



# Risk Sharing in the Circular Economy

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## Abstract

*Activities and research in recent years have clearly shown that the emergence of the circular economy is an economic, rather than only environmental approach (Yuan, 2006; The Ellen MacArthur Foundation, 2012, 2015). Consequently, it becomes crucial to first consider its unique risks and promises for business and economics, and then propose foundations for its adoption as a viable alternative to traditional models. The goal of this article is to research how circular-oriented small and medium-sized enterprises (“SMEs”), due to their unique values and principles, would be able to share risks related to market activities. For this research, six representatives from various circular-oriented SMEs were interviewed based on several relevant risks related to their business models, and they described how they mitigate these risks. The findings revealed a common pattern which was also examined by experts in the circular economy. The results show that a network structure, where companies from related industries and who share a common goal, work together and actively engage customers in companies’ activities, can more effectively share risks. These networks need to be highly transparent and based on trust rather than purely on formal contracts.*



## I. Introduction

Since the industrial revolution, the linear economy has been the most dominant model in our society (Grübler, 1994; Bonciu, 2014). Nowadays it is becoming increasingly recognized that the linear model (“take-make-dispose”), is responsible for producing waste, is unsustainable and results in the devastation and exhaustion the Earth’s natural resources (Yuan et al., 2006; Fernandez, 2007; Pearce and Turner, 1990). As a result of resource degradation, procurement prices have been steadily increasing (The Ellen MacArthur Foundation, 2015a). Knowing that the traditional economy fully exploits resources and causes many social problems, it is clear that the linear business model is no sustainable (Preston, 2012; The Ellen MacArthur, 2014; Bonciu, 2014). The circular economy has been defined by The Ellen MacArthur Foundation as an alternative solution and has the potential of replacing the traditional linear business model.



## II. Economic Perspective on Risk Sharing

From the beginning of the 1970s, a major interest of economics scholars were alternative governance forms - both within and between firms and the market, as one of the key aspects for the organizational success and minimization of transaction costs and risk sharing (Chiles et al., 1996). Governance form relates to the decision on whether to buy from the market, make or form alliances. It had been perceived as a crucial decision for every firm as it could create lots of damage and losses for organizations if incorrectly chosen, but also an area where they would be able to share risks if they would create a successful joint venture or other form of partnership (Williamson, 1979; Chiles et al., 1996). In a traditional economic system, when companies decide to share risk, various important factors are considered. These traditional factors stem from early research in the economic field. Based on traditional

competitive market theory, Coase (1937), Williamson (1979), Buvik, & Reve (2001) and Hennart & Zeng, (2005) discussed different aspects that became determinants for risk sharing. For example, by choosing adequate governance modes and contracting methods, companies become jointly responsible for asset-specific investments and they are able to share risks. However, even though companies have the possibility of signing extensive contracts, due to the existence of unforeseen contingencies, they are not able to predict all potentially harmful situations. Companies are often forced to make quick decisions based on incomplete information (Xiao and Yang, 2009), wherein the existence of bounded rationality impedes their choices (Williamson, 1985). Due to bounded rationality, even when actors try to make rational decisions, depending on product quantities, they will be constrained by uncertainties, which can then lead to different risks. Therefore, companies become less inclined to make asset-specific investments, which in general results in a lower welfare perspective for the overall economic system (Hendrikse & Bijman, 2002; Ruzzier, 2012). Transaction Costs Economics ("TCE") assumes that when asset specificity for certain investments is high, then it is more likely that companies integrate vertically so that the whole supply chain of a company is owned by that company (Buvik & John, 2000). On one hand, such integration saves the company the costs of an insufficient collaboration, however on the other hand, the company needs to handle all encountered risks by itself.

