and eco-friendly design became possible;
(3) The education system representative wanted to connect with the consumers through the NGOs and the press to inform about the need for more sustainability in the textile industry.

Taking this step and speaking from their new position within the constellation about what becomes possible allowed people to have a direct felt experience of "we are all together in the same boat". The step towards better and the generative discussion that followed immediately produced a shift in the way participants related to each other and to the whole experience. There was an increased level of interest from participants, more dialogue and an expressed willingness to stay connected after the workshop. The participant representing a manufacturing company said that she needs to get out of the office and connect more with stakeholders from the industry. Participants exchanged contacts and offered feedback, saying that the workshop experience managed to shift their perspective from an individual interest to a group perspective. This felt sense of connectedness between different actors from the textile ecosystem that emerged out of the final exercise was really what the authors envisioned in their third hypothesis - that "re-membering the big picture of the textile industry" (Whittington, 2016) will move the

awareness from the individual interests to the group interests, that the new systemic awareness and perspective of the whole value chain will stimulate dialogue.

Conclusions, limitations and recommendations

The goal of this research was to acknowledge the elements which hinder or facilitate the transition from linear to circular economy in the textile and apparel sector in Romania by identifying current and desired interactions among the ecosystem's stakeholders. The two researchers mixed their practical experience (one as social entrepreneur in textile and apparel economy in Romania and the other one certified master practitioner in business constellations, systemic coach and learning facilitator) with scientific literature evidences in designing this research.

The core assumption formulated by the researchers that "a weak circular ecosystem applied to the textile and apparel sector in Romania is determined by poor interactions among the stakeholders" was validated. The obstacles in making the circular economy "work in practice" identified through this research are the following: (1) a vicious circle (Gharajedaghi, 2011) of different actions leading to a consolidation of the mechanisms that feed isolation and prevent a move from "silo mentality" to collaboration; (2) the absence of collaborative spaces where people from the textile industry can meet, connect and explore the various opportunities to collaborate. In absence of the felt sense of "we are all together in the same boat" that is naturally stimulated by collaboration perpetuates the vicious circle. The unspoken assumption that connecting with people from the industry does not support profit-making and hence is a waste of time keeps being validated. This in turn prevents a natural consolidation of a professional community within the textile ecosystem that could foster a lot of sustainable growth and innovation; (3) lack of general awareness on "circular economy and textile and apparel" and its mechanisms. The first place a person goes to look for information is nowadays the internet. Therefore, if someone wants to understand how circular economy applies to the textile and apparel sector, goes go on Google search engine and uses keywords related to "circular economy textile and apparel Romania". The research will return about 40 mentions. Such a small digital footprint is a good indication of the fact that this subject is not part of the collective discourse at the moment and needs more attention. This is supported also by the results of the online survey the participants filled in: the first reason for attending the workshop stated by the participants was "learning about the circular economy" (9 out of 17 answers).

Participants gained insights into what a circular economy ecosystem is, interacted in reflection sessions which may have deepened their perspective on the interactions they have or may have with other stakeholders and reflected on their development needs in the context of the circular economy.

The research validated the initial assumptions that there is a low interaction between the actors of the textile and apparel circular ecosystem and low visibility of what social entrepreneurship stands for in this industry and where they are situated in the value chain. It also showed that, although currently each actor is seeing the world through their own lens and business agenda, with not a lot of interest for what the other actors from the value chain are doing, this attitude quickly shifts once stakeholders have a felt sense and "re-member" (Whittington, 2016) that everyone in the industry is in the same boat. The space of collaborative dialogue naturally moves the awareness from the individual interests to the group interests. As the researchers observed in practice, having more systemic awareness motivates people to stay connected and develop opportunities to collaborate and tackle common struggles together. In a sense the biggest hinder and also the biggest opportunity for the transition to a circular economy

lies in the hearts and minds of people in the industry. Any sort of solution or policy in the field of circular economy needs to support the process of reconnecting people to the felt sense of belonging and being together in the same boat. That in itself motivates people and raises the awareness of each and every stakeholder for being responsible to do their own steps towards a more integrated and sustainable value chain.

This study comes with some limitations. The research was founded on a small set of data: 10 stakeholders. The location of the participants was limited to stakeholders living in Bucharest, Romania mainly due to the workshop location set in Bucharest. Furthermore, the research methodology was based on qualitative research methods only. The findings are subjective in nature and reflect the views of selected individuals. It is recommended that more qualitative, quantitative, and mixed-method studies be used to explore the textile and apparel actions towards circular economy. Empirical research on practices in this field should be conducted and synergies should be explored in order to understand how to meet in Romania, the European Union objective of waste being 'managed as a resource' by 2020 (European Environment Agency, 2018).

Given the 2018 European Union legislative proposals for waste the coerciveness to implement the European law, Romanian decision-makers and other stakeholders will have to act and prove movement towards the European goals. Therefore, an iteration of this process is needed by the end of next year to understand if changes in practices and behaviors have happened and more attention needs to be paid to social entrepreneurs active in the textile and apparel sector, invisible for the moment to the ecosystem, as the findings showed.

The two researchers should share their context-specific knowledge on national and international levels and contribute to spreading indigenous knowledge combined with practices internationally, as this subject of mapping the textile and apparel circular economy ecosystem might be of use in other countries where such practical approaches have not yet been developed.

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