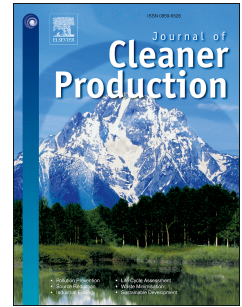


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Circular Economy and Paradox Theory: A Business Model Perspective

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## **Circular Economy and Paradox Theory: A Business Model Perspective**

### **Abstract**

Business models have become the subject of increasing attention amid management practitioners and researchers since the early nineties and business model innovation has emerged as a distinctive field of academic enquiry. More recently, business model innovation for the circular economy has caught the attention of business leaders and academics alike as the circular economy promises to deliver economic prosperity within ecological limits. Yet research on circular business models is nascent and the business literature gives limited attention to the challenges deriving from circular economy implementation. Using an integrative research approach and particularly, drawing on both paradox theory, and circular economy principles and loops, this article provides a preliminary, conceptual systematisation of the typology of organisational tensions in circular economy implementation. It also discusses the relevance of these tensions from a business model perspective. As a result, this article contributes to circular economy research wherein challenges are mostly analysed at the macro level and in the absence of a specific theoretical anchoring.

**Key words:** circular economy, paradox, business model innovation, corporate sustainability

### **1. Introduction**

How to create and capture value in the pursuit of a sustained competitive advantage is at the core of any business enterprise. This is why the concept of the business model, i.e. the ‘design or architecture of the value creation, delivery, and capture mechanisms’ (Teece,

2010, p. 172) of a firm, is the subject of considerable attention among scholars and practitioners alike (Foss and Saebi, 2017). Business models have also become themselves subject of innovation: established or emergent business models need to respond to the changes in the company's environments in the pursuit of superior organisational performances (Spieth *et al.*, 2016).

Firmly resting upon an interpretation of value under a purely commercial logic in its early days, according to which a value proposition is directed at paying customers and value is exchanged in the market and captured back in terms of profit (Teece, 2010), the business model (BM hereafter) concept has evolved incorporating a broader value logic including environmental and social aspects more recently (Dentchev *et al.*, 2018). Due to the magnitude of environmental degradation and social inequality, BM innovation for sustainability has emerged as necessary to progress towards a more environmentally and socially sustainable economy (Roome and Louche, 2016; Seebode *et al.*, 2012). Arguably, the transition towards a more sustainable economy cannot be achieved by the means of product and process innovation alone but rather via fundamentally altering the logic of value creation underlying current production and consumption systems (Roome and Louche, 2016; Wells, 2016). As a result, BM innovation for sustainability has become a distinct area of academic enquiry and has also caught the attention of management practitioners.

Within the broader field of BMs for sustainability, attention towards BMs based on circular economy principles is also growing. This is the case because the circular economy (CE hereafter), by replacing linear operating industrial models with cyclical, closed-loop production systems based on the no-waste principle existing in nature, has the potential to address the severe shortcomings of linear production and consumption systems (e.g., materials and energy losses, dependence on scarce resources, exposure to resource supply

and resource price volatility, planned obsolescence) (Cooper, 2017; Hopkinson *et al.*, 2018; Ilic *et al.*, 2018). Not surprisingly, circular-inspired innovations are emerging across some manufacturing industries (Confente *et al.*, 2019), including textiles (Franco, 2017), construction (Leising *et al.*, 2018), electronics (Hobson *et al.*, 2018) and automotive (Ranta *et al.*, 2018).

Yet, the uptake of circular principles within the business community is rather slow (Babbitt *et al.*, 2018; Fehrer and Wieland, 2020; Parida *et al.*, 2019). A reasonable conjecture about the reasons why this is the case is that such a transition is confronted with many practical challenges (e.g., regulatory, technological, cultural, market and organisational) (Kirchherr *et al.*, 2018; Tura *et al.*, 2019). These are described as ‘soft’ and ‘hard’ barriers (de Jesus and Mendonça, 2018), investigated in the absence of a specific theoretical anchoring and - apart from few exceptions (e.g., Oghazi and Mostaghel, 2018) - are not analysed from a BM perspective but rather often categorised at the macro, meso and organisational levels (e.g., Tura *et al.*, 2019). By contrast, this article makes use of the ‘paradox lens’ (Smith and Lewis, 2011) to highlight organisational tensions that are likely to stem from the implementation of CE principles. It also illustrates the relevance of these tensions from a BM perspective and so in terms of value proposition, value creation and delivery and value capture.