As an example from a traditional industry, Tsay (2002) studied risk sharing predicated on manufacturer return policies wherein the manufacturer took responsibility for over-supply. In companies based on a traditional exchange, buyers use their bargaining power to influence suppliers to support their own, private objectives. When manufacturers take on surplus risk, this is perceived as a risk-sharing method wherein the retailer can return unsold articles back to the manufacturer. In the case of the circular economy, however, additional issues play a role and make the situation more complicated to deal with. At the moment it would be too risky for a circular small, or medium-sized manufacturer to take entire responsibility for something as comprehensive as say, managing the whole circular supply chain on their own. The first issue is that demand and supply for circular-oriented product/services is still quite low and implies high production costs. The second issue is that there are operational

and legal constraints that make reverse logistics processes difficult to cost-effectively manage (Preston, 2012). A further complication is that the appropriate end user and partner incentives are not currently in place to facilitate this reverse logistics function.

Moreover, De Man & Friege (2016) pointed out that the major risk facing companies oriented in the circular economy is related to marketplace activities. They cite two major reasons for why economic circularity may create rigidities and dependencies that are difficult to establish and manage in a market economy. The first reason is that quantities are processed and products produced in traditional markets based on variable market demand. Secondly, market imperfection leads to the continuous, regular appearance and disappearance of companies from the competitive landscape.

As already mentioned above, the traditional economic approach currently offers different possibilities for how companies can share risks, e.g. forms of joint ventures or other forms of cooperatives. Recently however, other unconventional structures have been observed, where companies more susceptible to downside risk, are able to risk share. These could serve as better options for the Circular Economy system. Examples include collective insurance (e.g. Brood funds) and banks offering flexible financial systems allowing companies the opportunity to access zero-rent loans, while enabling an environment where contributing partners collectively support each other. Though this is a good start, there is still a need for more effective ways for companies to risk share.

### III. The Role of Small and Medium Enterprises in Risk Sharing

In creating a structure that allows companies to share marketplace risks, small and medium enterprises ("SMEs") can play a crucial role. In the Netherlands, the majority of circular enterprises are SMEs possessing an innovative mindset and a drive for new business possibilities. They invent and create new workplaces, and are seen as a motor for the future economy (Storey, 1995; Sullivan-Taylor, 2011). Because they are constantly challenged to create strategies that balance the need to remain profitable while maintaining their mandate to drive sustainability within themselves and their processes, they still manage to compete fairly in the marketplace (Iles et al. 2013). By choosing to adopt this unconventional approach, circular-oriented

SMEs face unique circumstances and the question becomes how should one organize a well functioning circular economy to enable companies to share risk from “self-imposed” constraints and market imperfections, so as to remain profitable and ideally show growth? This article assumes that CE companies are more sensitive to particular risks when compared to traditional companies (Van Gils, 2005), however different tactics exist for how they might share these risks. Though each company is unique and their particular situations should not be considered as universally applicable, identify common patterns have been identify between how specific risks they face can be shared.

#### **IV. The Circular Economy**

The circular economy has been already studied from different perspectives by scholars and experts in the field of sustainability. Linder and Williander (2015) opinion about the CE is aligned with economic perspectives as a strategy for companies to achieve effective growth. For others, this new economic system offers to not only maximize economic growth, but also preserve social and environmental values (Lieder and Rashid, 2016, Zhu, 2000; Greyson, 2007). One of the characteristics of the circular economy is the ability to exchange materials like energy, water, and information etc., as one entity’s waste becomes another’s input (Pearce & Turner, 1990). Furthermore, in this circular approach, all parts of the economic system work together in order to achieve a collective benefit that is higher than the sum of the individual benefits each entity would realize if operating on their own (NDRC, 2004).

The Ellen MacArthur Foundation (2013a, p. 22) defines the circular economy as, “an industrial system that is restorative or regenerative by intention and design.” This definition depicts the importance of shifting from traditional “end of life” product approaches towards a cradle-to-cradle approach; which only allows the use of renewable energy sources while eliminating toxic chemicals and waste by innovating the smart design of products, systems, and business models. In this sense, the circular economy represents a new vision for energy and resource usage, value creation and entrepreneurship. From an economic perspective, the majority of research on the Circular Economy was developed from theories based on the transformation of economic structures and business rationales with a main focus on “product as a service” (Lieder and Rashid,

2016). The underlying principles of this strategy are product life extension in order to minimize material and energy flows as well as to minimize the negative environmental effects of resource exploitation (Stahel and Reday-Mulvey, 1981). According to Stahel and Reday-Mulvey, the main objective of the Circular Economy is to create, preserve, exploit and restore the highest value of the product for the longest period of time. Using “a mix of tangible products and intangible services designed and combined so that they are jointly capable of fulfilling final customer needs” (Tukker and Tischner, 2006), it is argued that an increase in service-orientation, rather than product-orientation, will facilitate the design of systems with significantly lower environmental impact while maintaining economic growth.

#### **V. Perspectives for Risk Sharing in the Circular Economy**

Since the majority of circular-oriented SMEs are seen to be innovative, they often rely on different activities in production/supply chains, as well as other companies’ resources. Recent studies have shown that even though the new organizations are prone to high levels of uncertainty and often require asset-specific investments, vertical integration is no longer the rational choice for them as was traditionally explained by TCE (Holmström and Roberts, 1998, p. 92). Increasingly fast-changing and uncertain environments have, as a result, also increased the degree of interdependencies between partners. Though these interdependencies may seem to complicate the situation (Coase, 1937; Williamson, 1991), in the case of the circular economy, they can also offer new possibilities for inter-company risk-sharing. For example, thanks to open information exchange and collective decision making related to contingencies, companies can more precisely forecast demand. This accomplishes two goals. First, it diminishes the risk of over-production and the accumulation of “waste”. Secondly, this addresses consumer tastes to operate more responsibly and not overproduce. In situations of oversupply, collective responsibility could diminish financial losses to individual companies within the collaborating partnership. Moreover, the network structure enables the “second hand commodity” to be better and faster utilized when transferring ownership further down to the partners. However, in order to create such a collaboration, organizations would need to

collectively form a structure that would enable them on the one hand to share market risks, but on the other hand achieve common goals of value creation for all stakeholders (Post et al., 2002). This collaboration could be a network built upon inter-organizational pillars that goes beyond the traditional construct of pure competition that is mostly focused on self-protecting mechanisms. Strategic networks have been found to be one way of collaborating when companies are unable to rely on their own recourses and capabilities (Podolny & Page, 1998). Networks can have multiple forms wherein members occupy different positions among network value chains and possess various characteristics (Inkpen and Tsang, 2005).

When we think of networks, specifically as means for coordination, we can also refer to them as a specific form of governance. Williamson's (1975) work on various forms of governance over a 20-year span challenged the belief that markets are the only form of non-hierarchical coordination. As a result, networks were seen as either: a mixture combining market and hierarchical elements, or as a separate form of governance in and of themselves (see Powell 1990). Provan and Kenis' (2008) work looked at networks of three or more independent companies working together so as to achieve both collective and individual goals. When operating in the public sector, these networks may come about either through mandate or through contracts, however this 2008 work noted that these networks may also be initiated by the members of the networks themselves. As organizations working together towards common goals as well as their individual targets, Kilduff and Wenpin (2003) defined them instead as "goal-directed" as opposed to "serendipitous" or accidental networks. When these networks come together by joint design, they can become very complex structures which challenge the traditional explanations provided in both organizational and strategic management studies.

## VI. The Governance Structure

The governance structure, which emphasizes hierarchical control, can differ in incentive intensity, administrative controls and applicable contract law regime (Williamson, 1991). Mandell's (2001) work describing how different, contributed resources to a network create varying levels of power and influence within that network structure, supports the notion that even though networks rely on collaboration, traditional hierarchical structures

and relationships persist. Additionally, some degree of governance amongst these individual firms will be necessary and can help ensure network members work together, are mutually supportive, efficiently and effectively utilize contributed and acquired resources, and do not get embroiled in unnecessary conflicts. Even though the member firms are independent and will have varying levels of interactions amongst each other, utilizing institutional or authoritative constructs for collaboration so as to coordinate network actions and allocate resources, creates a resulting focus on governance. Provan and Kenis' (2008) research has described three forms of network governance: Participant-Governed Networks ("PGNs"), Lead Organization-Governed Networks ("LOGNs") and Network Administrative Organizations ("NAOs"). PGNs are the simplest of the three, as they involve no additional governance entities to be created/involved. As suggested by its name, this form of governance is conducted by the participating organizations themselves, without the need for separate entities. This may either take place through a formal process involving regular meetings among the organizations' representatives, or more informally through ongoing exchange between interested parties within the network. Though on the surface, PGNs may seem to be preferable from an equality perspective, this decentralized, collective self-governance has been experienced to be insufficient, and instead favours the need for lead structures. LOGNs tend to come about in vertical (i.e. buyer/supplier) relationships where there is size or power disparity amongst the network participants. Lastly, NAOs exist when a separate administrative entity is created to govern the network, its activities and the members. This structure does not eliminate direct interaction among the participants, however, NAOs play a central role in coordinating activities and helping preserve the longevity of their networks.