Paradoxes are defined as ‘contradictory yet interrelated elements that exist simultaneously and persist over time’ (Smith and Lewis, 2011, p. 382). Paradox theory has received some application in the corporate sustainability literature (Hahn *et al.*, 2018; Ivory and Brooks, 2018) and only very recently has appeared in the sustainable BMs and CE literature (e.g., Daddi *et al.*, 2019; van Bommel, 2018). Particularly, this article asks: *which paradoxes are likely to emerge in the process of CE implementation?*

The remainder of this article is structured in the following way. Section two brings together the key constructs of this research and builds its conceptual framework. Particularly, it sketches the reasons why CE thinking and circular business models (CBMs hereafter) are becoming salient in the context of the transition towards a more sustainable economy and their evolution in the literature. Additionally, it introduces the concept of paradox and synthesises paradox theory in management, corporate sustainability, sustainable BMs and CE studies. Drawing on Smith and Lewis's (2011) typology of organisational paradoxes, section three evidences which of these paradoxes are most likely to emerge when CE principles and circular value creation loops are implemented in practice. It also discusses the relevance of these paradoxes from a BM perspective. Finally, section four summarises the article research contribution and managerial implications. It also suggests how this research can advanced with future studies.

## **2. Building the conceptual framework**

As briefly stated in the introductory section, the study of the challenges associated with CE implementation is still limited and mostly developing as a-theoretical. Therefore, rather than reviewing extant literature, this article seeks to produce a preliminary conceptualisation, an approach deemed appropriate when the research is confronted with newly emerging topics (Snyder, 2019). This so-called integrative research approach bridges perspectives from different fields to promote knowledge building or new theoretical frameworks (*ibid.*). Drawing on both paradox theory, and CE principles and loops, this article provides a conceptual systematisation of the typology of organisational tensions in CE implementation as well as discussing their relevance from a BM perspective. Sections 2.1 and 2.2 emphasise the need for a theoretically grounded investigation of the organisational tensions in CE implementation and introduce paradox management theory highlighting the suitability of this

theory within the context of CE research. The suitability aspect is particularly relevant because the successful integration of two different domains requires that there should be: a) a clear link between the two for a constructive dialogue to be established and, b) compatibility between underlying assumptions (Mayer and Sparrowe, 2013).

### *2.1. Circular economy and circular economy implementation: A business model perspective*

The CE - a production and consumption paradigm for achieving sustainable development (Bansal, 2019) – draws on a number of different schools of thought as highlighted in extant literature (e.g., Geisendorf and Pietrulla, 2018). As an economy nested within ecology, aiming at eliminating the concept of waste and offering opportunities for innovation and growth (EMF and McKinsey, 2012), the CE is the subject of an ever-increasing number of academic publications, introduced in national and supranational policies in the pursuit of prosperity within ecological boundaries as well as gaining prominence in the corporate arena. This is not surprising considering that ‘in providing a unifying framework that can solve the challenge of decoupling growth from environmental impact, understood and implemented correctly the circular economy is a genuinely systemic – and potentially transformational – approach; it is radical new models like these have the potential to shift the economy from an incremental path to a revolutionary one’ (Lacy *et al.*, 2019, p. 518).

Preserving and enhancing natural capital, optimising resources productivity and fostering the elimination of all negative environmental externalities associated with production and consumption systems, are the three main principles that underline CE thinking (EMF *et al.*, 2015). A fundamental step to progress towards a CE is BM innovation. This is clearly stated in one of the most influential CE definitions according to which the CE can be conceptualised as ‘an industrial system that is restorative or regenerative by intention



and design [that] replaces the end-of life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impairs reuse and aims for the elimination of waste through the superior design of materials, products, systems, and within this, **business models**' (EMF and McKinsey, 2012, p. 7). Since the BM describes 'the rationale of how an organisation creates, delivers and captures value' (Osterwalder and Pigneur, 2010, p. 14), a transformation of existing structures or the emergence of entirely new ones is required to gain what has been termed as 'circular advantage' (Lacy and Rutqvist, 2015).

Three are the most common and successful BMs for capturing value in a CE: *resale*, *internalisation* and *performance-based* (Hopkinson *et al.*, 2020). *Resale* consists of reintroducing products back in the market 'as if new' with a low cost advantage to the end customer; *internalisation* consists of adopting circular practices upstream in the supply chain or within production processes to improve cost effectiveness and resilience against raw materials price volatility without the need to communicate the circular element of the offer to the customer; *performance-based* BMs capture value through pay-per-use revenues systems with customers benefitting from reduced upfront costs and manufacturers from control over the product, components and materials during the usage cycle (*ibid.*).