## VII. Partner fit

This notion indicates the degree to which partners share common characteristics (Douma et al. 2000). When companies decide to collaborate, finding the right partner is important for mitigating opportunistic behaviour and can increase trust levels due to the quality of the relationship (Saxton, 1997). This study assumes that network structures promoting a well-functioning circular economy would need to possess three types of fit: Cultural, Human, and Strategic.

Post et al. (2002, p.606) defined organizational culture as a, “blend of ideas, customs, traditional practices, company values and shared meanings that help define normal behaviour for all who work for a company.” Moreover, Park and Ungson (1997) defined it as a manifestation of the distribution of power and control, wherein openness, innovation intentions, and willingness to collaborate all play important roles. Partnering with other companies may endanger individual company culture (Carrillo & Gromb, 2007). This is because employees often possess strong beliefs about their own corporate culture, often rooted in the companies they work for. Therefore, depending on how close partners are, two possibilities exist for how to deal with different company cultures. In the case of loose forms of networks, companies may allow the cultures to co-exist. However, when partners form a close relationship, they may create one new culture based on the individual partners’ original cultures.

Moreover, the existence of openness and lack of culture rigidity allows employees to work creatively, where knowledge transfers freely throughout the company and enables a “shadow system” of the firm for exchanging and sharing ideas (Cook, 1999). Due to the specific values and principles that companies in a circular economy possess, having team members who share similar beliefs and culture would be a crucial element for network growth and sustainable relationships. Partnering amongst companies with differing strategic goals can be challenging since they may not fully understand each other. For example, one of the factors underlying TCE depicts difficulties in negotiation between contracting partners where there is a lack of common understanding about actions and states of a world where the parties have insufficient prior experiences (Hart, 1995). In order to combat market share issues from large, dominant players in a field, Chen and O’Mahony (2009) found as effective strategies, that when there is a good partner fit, CE networks compete by producing products viewed as uniquely authentic, or find success when they tap into an existing cultural sentiment against mass production (Carroll & Swaminathan, 2000; Carroll et al., 2002). The effect of possessing a common culture, shared goals and the right employees is so strong, it is even possible for circular oriented SMEs within the same sector to partner and share the competition risk resulting from having to go up against huge companies. By creating an “us” versus “them” or “oppositional” identity, Swaminathan and Wade (2001)

found that this mechanism allowed for more effective competition by smaller companies.

## **VIII.** Transparency

Transparency can be defined as an openness and willingness to share information. Barratt (2004) distinguishes, based on the active vs. passive nature of the activities, between information sharing and transparency. Transparency is a passive quality that relies on and is part of the organizational culture of an entity, which in turn enables information sharing. This type of sharing is critical to how a circular economy performs. As already mentioned, transparency and subsequent information sharing reduce information asymmetry and consequently help develop trust. This interrelationship between trust and transparency is effectively a self-reinforcing feedback loop, as Akkermans et al. (2004) show, where, as trust grows, so too does transparency and information sharing. Since contracting parties value sensitivity and confidentiality of information, the more private the information shared is perceived to be, the more quickly will trust levels be established amongst them. In order to share risks related to e.g. accurately forecasting market demand, companies need to be open and willing to share information with their partners.