CBMs have attracted the interest of corporate leaders as source of circular advantage and become the subject of scholarly research (Lüdeke-Freund *et al.*, 2019), wherein categorisations as well as analyses of empirical cases have been developed (e.g., Hopkinson *et al.*, 2018; Lüdeke-Freund *et al.*, 2019). Yet CBMs literature is only in its infancy (Diaz Lopez *et al.*, 2019) and further research is needed, especially to understand the challenges associated with implementation (Panwar and Niesten, 2020; Salvador *et al.*, 2020). This would be also beneficial from a practical point of view since CBMs implementation, despite

sounding promising, is not progressing rapidly (Kristensen and Mosgaard, 2020; Rosa *et al.*, 2019) with Bianchini *et al.* (2019) arguing that ‘there is a big gap between CE business model design and implementation’ (p. 2). Current CE research mostly reflects environmental and engineering angles and therefore, studies exploring managerial and organisational issues are certainly needed and would complement current perspectives in the CE scholarly field (Khitous *et al.*, 2020). Why the uptake of CBMs is slow requires both a more fine-grained investigation beyond the purely attribution to different levels of challenges, and a better theoretical grounding (Stål and Corvellec, 2018). Particularly, the implementation of CE principles raises a number of organisational tensions but the business literature seems to neglect these (Lazell *et al.*, 2018) and thereby some exploration is needed.

To address this relevant research void, this article investigates organisational challenges in CE implementation under the lenses of ‘paradox theory’ (Smith and Lewis, 2011). Why paradox theory is suited to this task can be explained in the light of the characteristics of CE thinking and the level of complexity inherent to BM innovation for circularity. The CE concept, like paradox theory, relies on systems and complexity thinking (EMF *et al.*, 2015). Additionally, since the CE is viewed as a ‘systemic’ and ‘revolutionary’ approach for decoupling economic growth from further pressure on scarce natural resources (Lacy *et al.*, 2019, p. 518), BM innovation for circularity is likely to raise a number of organisational paradoxes. As witnessed in recent literature ‘the shift to a CE is not straightforward, and the current transitional phases may collide against many entrenched features of the highly successful and much older linear economy model’ (Hopkinson *et al.*, 2018, p. 91). Furthermore, as any BM underpinned by a multiple value creation logic is a pertinent archetype of paradoxical tensions (Schneider and Clauß, 2019), the multiple value creation logic inherent to CBMs makes paradox theory pertinent in the study of the challenges associated with their implementation. The choice this article makes in relation to its

theoretical underpinning is also consistent with the call for further research using paradox theory in the context of specific types of sustainable BMs expressed in this journal (van Bommel, 2020).

Next, paradoxical thinking and its more recent development in management, corporate sustainability, sustainable BMs and CE literature, is introduced.

## *2.2. Paradox theory in management studies, corporate sustainability and circular economy literature*

A paradox can be defined as ‘contradictory yet interrelated elements that exist simultaneously and persist over time’ (Smith and Lewis, 2011, p. 382). Companies operate in very complex environments, which raise many paradoxical demands (Smith and Lewis, 2011). Firms are requested to be efficient and effective, innovative and conservative (Dameron and Torset, 2014), to offer products and services functional to a global market and responsive to tailored local needs at the same time (Marquis and Battilana, 2009), to accommodate the interests of multiple stakeholders with divergent yet valuable demands (Scherer *et al.*, 2013). Paradoxes, however, do not equal to simple, competing tensions. In a strategic paradox, goals are interrelated, i.e. they are ‘mutually constitutive, yet contradictory’ (Iivonen, 2018, p. 310). This means that strategic paradoxes emerge within competing goals but not all competing goals result in a strategic paradox (Schad *et al.*, 2016).

Smith and Lewis (2011) grouped organisational paradoxes in *learning, organising, belonging and performing paradoxes*. They are linked to the core activities and elements of an organisation: *learning* reflects knowledge, *belonging* reflects identity, *organising* reflects processes and *performing* reflects goals (*ibid.*). *Learning* paradoxes emerge during change

and innovation processes since these involve to build upon as well as destroying the past to develop the future, and so an example of *learning* paradoxes is exploitation versus exploration (*ibid.*). *Organising* paradoxes arise from the processes that are put in place to achieve a desired outcome (*ibid.*). Studies have explored, for instance, the organising tensions between alignment and flexibility, controlling and empowering employees (Schad *et al.*, 2016). *Belonging* paradoxes emerge from competing identities (individual versus collective identity) and competing values, roles and memberships (Smith and Lewis, 2011). *Performing* paradoxes emerge from the conflicting demands of internal and external stakeholders (*ibid.*). Tensions can occur also across categories.

Attending to multiple and competing environmental, social and economic goals is amid the complex paradoxical demands that contemporary organisations face in the management of their operations. As a result, paradox theory is gaining salience in the corporate sustainability field as shown by recent studies (e.g., Hahn *et al.*, 2018; Ivory and Brooks, 2018).

Research based on paradox theory is also emerging in the sustainable BMs and CE literature. Van Bommel (2018) employs paradox theory to examine the tensions surfacing when organisations transition towards more sustainable BMs, and the organisational responses to these tensions. Particularly, the author explores how paradoxical thinking and management can aid in the process of BM innovation for sustainability. All of the categories of paradoxes above introduced are found in Van Bommel's study though the most frequent are *performing*, *organising* and *belonging* tensions. The research finds that paradoxical thinking creates a virtuous cycle in the sense that BM innovation for sustainability is successful only if an organisation attends simultaneously to competing economic, environmental and social goals. Daddi *et al.* (2019) find the existence of *performing* and

*organising* paradoxes in a CE in a multiple, case-based study. Increased environmental sustainability - via the use of secondary raw materials - compromises quality perception in the high-end, luxury leather industry and hence profitability (*performing* paradox). Furthermore, the tension between creativity and efficiency highlights a paradox of *organising*.

This article makes a more systematic use of Smith and Lewis's (2011) typology of organisational paradoxes, offering a more complete framing of paradoxes in CE implementation, particularly from a BM perspective. Figure 1 below visualises the conceptual framework that is used to provide a conceptual systematisation of the typology of organisational tensions in CE implementation.

**<Insert Figure 1 about here>**

Next, section three discusses the challenges that become salient in the process of CE implementation from a paradox perspective.

### **3. Organisational paradoxes in circular economy implementation**

In what follows, Smith and Lewis's (2011) typology of organisational tensions is placed in relation to CE principles. Table 1 summarises CE principles and implications from a paradox perspective.

**<Insert Table 1 about here>**

Any business - either a start-up or an established corporation - wanting to pursue a CE-oriented strategy, must grasp CE principles first. At this exploratory stage managers will be confronted with paradoxical tensions. In fact, as noted earlier in section two, 'the shift to a

CE is not straightforward, and the current transitional phases may collide against many entrenched features of the highly successful and much older linear economy model' (Hopkinson *et al.*, 2018, p. 91). As the CE is a systemic and revolutionary paradigm for building an economy that thrives within ecological limits, companies will be also confronted with a *learning* paradox from the perspective of the core corporate activity of *knowledge*. Particularly, a tension will surface between the intensity and degree of innovation, i.e. incremental versus radical. How can an individual company manage innovation for circularity? Can circular innovation levers be actioned through a step-by-step process or do they need a more radical approach? How far should a company go in pursuing circular innovation in order to be substantially engaged with CE thinking? And also, what will the impact be for the products portfolios of incumbent organisations? A tension will surface between exploitation (build upon current knowledge and experience) and exploration (destroy the past to initiate a radically new process). Turning to the perspective of *goals*, a *performing* paradox is likely since a tension could surface between the pursuit of short-term gains and long-term prosperity. The CE aims at 'recoupling economy with ecology' (EMF *et al.*, 2015). When translating this principle in practice, a company, for instance, may be faced with the choice of dismissing old materials with renewable and better performing materials from an environmental sustainability point of view. This could result in increased costs (e.g., R&D, testing, development) and thereby in reduced profitability in the short term.

The importance of feedback loops lies at the heart of CE thinking: in a CE stocks and flows of resources (e.g., materials, energy) interact with each other. This has implications at the product and system level, i.e. the interaction of a product with economic and ecological systems must be considered along its entire lifecycle and any organisation moving to a CE has to acknowledge its interaction with the wider system (EMF, 2018). This systemic thinking will raise a *belonging* paradox from an *identity* perspective. If organisations project

themselves in the wider socio-ecological system within which they operate while simultaneously retaining independency, a tension between the organisation as a ‘stand-alone entity’ and ‘as part of a wider system’ will surface. Also *belonging* paradox can become salient in the tension between organisational/individual self-interest and the prosperity of the whole system/collective, i.e. **■**whom is an organisation creating value for?