## **IX.** Trust

Along with formal contracting, trust is another safeguard mechanism against opportunistic behaviour (Achrol and Gundlach, 1999). The theory of incomplete contracts states that it is very difficult to include all detailed information in a formal agreement due to the existence of contingencies and high costs required for creating comprehensive contracts (Hendrikse & Bijman, 2002). In this case, due to the incomplete nature of contracts, trust plays an important role, especially when companies decide to collaborate (Inkpen and Tsang, 2005). In describing trust, honesty and benevolence are key terms to define and consider. Deutsch (1958) and Larzelere & Huston (1980) similarly define trust as the degree to which a company feels that “its exchange partner is honest and/or benevolent.” To then trust another member’s honesty is reflected by one firm’s belief that their transactional partner is sincere, reliable, fulfills whichever obligations are assigned to their role in the network, and stands by their word (Anderson and Narus, 1990; Dwyer and Oh, 1987). Lastly, “benevolence” reflects the attribute that one’s trading part-

ner is interested in seeking joint gains, and that they have the former party's interests and welfare at heart. Anderson et al. (1987) and Crosby et al. (1990) claim that benevolent partners pursue long term group gains over their own immediate self-interests. With this in mind, they are not likely to take unforeseen actions that negatively impact the network (Andaleeb, 1995; Anderson and Narus, 1990). All these actions/beliefs act to increase trust within the system. Information asymmetry is the notion that knowledge is rarely the same among transacting entities. One generally possesses better or more complete information than the other. This asymmetry and existence of uncertainty increases transactional risk. However, this risk is mitigated by the existence and fostering of trust. Multiple scholars (Sahay, 2003; Akkermans et al., 2004) have posited that as transacting companies become more acquainted through continued interaction and communication, trust will be fostered and continue to grow. Akkermans et al. (2004) maintain that as the acquaintance period continues, levels of information asymmetry and mutual uncertainty decline at the same time as transacting habits become established and intra-firm behaviour becomes institutionalized. This, however, is a continuous process. Transparency and open communication are tools that further build trust as they remove potential misinterpretation or erroneous assessment of the counterparty's motives. For the highest levels of successful collaboration and intra-cooperation, as well as lower transaction costs, trust will need to be institutionalized (Inkpen and Tsang, 2005). By virtue of being a member of the network, it shows others that they should be considered to be trustworthy. Trust not only saves on transaction costs, but it also enables companies to share risks with their employees when signing employment contracts. For example, if they both sign "nonbinding contracts" they are not constrained by legal obligations. The worker is free to work for other employers and the owner can be flexible in periods of unforeseen uncertainty (Stiglitz, 1974).

## X. Methods

Data was collected through either face-to-face or via Skype semi-structured interviews. Additionally, one interview was conducted via phone call. All interviews were recorded wherein each interview was approximately an hour in length. Standard questions asked during the interviews were formed based on operationalization standards, and the opera-

tional construct applied for this study. The aim of the interviews was to gain deeper understanding of the phenomenon since there is an insufficient amount of academic research regarding inter-organizational risk-sharing components needed for this new economic approach, and also a limited quantity of economic theories applicable to this phenomenon. Furthermore, concepts addressed by this research are still vague and abstract, and therefore needed to be better explored.

## XI. Results

The empirical results show that collaboration plays a crucial role for risk-sharing within the circular economy. It has been found that within a network, companies can exchange information amongst themselves. During interviews, the interviewees claimed that collaboration offered companies much more than when they work apart. Such a structure would not only enable companies to work more effectively, but it would also enable companies to share risks related to uncertainty and market externalities. Currently, networks exist where circular-oriented companies exchange knowledge and contribute to research, however there are only a few examples of networks where circular-oriented SMEs collaborate at the operational level. Furthermore, empirical findings show that the circular economy is not only about connecting with companies from related sectors, but also with its consumers. One of the experts assumes the importance of the Internet when building such networks and sharing different risks. The governance structure is an inseparable element of every organization since every company is based on certain levels of hierarchy, and decisions are made based on the division of power. Also, the results of this study show that a proper governance structure is crucial for a network where circular-oriented SMEs collaborate. In general, related findings show high levels of similar positions for how a decision-making process should be organized in such network structures. Respondents claimed that a well-functioning network structure should be based on a democratic/collective decision-making process, with equal division of power rather than based on a highly formal structure. Also the size and/or resource contribution of a single partner shouldn't play a role in determining power-division. Also, a hierarchical structure would not work well in circular-oriented company networks because it could exclude some partners and make them feel less important. Moreover, the go-

vernance structure should not be based on strange rules and policies. Also the amount of participants should not be constrained. In addition to a democratic/collective governance structure, there is a need for strong leadership enthusiastic about new possibilities in the circular economy and not afraid to take risks.