From a *process* perspective, organisations will be confronted with different *organising* paradoxes. Particularly, competition versus collaboration. Companies need to integrate their resources and competences with those of their partners in the value chain and therefore, shift towards higher degree of cooperation and interaction within the system to implement CE strategies (Brown *et al.*, 2020). As noted by De Angelis *et al.* (2018), the simultaneous existence of competitive and collaborative forces in a CE is not surprising considering that CE thinking takes inspiration from the functioning of ecosystems, wherein competition and cooperation enable them to thrive (Sauvé *et al.*, 2016). Incumbent organisations will be also confronted with tensions arising between efficiency and resilience in the transition to a CE. The CE runs on local, small-scale processes (e.g., repair cafés) and regional industrial processes (remanufacturing workshops and factories) to extend the durability of goods (Stahel, 2019). Small scales and decentralisation enhance resilience, that is the capacity of a system to recover to its previous state after a disturbance (Goerner *et al.*, 2009). This is at odds with the economies of scale of highly concentrated and efficient systems of traditionally established linear operating production and consumption systems. Increasing efficiency at the organisational level means that diversity and resilience at the system level are reduced (Hahn *et al.*, 2015). Fath *et al.* (2019) qualify effectiveness as the interplay between efficiency and resilience. Effectiveness is where CE thinking, which draws on insights from complex adaptive systems, ideally stands (Webster and Fromberg, 2020). Another *organising* paradox will emerge in the organisational structuring efforts between separation and integration of a

CE functional division within corporate structures. This tension may surface as an implication of the systemic thinking underlying the CE, which encourages to see parts in relation to the whole and vice versa.

Next Smith and Lewis's (2011) typology of organisational tensions is placed in relation to the sources of value creation in a CE, referred to as 'value loops' in CE literature (EMF and McKinsey, 2012). In a CE value creation depends on the circulation and flows of 'technical' (synthetic, mineral materials) and 'biological' (renewable) materials, products and components through the economy. These value creation opportunities are referred to as the 'power of loops' and, together with the categories of paradoxes, are described in Table 2.

**<Insert Table 2 about here>**

These CE 'value loops' fundamentally alter the value creation logic underpinning linear production and consumption systems and therefore, the likelihood of tensions surfacing in the process of transforming current business practices or setting them up from scratch is very high. From a *process* perspective, there are a number of *organising* paradoxes that are likely to emerge. More cooperation with partners along a company's value chain (e.g., designers and suppliers) to prevent value loss and enable greater value capture in the light of the *powers of the inner loop*, *cascaded usage*, *circling longer* and *pure inputs* may require more vertically integrated organisational structures wherein the advantage of higher degree of control could be paid in terms of reduced organisational flexibility. *Organising* and *performing* paradoxes surfacing in the tension between processes and outcomes, could also emerge. The recovery and processing of critical technical materials for the high-tech industry may not be viable because of either design failures or costly capital investments which may compromise the financial bottom line (Ünal *et al.*, 2019). Another *organising* paradox can emerge with a tension between efficiency and resilience. In a CE, like in ecosystems wherein



cyclical patterns of materials use are closed but also local and decentralised (Nielsen and Müller, 2009), it is within local loops that opportunities for materials recovery and value capture exist (De Angelis *et al.*, 2018). Remanufacturing creates opportunities for reshoring components and products. Whilst this contributes to increase system resilience and employment at the local level, it may also create a conflict with the multi-tier manufacturing networks established across global supply chains prevailing in incumbent linear operating models. Products and components in the highly globalised supply chains are sourced worldwide; this is a significant barrier to the recovery of materials as manufacture and use are located in very distant regions (De Angelis *et al.*, 2018).

From a *goal* perspective, *performing* paradoxes are also very likely. Due to enhanced cooperation, a *performing* paradox can surface since the goal of attaining value retention at the level of the network structure may clash with value capture at the company's level (Jonker *et al.*, 2018). In this respect, Parida *et al.* (2019) argue that major challenges are encountered by manufacturing companies in a CE ecosystem since it requires them to manage the incentives and investments of different actors. Shifting from a product sale to a pay-per-use model means that manufacturers have to collaborate with suppliers, customers and service providers to create and capture value profitably but also that ways to incentivise partners in the circular ecosystem, share risks, responsibilities and revenues must be found (*ibid.*).

Another *performing* paradox could result from competing internal incentive mechanisms, i.e. between organisational units whose success is assessed in terms of new product sales and other units working to enhance remanufacturing (EMF and McKinsey, 2013). Also, the goal of enhanced environmental sustainability through design for durability, disassembly and recycling may clash with the entrenched financial goals of repeat sales and

profitability. As found by Daddi *et al.* (2019), while the recovery of by-products from the production process to be used in subsequent manufacturing cycles could increase environmental commitment, the quality of the final product could be negatively affected and with it a company's profitability. For one, the use of recycled components into high-end luxury leather garments could have a negative effect on the brand image and quality of the final product (*ibid.*). On a similar line, Goworek *et al.* (2018) find that in the fashion industry the simultaneous achievement of product sustainability and commercial viability is a major issue. Their research suggests that design for longevity, for instance, is rarely prioritised, as enhanced product durability may collide with commercial goals.

Next these organisational tensions are viewed from a BM perspective. By considering the key components through which the concept of the BM is articulated and so value proposition, value creation and delivery and value capture, the article shows how the salience of each of these tensions varies when matched against BMs components. Starting from value proposition, in defining or re-defining who customers are and what is the customers' offering in the light of CE principles, the *learning* paradox of incremental versus radical innovation will surface depending on the level of circularity adoption pursued at the organisational level. *Organising* paradoxes will most likely affect the value creation and delivery aspect with the tensions of competition versus collaboration and efficiency versus resilience. The *belonging* paradox of organisational versus collective value will also have implications for value creation and delivery, i.e. the question of 'for whom value is created' will confront managers with a tension between value creation for a restricted pool of stakeholders and mostly intended from a commercial perspective, to multiple value creation for the society as a whole. *Performing* paradoxes will affect the value capture dimension instead, with companies trying to accommodate the need for capturing economic value while preserving and regenerating

natural capital and building social capital, as well as achieving and capturing value at the organisational versus capturing value at the network level.

#### 4. Conclusion

As a promising vision for the attainment of multiple forms of value, the CE has gained the attention of diverse stakeholders and initiatives across different quarters are proliferating to accelerate the transition towards a circular industrial economy. The involvement of the corporate sector and particularly the transformation of linear-operating BMs is a crucial constituent in the attainment of such an economy. CBMs have also attracted the interest of scholars recently. However, academic literature on the subject is still in its early days (Diaz Lopez *et al.*, 2019) and this mirrors the slow uptake of CBMs within the corporate sector. The implementation of CE principles raises a number of organisational tensions but scant attention has been given to these in the business literature (Lazell *et al.*, 2018).

To offer a more structured understanding and solid, theoretical grounding to the analysis of tensions in CE implementation, this article has relied on paradox management theory (Smith and Lewis, 2011) and outlined the relevance of these tensions for the components of the BM and so for value proposition, value creation and delivery and value capture. Particularly, this article has asked: *which paradoxes are likely to emerge in the process of CE implementation?*

To the best of this author's knowledge, this article provides the first conceptual systematisation of paradoxical tensions in CE implementation and this is useful to aid construct clarity and theory building in the CE scholarly literature. By answering this question this article also makes other relevant contributions. Studies investigating tensions in

sustainable BMs using a paradox lens are welcomed (van Bommel, 2018) and most of paradox research has taken an individual or organisational perspective (Jarzabkowski, 2013) whilst this article outlines the relevance of circularity paradoxes from a BM perspective.

This research is also relevant for management practitioners who, in addition to the direct research findings may want to consider the implications of these findings for the strategic change management process and particularly for organisational structures, processes, culture and leadership. Which organisational structures will be better suited to respond effectively to those paradoxical tensions? Which performance systems need to be in place to monitor and measure multiple goals? How can corporate culture facilitate the management of organisational paradoxes? What kind of leadership style - transformational or transactional (Bass and Avolio, 1993) - will be more successful in leading the change in times of greater organisational complexity?

This research has started building some theoretical grounding for the study of paradoxical tensions in CE implementation. Whilst this is certainly beneficial to advance the contribution of business and management scholars to the development of CE literature, it has not dealt with the responses that these tensions might trigger in a real corporate context. On one hand, this can be seen as a limitation of this study. On the other hand, it can be a future line of enquiry for business and management scholars to investigate. Future studies could test the existence of these paradoxes in empirical settings and identify the strategic outcomes resulting from attending to these tensions with a paradoxical mindset rather than with the more established instrumental logic of both 'win-win' and 'trade-off' approaches. In fact, recent research welcomes studies that explore how abilities such as paradoxical mindsets lead to successful BM innovation in a social enterprise setting (Tykkyläinen and Ritala, 2020). Additionally, other enquiries could extend the circularity paradoxes here identified.

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## Tables

**Table 1**

CE Principles		Categories of paradoxical tensions
<b>Preserve and enhance natural capital</b>	Use renewable resources whenever possible and return to nature biological materials to build natural capital (EMF <i>et al.</i> , 2015).	<b>Learning paradox:</b> incremental versus radical innovation; exploitation versus exploration.
<b>Optimise resource yields</b>	Boost resource productivity in technical cycles by preserving embedded energy, labour and materials and by returning biological nutrients safely to nature once they can no longer be valuable feedstock for a new cycle ( <i>ibid.</i> ).	<b>Performing paradox:</b> short term profitability versus long term prosperity.  <b>Belonging paradox:</b> organisations as stand-alone identities versus organisations as part of a wider

<b>Foster system effectiveness</b>	Design out all negative environmental externalities deriving from production and consumption systems ( <i>ibid.</i> ).	system; organisational versus collective value creation.  <b>Organising paradox:</b> competition versus collaboration in innovation for circularity; efficiency versus resilience, i.e. economies of scale versus small scale, concentration versus decentralisation; separation versus integration.
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Table 1: CE principles and organisational paradoxes

Source: Author's own elaboration and based on the literature cited in text.