Some respondents, mostly the representatives of the circular-oriented companies, admitted that they had been attracted to the circular economy because they were influenced by a person with a strong vision for the circular economy. Another important new insight related to governance structures was called, co-creation. The interviewees used this term to describe a decision-making process. In this study three types of partner fit had been found as needed elements for creating a well-organized network structure between circular-oriented SMEs: common culture, human fit and strategic vision. The results show that they all are important in such a structure and enable companies to share partnering as well as cash flow risks. Collaboration with partners who share a common vision can support them financially in the event of poor cash flow. From these three partner fit elements and common culture was the one most often mentioned during the interviews. Although the respondents comments were consistent with the assertion that common culture and strategic vision is needed for a well-functioning network, it was found that the circular economy network structure would require a human fit composed of employees with differing, non-common experiences and backgrounds. The circular economy networks need a different entrepreneurial spirit and innovative mindset. Also having a strategic vision was often mentioned as a common goal. Along with a common culture, partner fit and strategic vision, it was found that operational fit is also important for a circular-oriented network. Operational fit between partners is important for assuring that companies produce adequate outputs in line with circular economy principles. Next to the interpretation of common culture as sharing values and beliefs about the circular economy, respondents argued that it is preferable for collaborating companies to be from the same industry. For the well-functioning circular-oriented networks, companies should share the same culture and have the same goals, however it doesn't exclude companies that are not in line with the same principles. The respondents claimed that new partners would often be in the beginning of a transition, so they need guidelines and help in the

beginning, but if they share the same ambitions, they can become part of the network. Another respondents commented that as soon as companies see how much value such collaborations bring, they become more and more enthusiastic.

In this article transparency and information sharing have been defined as passive and active processes wherein the passive one is related to openness and having nothing to hide, and information sharing is an active one and has to do with the willingness and activities to share. The empirical results show that both aspects are crucial for a circular-oriented network structure. Information exchange is important when companies want to share risks related to customer demand. Although it is not always required to share sensitive information, the respondents maintain that sharing information with partners is always more beneficial than being only partially transparent. When partners exchange information related to the product and co-create, especially in niche markets, they can better predict demand. In order to share customer satisfaction risks, the majority of companies involve their customers throughout the whole process. Story telling is a very popular method to attract and satisfy customers. Respondents agreed that consumers have the right to know both the history and materials used for the products because this allows them to make conscious choices. By informing them that one product is made in a more sustainable way than another, this automatically promotes the circular economy, but most of all, shares risks related to customer dissatisfaction. Moreover, to share this particular risk, companies organize meetings where they innovate about the product/service they offer, which then saves them extra effort and time.

As it was already mentioned information sharing naturally protects against opportunistic behaviour. In a network where partners exchange information, word would spread very quickly if one of the companies were to play unfairly. However, so far none of the respondents have experienced such situations firsthand. Findings show that transparency helps with technological innovation risk-sharing. Collaborating partners feel responsibility for each other's success, since their own survival depends on their partners' performance. One respondent gave an example of how transparency helped in the sharing of risk related to not leveraging advancements in technology. Moreover, by exchanging information within a network, companies are well-informed about input costs and oppor-

tunistic behaviour is automatically diminished as a result. The results showed that the SME representatives generally possess high levels of trust and are less likely to consider signing legal contracts. They claim that legal contracts are expensive and not worth the effort, if not necessary. Because the majority of them are open to collaboration, they don't perceive other companies purely as competitors. Although, they would rather build trust than construct contracts, some respondents claim that it is still good to have some legal base.

Moreover, the findings show that respondents opt for honesty, realization of common interests and responsibility for realizing commitment. By building trust with their employees, interviewed circular-oriented SMEs were able to form more flexible work contracts (nonbinding contracts) with their employees, which shared the risks of uncertain demand. Employees benefit on the other hand by possessing more freedom and are not obligated to work for only one employee. Mutual trust is important when companies want to share demand risk with their customers. By making upfront agreements based on trust, circular-oriented companies can produce correct amounts of product and avoid financial loss. One of the respondents commented. This study assumed that circular-oriented SMEs are more prone to specific business risks due to a mismatch with the old, traditional economic system. Furthermore, due to the existence of multiple governmental and business legislations and their self-imposed principles, circular-oriented companies have more challenges to prospering in competitive ways. Because they are sensitive to unforeseen circumstances, they make conscious decisions regarding supply and demand, and so they would rather produce less than deal with oversupply. The interviewed representatives of the circular-oriented SMEs are currently not engaging in formal activities to share risks as they still mostly rely on themselves or their direct partners. Although these companies offer, to some degree, various strategies as to how to share risk, these are practiced on a small scale within their own group of partners.

## **XII. Conclusion**

For enabling companies to share risk, there is a need for an effective collaborative structure. Collaboration would enable companies to identify the risks, but most of all to realize the benefits of collective work. This paper proposed a network structure as one such

collaborative form. These network structures would need to have democratic, decentralized governance with high-levels of flexibility and adaptability. These elements would enable a better match with new flexible financial systems that are highly required for a well-functioning circular economy. However, there can be a conflict between the openness of a flexible financial structure and those creditors who require a fixed-term system in order to offset their lending risks and see who is to be held responsible and accountable. Therefore, the nature of entities investing in the circular economy need to align with the long-term nature of its principles, support flexible structures and should not expect short-term gains. Risk sharing by creating, for example, a collective ownership in the form of joint ventures or other cooperatives are not yet fully practiced by circular-oriented SMEs. They are also not suitable for enabling a well-functioning circular economy since this system requires flexibility and adaptability. In the transition towards the circular economy, companies would need to be able to join and disappear from the networks, therefore complicated ownership agreements constrain the system and could make it unworkable. A more suitable structure could be similar to the one introduced by Bitcoin, which is based on a block chain system that works without having any trusted central authority. Data can be accessed and used by every involved actor, which creates a high level of transparency and social control. This would mitigate the possibility of opportunistic behaviour, but most of all allows companies to make collective decisions. Furthermore, network structures could be diverse depending on the companies' industries, however they would need to be connected through one central coordinating system.

Risk sharing would be fostered and assured by forming networks based on partners common strategic goals, cultures and people interests. Collaboration within a network would need to be highly transparent with unconstrained information exchange. Necessary trust between partners would need to be developed and preserved in order to make the network successful for the long term. The circular-oriented SMEs interviewed in this study seem trustworthy due to their transparency and willingness for open information sharing. This helped them be more flexible in uncertain situations and enabled them to share supply and demand risk with their employees and partners by using, for example, nonbinding contracts. The circular

economy cannot be fully compared with the traditional economic system since companies in the circular economy are not only profit-driven. The enthusiasm and emotions observed while conducting interviews with the respondents, shows that a lot of satisfaction is derived, and most of all comes from being able to fulfill environmental and social goals; that financial profits alone are not enough. They are more open to collaboration, in contrast to traditional companies that act only based on competitive principles. As Tencati and Zsolnai (2008) argue, by applying open and collaborative attitudes, it is possible to create an economic structure which is not necessarily based on a traditional competitive paradigm.

Collaborative networks foster long-term mutual benefits, not only for direct partners, but most importantly, value for the whole business ecosystem (Mills and Weinstein, 2000; Jensen, 2001); and this should be a main objective for every company. Since it has been shown that risk-sharing provides tangible benefits, it would be beneficial for future research to examine, draw parallels and see how other industries (for example, collective insurance and collective space-sharing entities) have been able to successfully share risk. In future research, these new strategies of risk-sharing should be studied and considered by companies in the circular economy. In addition to the economic perspective, this article used an organizational viewpoint to show what the crucial elements for a collaborative structure are that would enable them to share risks in more effective ways. These are however, not exclusive to these collaborative structures and a more comprehensive study is strongly recommended.

### **XIII. References**

#### **XIII.I Literature**

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