Table 2

CE Value loops		Categories of paradoxical tensions
<b>Power of the inner circle</b>	It suggests that end of life materials recovery strategies that preserve more of the embedded labour, materials and energy should be preferred (EMF and McKinsey, 2012). As the inertia principle postulate: 'do not repair what is not broken, do not remanufacture something that can be repaired, do not recycle a product that can be remanufactured. Replace or treat only the smallest possible part in	<b>Organising paradox:</b> control versus flexibility; efficiency versus resilience.  <b>Organising and performing paradoxes:</b> surfacing in the tension between processes and outcomes.  <b>Performing paradoxes:</b> commercial goals (sales) versus enhanced durability and so environmental

	order to maintain the existing economic value of the technical system' (Stahel, 2010, p. 195).	sustainability goals; competing internal incentive mechanisms (EMF <i>et al.</i> , 2013); achieving value retention
<b>Power of circling longer</b>	It suggests extending the period of time during which materials, products and components are kept in use (EMF and McKinsey, 2012).	at the network level versus the organisational level (Jonker <i>et al.</i> , 2018).
<b>Power of cascaded usage</b>	It suggests diversifying resource usage across value chains ( <i>ibid.</i> ).	
<b>Power of pure inputs</b>	It highlights that materials can circulate properly within many cycles only if their purity and quality are maintained ( <i>ibid.</i> ).	

Table 2: Value loops in a CE and organisational paradoxes

Source: Author's own elaboration and based on the literature cited in text

## Figure 1

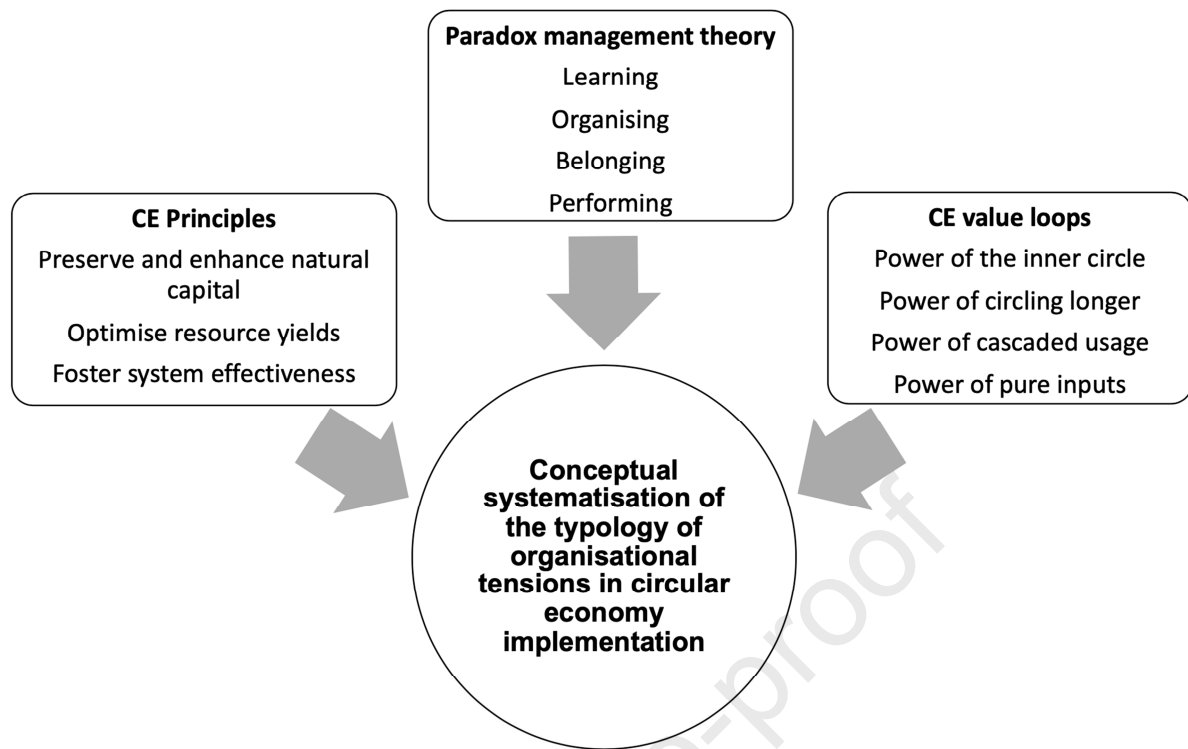
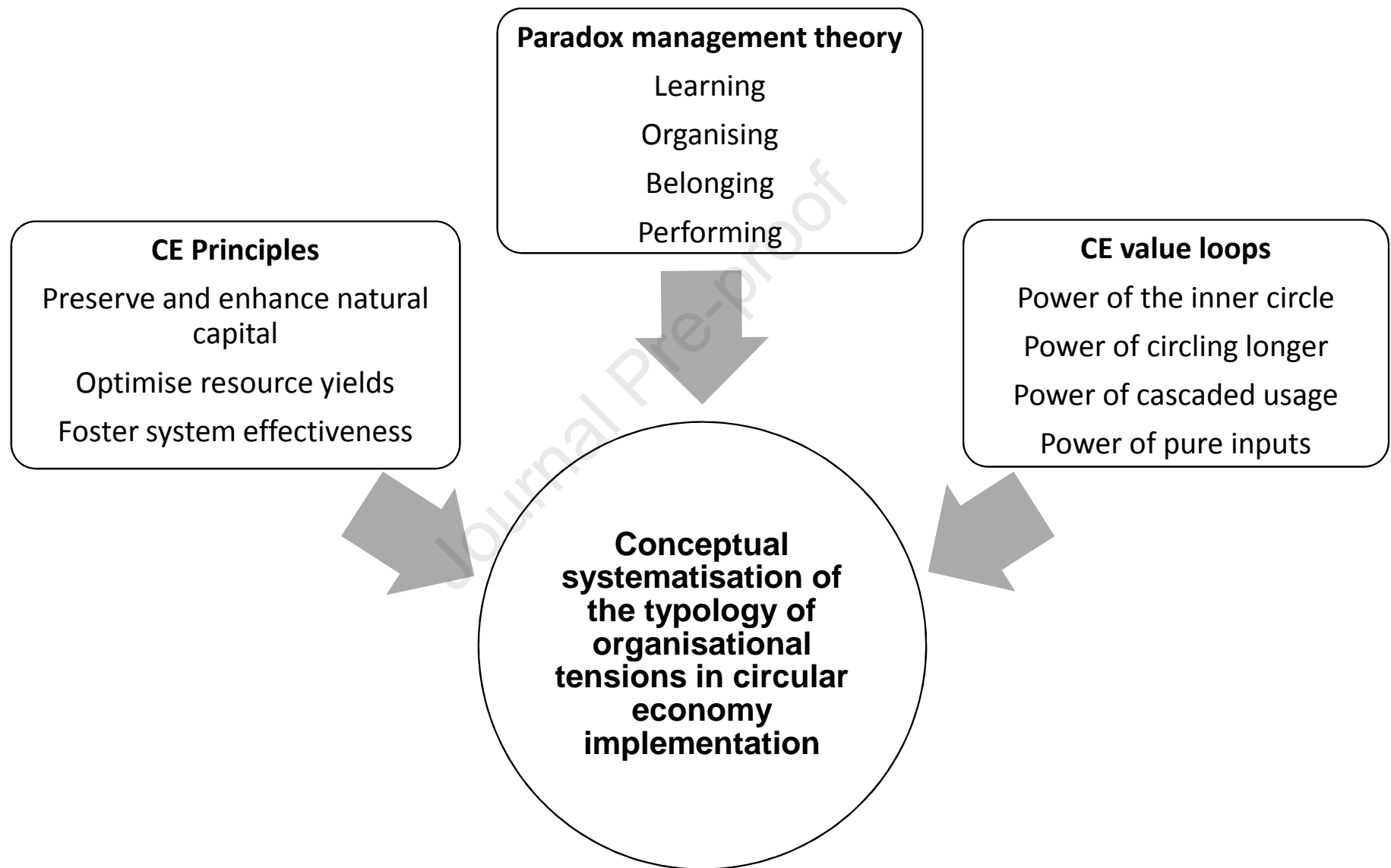


Figure 1: Research conceptual framework

Source: Author's own elaboration





### **Highlights**

- Studies of tensions in circular business model implementation are limited.
- A framework of tensions in circular business model implementation is built.
- Paradox theory underpins the conceptual framework.
- Organisational paradoxes are linked to circular economy principles and loops.

**Declaration of interests**

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: