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Developing Sustainable Partnerships for Circular Economies: A Literature Review

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Introduction

To move towards more sustainable societies by 2050 (European Commission, 2019), there is a need for systemic innovation that allows organisations to evolve from linear to circular models (Anttonen et al., 2018). However, organisations often need to enter into partnerships to respond to their challenges and solve deeply ingrained societal issues, often referred to as wicked problems (Weber & Khademanian, 2008). Due to technological and economic developments, it has become easier to engage with other stakeholders (Held, 2006), yet it is still unclear how to do this in activities related to circular economies (CEs). A circular economy (CE) represents a timely opportunity for a business to

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question its current mainstream, linear economic “take-make-consume-waste” approach (Niero & Rivera, 2018). This approach has been recognised as unsustainable from at least three different perspectives. First, it depletes limited, natural resources and pollutes the environment (Masi et al., 2017). Second, it strains a company operationally and financially (Ghisellini et al., 2016). And third, there is a growing awareness and expectation from various stakeholders who are increasingly putting pressure on businesses to take up their social and environmental responsibilities (Lieder & Rashid, 2016).

The CE has been identified as a promising approach to establishing more sustainable societies (Kirchherr et al., 2017). Essentially, the CE encourages closed flows or loops of materials (Yuan et al., 2008), recycling materials, superior design of products, systems, and business models (Hobson, 2016), and a system of interconnected stakeholders (Ellen MacArthur Foundation, 2012). The latter aspect requires specific attention to stakeholder relationships. As Mhatre et al. (2021, p. 199) pointed out, more research is needed to understand the “impact of stakeholder collaboration on the circular economy”, which raises the need to better understand cross-sectoral relationships surrounding CEs (Galvao et al., 2019). Because of the relevance and potential that the CE represents, Brown et al. (2021) have also called for more research on collaborations, alliances, or partnerships amongst different stakeholders.

Through this literature review, we want to better understand how stakeholder engagement—i.e., “the activities and impacts of stakeholder relations in a moral, strategic or pragmatic manner” (Kujala et al., 2022, p. 1139)—may take place when stakeholders seek partners to address sustainability challenges. As different individuals, organisations, or groups may influence one another (Freeman, 1984), their activities are crucial in terms of strategies (Ramus & Vaccaro, 2017), as well as knowledge and innovation development (Mitchell et al., 2022). Stakeholders developing partnerships fit within the broader notion of stakeholder engagement (Sloan & Oliver, 2013). Therefore, we aim to answer the following research question: *How are sustainable partnerships developed for circular economies?*

We adopt the theoretical lens of the quintuple helix model (QHM) (Carayannis et al., 2021a), because it focuses on sustainability challenges,

and it provides a comprehensive understanding of university–industry–government–civil society relationships (within the environmental or natural boundaries of society). Bloom and Dees (2008, p. 47) explain that such an integrative framework is necessary, as the whole system of interacting “friends, foes, competitors...innocent bystanders...laws, policies, social norms, demographic trends, cultural institutions” needs to be understood if a societal change is to be substantiated.

Based on an inductive approach (Onwuegbuzie et al., 2012), we carry out a literature review and develop a clover model based on three building blocks that are important for developing sustainable partnerships within a CE: vision, stakeholders, processes. Each of these building blocks relies on various enabling mechanisms, i.e., fundamental elements needed for specific activities and impacts, for stakeholders to engage with one another. The building block “vision” relies on enablers such as stewardship philosophy, motivational drivers, and circular principles. The building block “stakeholders” relies on enablers such as role stipulations, partner activities, and partner capacities. The building block “process” relies on enablers such as procedural phases, managerial tools, and governance methods.

The literature also discusses a multitude of obstacles that may affect one or more building blocks. We discuss both the enablers and obstacles stakeholders encounter when engaging in sustainable partnerships for CEs. We respond to the recent calls for more insights into stakeholder relationships for CEs (Brown et al., 2021; Mhatre et al., 2021) by offering a more nuanced perspective of how the circular transition of society could occur.

The remainder of this chapter is structured as follows. First, we discuss partnerships in a CE, as well as the theoretical background of the QHM. Second, we present our methodological choices leading to the in-depth analyses of 59 peer-reviewed, high-impact journal articles. Third, we discuss our clover model and its underlying mechanisms and obstacles in more detail. Finally, we conclude with some discussion points, as well as managerial implications and future avenues of research.

Partnerships in a Circular Economy

The CE, which has been touted as a viable solution for more sustainable societies (Ibn-Mohammed et al., 2021), can be defined as an industrial economy that is “restorative and regenerative by intention and design, which aims to keep products, components, and materials at their highest utility and value at all times” (Ellen MacArthur Foundation, 2015, p. 7). Furthermore, the CE aims to introduce closed systems to reduce the dependency on new materials for production purposes (Genovese et al., 2017). As such, CE industries tend to focus on prolonging the life cycle of materials and goods, using fewer resources, or facilitating the development of new materials from old ones.

CE scholars traditionally focus on research and development efforts (Morawska-Jancelewicz, 2021), on training and teaching, on developing new technologies or companies, or on their third mission (Peris-Ortiz et al., 2016). Conversely, governments are known to facilitate CE development and implementation by acting in the more traditional roles of regulators and subsidy providers (Jia et al., 2020). However, recent publications suggest that a more systematic, inclusive, or holistic approach (Nogueira et al., 2019) is required for the CE to be effectively implemented (Govindan & Hasanagic, 2018).

Cross-sector collaborations refer to the engagement between “business, government and civil society – the three main societal sectors” (Selsky & Parker, 2005, p. 849). Although cross-sectoral collaborations have been noted as essential for tackling wicked problems that the CE aims to address in the long run (Fehrer & Wieland, 2021), not all collaborations automatically focus on sustainability issues, nor are they exclusively developed and maintained for the long term. Furthermore, cross-sector collaborations may occur between two sectors, (e.g., public–private, or non-profit and for-profit), but do not explicitly refer to multiple cross-sectoral partnerships (Babiak & Thibault, 2009). For this chapter, we chose to refer to stakeholder engagement across different sectors as sustainable partnerships for three reasons. First, we refer to sustainable partnerships in the societal sense, i.e., where partnerships aim to contribute to a more sustainable society by addressing social or environmental problems (Grunwald et al., 2022). Second, we refer to

sustainable partnerships in a timely sense, where collaborations are set up for the long term. Third, we refer to sustainable partnerships in the holistic or inclusive sense, as for societal transformation to succeed and be accepted, all relevant stakeholders must be engaged (Geissdoerfer et al., 2018).

Keeping this in mind, the definition of a “partnership” given by Wood and Gray (1991, p. 11) seems to be adequate, as we can also understand a sustainable partnership as being “a process that engages a group of autonomous stakeholders interested in a problem or issue in an interactive deliberation using shared rules, norms, and structures, to share information and/or take coordinated actions”. Such partnerships demonstrate different purposes, such as developing a shared vision, designing a shared strategy, opening dialogues, or negotiating settlements (Gray & Purdy, 2018). Partnerships are often based around the intentional and voluntary interactions (linking or sharing of information, resources, activities, and capabilities) between two or more organisations (and the individuals involved) to achieve a common goal or purpose that could not be achieved individually (Wood & Gray, 1991). Even though the dynamics between different stakeholders is so crucial, the CE literature lacks clear insights. This is where the theoretical perspective of the QHM contributes.

Quintuple Helix Model

The QHM is considered to be a promising interdisciplinary and trans-disciplinary framework (Carayannis & Campbell, 2021) for tackling sustainability challenges through societal change, “as it ties knowledge, innovation and the environment” together in one framework (Carayannis & Campbell, 2010, p. 42). It provides a comprehensive understanding of the relationships between different stakeholders and sectors, such as academia (universities or higher education institutes), state (government), industry (business), civil societal organisations (NGOs, citizens as customers, and other media-based and culture-based public organisations), and nature (natural or environmental boundaries).

It also facilitates knowledge, innovation, internal development, sustainable competitive advantages, and sustainable development (Peris-Ortiz et al., 2016). The interconnections between stakeholders represent an innovation system that can be found at the regional or national level (Carayannis & Campbell, 2021). The core of the QHM model demonstrates that cross-sectoral collaborations are built on essentially complex interactions and evolution processes (Carayannis et al., 2021a, 2021b). As Barcellos-Paula et al. (2021, p. 2) point out, every sector is associated with a helix, which “represents a knowledge subsystem that functions as a spiral, connecting with the other systems”. Such systems may thus represent political (government), economic (industry), environmental (nature), social (civil society), or educational (academia) systems, with their subsequent political, economic, environmental, social, or knowledge capital (Carayannis et al., 2012).

Peris-Ortiz et al. (2016) have illustrated that at its core, the QHM focuses on the interactions that lead to the development (also sometimes referred to as creation or production), distribution, and application of knowledge (also sometimes referred to as innovation). Often, the QHM refers to the production of knowledge and innovation, especially in the context of specific social or environmental issues. Within such a framework, the classical role of universities and higher education institutions (HEIs) are to develop knowledge (creating or producing knowledge), whilst for businesses and industries, it is to apply and use knowledge (to innovate). Nevertheless, knowledge and innovation are not solely developed within one helix (i.e., academia), but also within other helices (governments or businesses). Furthermore, the QHM is founded on the notion that different knowledge and innovation modes coexist and co-evolve, both within and across helices, and that they rely on a process of mutual cross-learning (Carayannis & Rakhmatullin, 2014). In other words, the QHM focuses on developing and applying the societal exchange and transfer of sustainability knowledge from inside one subsystem to another.

Carayannis and Campbell (2010) contextualise the development and application of knowledge by integrating the helices of civil society (media and culture, consumers, and politics) as well as the natural environment (limited natural resources and environmental considerations). They

point out that the creation of knowledge and innovation should not be detached from a societal (social and environmental) perspective. Carayannis et al. (2021a, 2021b) argue that societal problems do not just represent challenges, but also drivers for creating knowledge and innovation. Carayannis et al. (2021a, 2021b, p. 8) state that the QHM refers to a “socio-ecological transition of society, economy, and democracy”. Helices may engage with one another in various ways depending on their configurations (Etzkowitz & Leydesdorff, 2000). But at the core, the quintuple helix incorporates a cooperative nature between four sectors, resulting in an open knowledge and innovation system (Galvao et al., 2019). Various stakeholders may be co-responsible for the knowledge creation, production, diffusion, and application or usage phases. This variety may result in the emergence of an overlay of communications, networks, and organisations amongst the helices.

Such overlay may be productive, but also has the potential to lead to tensions between the different helices, which the QHM not only acknowledges, but also argues, may be beneficial to the system dynamics, thriving on the “perturbations and interactions among its subsystems” (Etzkowitz & Leydesdorff, 2000, p. 119). The subsystems or helices can benefit in a setting of co-evolution where mutual learning and a positive learning interaction take place, following the rationale of sustainable development. The QHM is therefore simultaneously interdisciplinary and transdisciplinary (Carayannis & Campbell, 2011).

Methodology

To examine how sustainable partnerships are developed for circular economies, we carried out a systematic literature review. The article selection and analysis process followed a typical systematic literature review process (Tranfield et al., 2003), which involves the phases of identification, eligibility, screening, and inclusion (Fig. 4.1).

In the first phase, we developed the following search string to look for relevant articles by screening their titles, abstracts, and keywords: “*circular econ**” OR “*circle economy*” OR “*circularity*” AND “*partners**” OR “*collab**” OR “*cooperat**” OR “*cross-sect**” OR “*intersect**”. The

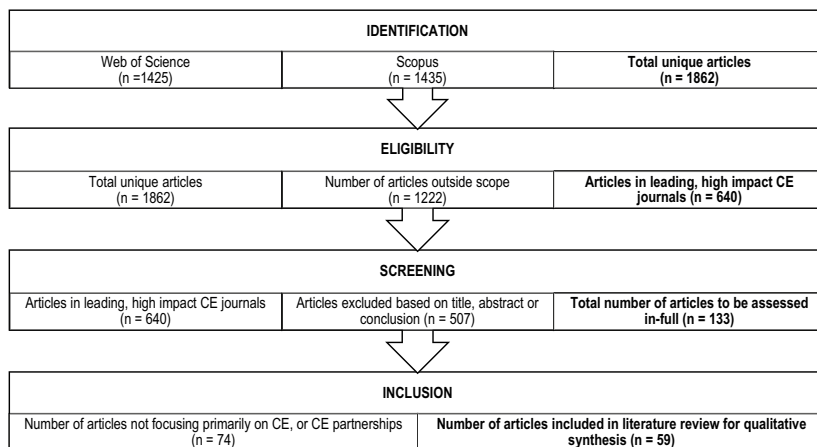


Fig. 4.1 Steps in the article selection process

term “circular economy” and its derivatives, as well as “partnerships” and its derivatives, were the central focus of this study, and are in line with previous literature reviews on the CE (Mhatre et al., 2021; Suchek et al., 2021). On various occasions between October 2021 and February 2022, we discussed our keyword selection with two panels comprised of academics, sustainability experts, and practitioners in the CE field. We excluded conference proceedings, books, book chapters or reviews, editorial material, trade journals, or paper reviews, as selecting peer-reviewed articles results in a considerable amount of relevant knowledge (Phillips et al., 2015). After removing duplicates, our initial literature search resulted in a total of 1862 unique articles.

In the second phase, we focused on the main CE publication channels (Sopjani et al., 2020), which include the journals of “Resources, Conservation and Recycling” (impact factor 10.204), “Journal of Cleaner Production” (with an impact factor of 9.297), and “Sustainability” (impact factor 3.251). During the peer-review sessions with the panels, experts recommended that we add the “Journal of Industrial Ecology” (impact factor 6.946) to the list of high-impact journals¹ to be screened.

¹ We considered journals as high-impact journals when they were ranked as highly regarded or better, following the Association of Business Schools Academic Journal Quality Guideline

Considering the relatively high-impact factors of all four journals, as well as the fact that 35% ($n = 640$) of all articles found during the first phase are published in these journals, they reflect the current situation in terms of theoretical and practitioner-oriented CE articles, and as such, are appropriate for this study.

In a third phase, these 640 articles were screened based on their titles, abstracts, and conclusion sections, and 133 articles were deemed to be potentially relevant. After a full-text assessment, we checked with the research team whether articles fitted within the scope of our definition and principles of sustainable partnerships, and whether these articles answered our main research question. We eventually found 59 articles fit for in-depth qualitative analysis. We excluded 74 articles that did not primarily discuss stakeholder relationships, actions, impacts, or partnerships within a CE context, or did not fit the scope of this literature review.

We used an inductive approach employing the constant comparison analysis (Onwuegbuzie et al., 2012): two co-authors first open-coded separately, then convened and discussed which keywords and concepts they attributed to 30 randomly selected papers over the course of a few weeks. This iterative refinement process continued until the coding process was crystallised, and disagreements were overcome. Once an agreement was reached, the main keywords were presented to the whole team of four researchers, and one of the authors further coded the remaining 29 articles. However, this author also frequently reconvened with the research team to discuss their findings in an iterative manner. The constant comparative analysis works by “systematically and inductively reducing source(s) to codes, then developing themes from the codes. These themes may become headings and subheadings...” (Onwuegbuzie et al., 2012, p. 12). In this manner, the literature review not only explored sub-categories (i.e., mechanisms) and categories (i.e., building blocks) for sustainable partnerships, but also the relationships

(Harzing, 2021). As such, both the “Resources, Conservation and Recycling”, and “Journal of Cleaner Production” (with an impact factor of about 10) fall under the category of world elite or top journals. “Journal of Industrial Ecology” has a similar impact factor to journals that are highly regarded. The “Sustainability” journal, although having a lower impact factor score, was considered a high-impact journal because it is one of the main journal outlets for CE.

between the enablers and obstacles for sustainable partnerships within the CE. The constant comparative analysis provides a “structured process and an audit trail describing how findings moved from concrete to higher levels of abstraction” (Quick et al., 2003, p. 817). By continuously coding and categorising findings, we were able to illustrate what is currently known about the development of sustainable partnerships in CEs.

Results

This literature review presents three interconnected building blocks with nine underlying enabling mechanisms, as well as obstacles acting as interwoven mechanisms, that may influence the development of sustainable partnerships for CEs. Understanding not only what stimulates, but also what hinders sustainable partnerships, may contribute to developing adequate policy, strategy, and action recommendations for stakeholders within the quintuple framework. Figure 4.2 represents the combination of stimulating and hindering mechanisms (obstacles) that are identified in the literature.

Building Blocks for Developing Sustainability Partnerships for Circular Economies

Vision

Vision as a building block refers to the shared mindset or approach needed to achieve the long-term objectives for the CE that are common to all stakeholder partners. This building block consists of three underlying mechanisms: (1) stewardship philosophy, (2) motivational drivers, and (3) circular principles. The vision building block can be defined as an agreement on the CE principles, values, approaches, and end objectives that need to be achieved (Boldrini & Antheaume, 2021), and may be essential to developing a common language or reduce opportunistic behaviour and misalignment amongst stakeholders. Due to these shared

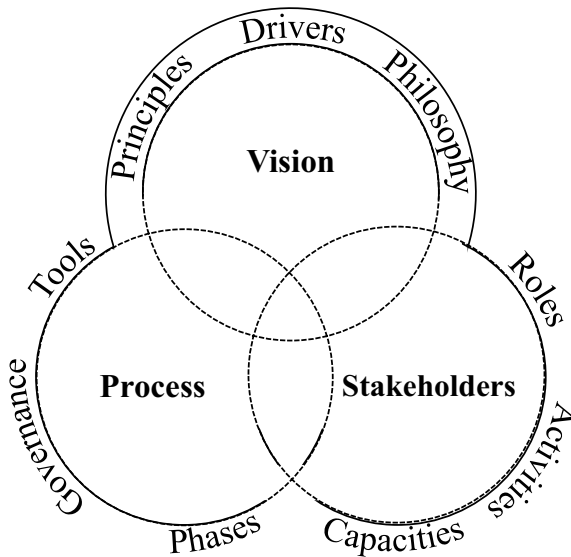


Fig. 4.2 Three building blocks and their underlying mechanisms with the black area referring to obstacles of sustainability partnerships for circular economies

objectives, organisations may gain access to a broader set of combined, shared, or pooled resources and competencies. Vision is potentially embodied through metaphors, words, or images, next to clear collective goals, rules, and leadership, as well as inspiration, direction, and motivation (Leising et al., 2018).

Stewardship philosophy. The first mechanism, the stewardship philosophy, underlines the idea that stakeholders are encouraged by strong social and empathy-based motivational drivers (Eiselein & Dentchev, 2020). It is primarily characterised by behaviours of collectivism and trustworthiness amongst stakeholders (Davis et al., 1997). The literature indirectly refers to the stewardship philosophy, through the specified importance of shared responsibilities (Witjes & Lozano, 2016), shared equipment (Ruggieri et al., 2016), common goals (Aid et al., 2017), and a shared set of long-term objectives (Franco, 2017), indicating the need for stakeholders to look beyond organisational boundaries.

Within the QHM framework, such a “long-term sustainable development vision of society” requires a co-creative vision and process to make sure stakeholders engage in developing a society in a “socially and environmentally responsible” manner (Galvao et al., 2019, p. 815). A shared vision, embodied and supported by different stakeholders, contributes to the coordinating strategies and operational plans, and translates vision and activities through synergetic efforts in a broader ecosystem of stakeholders (Carayannis & Campbell, 2021). Thus, a shared vision bridges different cultures from the five helices and streamlines the development and application of CE knowledge, even though it requires the assessment of the individual or common needs, opportunities, possibilities, strengths, and weaknesses of all five helices (Morawska-Jancelewicz, 2021).

Motivational drivers. The second mechanism, motivational drivers, examines the ethical and business reasons motivating stakeholders to (co)develop a circular vision. From an ethical point of view, the increasing world population, resource scarcity, and environmental pressures (Aid et al., 2017; Franco, 2017) may push organisations to adopt a sustainable vision for the future (Velenturf et al., 2018). From a business perspective, adopting a circular vision can reduce environmental impact (Scarpellini et al., 2020) and may optimise financial and human capital (Witjes & Lozano, 2016). It also allows for business innovation to thrive (Witjes & Lozano, 2016), as it also provides better access to markets, employees (Gray & Purdy, 2018), and expertise (Witjes & Lozano, 2016). Furthermore, it may help the reputation of an organisation (Aid et al., 2017), or gain legislative benefits (Ghisellini & Ulgiati, 2020). Governments, as well as organisations (such as NGOs, companies, multinationals, or circular entrepreneurs) may be motivated to partner with one another for legitimacy-, competency-, resource-, or society-oriented reasons (Gray & Purdy, 2018). In most cases, the collaborative processes in multi-stakeholder partnerships (Gray & Purdy, 2018) are intended to focus on mutual learning, gains, and support that can only be nurtured through a culture of cooperation and complementarity (Sousa-Zomer et al., 2018).

As such, stakeholders engage in symbiotic relationships (Yu et al., 2014b) with the intent of setting up efficient network dynamics

(Brown et al., 2021) and potential business-model-innovation stimuli (Brown et al., 2021). This refers directly to the knowledge production systems within the QHM framework (Carayannis et al., 2021a, 2021b), reflecting the characteristic of collectivism in a stewardship-style philosophy (Leising et al., 2018; Pesce et al., 2020).

Circular principles. The third mechanism, the circular principles, refers to the 10 R's presented by Campbell-Johnston et al. (2019), sometimes denominated as circular strategies. They discuss the principles or strategies of reducing, repairing, reusing, recovering, remanufacturing, recycling, repurposing, refurbishing, rethinking, and refusing. Even though circular strategies are essential for the CE transition, Pesce et al. (2020) pointed out that there is still much heterogeneity amongst various schools of thought on how these strategies are or should be implemented within companies and organisations. This implies that stakeholders do not necessarily share the same ideation of CE principles or quintuple systems. At the very least, this calls for attention, as stakeholders must be aligned around a common vision that is translated into their strategies and operational activities. From a QHM perspective, this indicates that the dynamics and channels amongst the different helices (Carayannis et al., 2021a, 2021b) need to be well defined. For this reason, the second building block we propose in our clover model focuses on the “stakeholders” within the quintuple framework.

Stakeholders

As a building block, “stakeholders” refers to the different helices from the QHM that come together as sustainable partners for CEs. The stakeholder building block consists of three underlying mechanisms: (1) role stipulation, (2) partner activities, and (3) partner capacities. With so many stakeholders engaging with one another, there is first a need to understand the potential roles each stakeholder can perform in co-developing and applying CE knowledge. Arsova et al. (2021) identified a long list of CE stakeholders: businesses, such as large corporations, private businesses, NGOs, and small and medium enterprises (SMEs), as well as HEIs (universities and high schools) and other knowledge

centers and educational institutions, hybrid organisations, circular or social enterprises, governments (local, regional, federal, national, and international) and consumers.

Role stipulation. First, regarding stakeholder roles, governments are expected to foster CEs, and act as coordinators (Velter et al., 2020; Yu et al., 2014a), as funders (Uusikartano et al., 2020), facilitators (Fischer & Pascucci, 2017; Yu et al., 2014a), enablers, or networkers (Sousa-Zomer et al., 2018). Companies are mainly discussed as pioneers (Ghisellini & Ulgiati, 2020) or innovators (Barrie et al., 2019), based on how they are described as being focused on product, process, or business-model innovation (Barrie et al., 2019; Uusikartano et al., 2021). Civil-society organisations (i.e., consumers) are the social licence providers, as they drive the demand and adopt CE products and services (Ruggieri et al., 2016; Sousa-Zomer et al., 2018). To a lesser extent, the literature discusses what academia can provide (Ghisellini & Ulgiati, 2020), but also makes several mentions of intermediary organisations, described as networkers, brokers or accelerators (Fischer & Pascucci, 2017; Ibn-Mohammed et al., 2021; Ruggieri et al., 2016), and process advisors (Brown et al., 2021).

Partner activities. Second, regarding partner activities, close to all stakeholders in the QHM have high expectations of governments. Considered to be one of the key players in addressing CE, stakeholders expect various CE collaboration stimulating activities and efforts from governments in terms of policy intervention (Aid et al., 2017; Alhawari et al., 2021), legislative harmonisation and support (Ghisellini & Ulgiati, 2020; Sousa-Zomer et al., 2018; Stumpf et al., 2021), development of standards (Fischer & Pascucci, 2017; Stumpf et al., 2021), regulations (Ruggieri et al., 2016), access to funding, or ease of administrative burdens (Stumpf et al., 2021).

A lot of attention is given to the industrial helix (mainly companies), which can implement circular interventions on their own organisational level by closing supply chains, managing adequately residual waste, extending product life cycles, or raising efficiency in resource usage (Aguilar-Hernandez et al., 2021). These circular interventions can be achieved by paying attention to key organisational elements such as chain coordination, contracting, and various internal and external financial

mechanisms (Fischer & Pascucci, 2017). Furthermore, companies may need to pay attention to the design of their implementation processes, take-back management, and recycling facets (Stumpf et al., 2021).

The literature on sustainable partnerships for CEs has mainly focused on how governments and industries may develop CE strategies (Carayannis & Campbell, 2010; Peris-Ortiz et al., 2016), indicating that there has been a tendency to focus on one or two helices (that may be dominating or guiding the other helices). Despite the QHM literature recognising and including academia as an important helix (Morawska-Jancelewicz, 2021) in sustainable partnerships for CEs, the literature indicates the roles of academia may not yet be well defined or fully explored (Carayannis & Campbell, 2021; Morawska-Jancelewicz, 2021).

Partner capacities. Third, stakeholders also need to acknowledge their capacity for sustainable partnerships. The majority of the European economy consists of SMEs. However, Rincón-Moreno et al. (2020) point out that SMEs can only share or manage limited resources through partnerships and that there are therefore capacity constraints in terms of resource flows in a quintuple setting. As such, achieving economies of scale for efficient CE strategies requires a community or network of partners to collaborate, both within and across sectors. For example, SMEs could benefit from the HEIs. HEIs are often described as educators (Brown et al., 2020, 2021), and advisors (Brown et al., 2020), and are often considered to be crucial for developing and distributing knowledge amongst governmental institutions as well as innovative companies. Furthermore, governments have been considered to be efficient stakeholders for nurturing partnerships, but are also known to encounter limitations when stimulating sustainable partnership development through policies and subsidies (Ghisellini & Ulgiati, 2020).

The literature does not always assign the same role to the same actor. Some actors, for example, governments, academia, and businesses, could easily be given multiple roles, either simultaneously or sequentially (Ruggieri et al., 2016; Sousa-Zomer et al., 2018; Yu et al., 2014a). Such ambiguities may reflect the capacity limitations of one organisation versus another, both within and across helices. Whilst stakeholders are expected to engage with one another, promoting shared expectations and learning (Barrie et al., 2019) that will eventually lead to various

organisational and societal benefits, the types of knowledge channels, as well as the cooperative nature between QHM stakeholders takes time to develop and adjust from organisational to system perspective (Galvao et al., 2019). At its core, the development of sustainable partnerships for a CE is essentially a process that needs to go through various phases and needs to be managed with the appropriate strategies and tools.

Process

The third building block, process, is connected to three underlying mechanisms: (1) the different procedural phases, (2) managerial tools, and (3) governance methods for developing sustainable partnerships in CEs.

Procedural phases. The literature review finds four models (Brown et al., 2021; Campbell-Johnston et al., 2019; Domenech et al., 2019; Leising et al., 2018) that represent the process for the development of sustainable partnerships in CE, which consists of three overall phases, namely initiation, implementation, and stabilisation. In the initiation phase, different helices set up new co-creative, collaborative processes between stakeholders (Leising et al., 2018). In essence, through open dialogue and discussions (Campbell-Johnston et al., 2019), a common philosophy and alignment of drivers and strategies needs to be explored to make sure stakeholders can engage with one another and agree on how knowledge needs to be developed and applied. Brown et al. (2021) refer to this as the status-quo phase where stakeholders are at the beginning of a transition period (i.e., from linear to circular economy). Doménech and Davies (2011) consider this phase to be an exploration of first collaboration opportunities and experiences, often in terms of simple transformation processes, setting in motion the first round of cooperation dynamics.

In the implementation phase, actual change is initiated (Campbell-Johnston et al., 2019), collaborations are formalised amongst stakeholders, and collective goals are pursued (Leising et al., 2018). In this phase, the circular vision, the underlying principles, and mutual understanding are translated into actual operations (Brown et al., 2021).

Doménech and Davies (2011) explain that new linkages and/or existing relationships can be further developed in this phase, as the constant interactions between different stakeholders build cooperative trust and routines.

The third overall phase is the stabilisation phase. Campbell-Johnston et al. (2019) considers this phase to take place when a new status quo has been reached and further facilitated by regulatory shaping and support. Brown et al. (2021) find that in this phase, documents and norms may be produced to more (in)formally define the interactions amongst stakeholders and see it as the phase where the responsibilities of the networks, as well as decision-making powers are divided and shared. Leising et al. (2018) consider this phase to be the moment where material flows are well established, and CE strategies are assured to be well implemented. Stabilisation phase is therefore more concerned with the overall procedure and formalisation for developing sustainable partnerships within a QHM framework.

Managerial tools. Different managerial tools for sustainable partnerships are discussed in the literature. Yu et al. (2014b) refers to the use of ICT tools, focusing on key performance indicators or progress measures. Brown et al. (2021) propose a design-thinking tool that may facilitate the decision-making process. Sousa-Zomer et al. (2018) also point out the rise and development of integrated managerial systems, which may facilitate brokers, networkers, or facilitators in their quest to guide the whole consortium of partners. Businesses, academics, or governments may also use different CE tools and models, such as the triple-layered business model canvas (Joyce & Paquin, 2016), stakeholder and value mapping (Brown et al., 2021), effectuation, design thinking, and lean experimentation (Brown et al., 2021), or the RCOV (resources, competences, organisational structure, value propositions) model proposed by Boldrini and Antheaume (2021).

Governance methods. We found only a few articles discussing the governance methods for managing the collaborations within sustainable partnerships (Witjes & Lozano, 2016). The governance methods may be helpful for stakeholders of each helix to know for their own use, but the literature focuses mainly on governments and brokers, such as associations, NGOs (Yu et al., 2014b), software companies, or tech developers

(Fischer & Pascucci, 2017), or any other intermediary organisation that is in multi-helix partnerships (Barrie et al., 2019). The primary purpose of governance methods is to make sure multiple helices or stakeholders are engaged (Witjes & Lozano, 2016), knowledge is being developed, and flows of knowledge, resources, and feedback are facilitated, resulting in innovative solutions (Ruggieri et al., 2016).

Stakeholders who would govern all five helices could take the initiative to set up informational activities, training and educational programs, workshops, conferences, seminars, forums (Witjes & Lozano, 2016), or thematic meetings (Aid et al., 2017), or develop certifications or validation programs (Sousa-Zomer et al., 2018). Each of these methods may result in a higher rate of inter-dependence for organisations (Yu et al., 2014b) that are collectively focused on creating economic and non-economic value (Boldrini & Antheaume, 2021) whilst also being characterised by systems thinking (Nogueira et al., 2019).

Obstacles of Sustainability Partnerships for Circular Economies

We found several obstacles that may influence the development of sustainable partnerships in CEs. According to Ghisellini and Ulgiati (2020), a misalignment of mindsets between stakeholders may pose an obstacle as it hinders the development of long-term, inclusive, cross-sectoral partnerships for a CE. Nogueira et al. (2019) even specify that besides a stewardship philosophy, systems thinking (or the lack thereof), is an important “mindset” obstacle.

Sousa-Zomer et al. (2018) explain there is also need for exemplary leadership, that has a long-term vision of sustainability. Leaders need to be able to show openness to change, an understanding of socio-cultural sensitivities (Ibn-Mohammed et al., 2021), and be apt enough to overcome soft barriers to behavioural or social changes (Campbell-Johnston et al., 2019; Sousa-Zomer et al., 2018). Essentially, developing partnerships remains an inter-individual phenomenon, and without the proper alignment, behaviours, and attitudes (Ibn-Mohammed et al., 2021).

Because of the right mindsets and thinking of individual stakeholders, potential distrust (Yu et al., 2014b) can be overcome, and specific or complementary roles can start to be developed and distributed across the collective group of partners in the QHM, allowing for the development, sharing, and application of sustainability knowledge (Carayannis & Campbell, 2010). Even if stakeholders are willing to cooperate and develop openly and collaboratively knowledge and innovations (Galvao et al., 2019), they still may be hindered due to a lack of engagement interest, time, or resources (Aid et al., 2017). Another obstacle may be attributed to a lack of interest or priority in circularity in terms of company culture (Sousa-Zomer et al., 2018).

The literature has paid a lot of attention towards governments in supporting and stimulating the CE (Arsova et al., 2021). It comes as no surprise that potential obstacles we found are related to laws, rules and norms (Ruggieri et al., 2016; Sousa-Zomer et al., 2018), policies (Arsova et al., 2021; Ghisellini & Ulgiati, 2020), and regulations set forth by governments (Ibn-Mohammed et al., 2021; Stumpf et al., 2021). In some cases, the level of complexity of administrative requirements, as well as the lack of standardisation and coordination of legislation, has had a significant impact on the collaborations between stakeholders. Furthermore, subsidies, taxation, and rights (Arsova et al., 2021; Fischer & Pascucci, 2017; Ruggieri et al., 2016; Sousa-Zomer et al., 2018) have also been pointed out as make-or-break mechanisms.

The potential need for business model adaptations to become more circular may hinder some stakeholders from either developing or entering into partnerships (Stumpf et al., 2021). Not only may this adaptation represent a risk in terms of cannibalisation, resource usage, or geographical dispersion (Sousa-Zomer et al., 2018), it could also require high amounts of investments (Aid et al., 2017; Ibn-Mohammed et al., 2021), and not all companies have the necessary capital available (Ghisellini & Ulgiati, 2020). Considering the niche nature of the CE (Campbell-Johnston et al., 2019), and its relatively complex market dynamics (Aguilar-Hernandez et al., 2021), some organisations may face market and operational obstacles. Additionally, the presence or lack of (technological) resources can furthermore influence an organisation's capacity to participate in sustainable partnerships.

Finally, in terms of process obstacles, the initiation phase may be characterised by certain stakeholders who face within their organisation risk aversion (Sousa-Zomer et al., 2018), or conflicts of interests (Sousa-Zomer et al., 2018) with other stakeholders. Ghisellini et al. (2016) explain that the lack of collaborative or enabling platforms may also form an obstacle, as those regions who have implemented them have benefited from stakeholder role distribution, collectivistic behaviour stimulation, balanced decision-making power distribution (Franco, 2017), or knowledge dissemination (Sousa-Zomer et al., 2018).

However, without strong customer demand for CE products and services, any of these efforts may seem futile (Lieder & Rashid, 2016; Ruggieri et al., 2016). As such, the development of sustainable partnerships for CEs needs to be truly inclusive, for long-term collaborative processes, a circular vision, business-model innovation, efficient network dynamics, and actor learning to come to fruition (Brown et al., 2021).

Discussion

Tackling sustainability challenges requires stakeholders to engage in complex and delicate processes, where a dynamic, systematic, or holistic perspective on achieving systemic change is crucial (Pesce et al., 2020). It requires furthermore a mind shift, as sustainable partnership development fundamentally builds on generating trust (Brown et al., 2020; Yu et al., 2014b) amongst stakeholders who may not speak the same language or be wary of one another's objectives and agendas. We aimed to use a literature review to answer the question of how sustainable partnerships are developed for CEs. Employing the quintuple helix framework as a theoretical lens, we analysed 59 articles, and proposed a clover model composed of three building blocks essential for stakeholder engagement in the CE: (1) vision, (2) stakeholders, and (3) processes. Within these building blocks, we identified nine enabling mechanisms, as well as nine clusters of obstacles (mentality, business model, markets, culture, resources, technology, networking, consumers, and rules) that may hinder the development of Sustainable partnerships in CEs. In what follows, we elaborate on how we have contributed to the literature, as

well as what future research avenues could be pursued based on our insights.

Brown et al. (2021) pointed out that most companies are inexperienced or reasonably new to the CE. They are not yet able to either develop or incorporate the CE in their business models, let alone incorporate sustainable partnerships. As such, gaining access to resources and materials, knowledge, experience, and expertise from a network, system or quintuple perspective could benefit both business and society. This study provides a comprehensive checklist as a method “to build strong, long-term partnerships” (Aid et al., 2017, p. 85). Furthermore, we answer the call for more insights that go beyond the organisational level of cross-sectoral partnerships (Brown et al., 2021) and provide more insights into the impacts of “relationships between various helices of economies, societies, and environments” (Galvao et al., 2019, p. 828). Additionally, following the examples of Brown and colleagues (2021) and Leising and colleagues (2018), this literature review contributes to a growing body of research on CE stakeholder relationships (Ozkan-Ozen et al., 2020; Sousa-Zomer et al., 2018). The theoretical contribution lies in the proposed building blocks, as well as the enabling and hindering mechanisms acting as ingredients to form a blueprint for sustainable partnership development in CEs. By taking on a trans-disciplinary perspective (Carayannis & Campbell, 2021), the overview provided offers a systematic appreciation of sustainable partnerships, and points out the complexity of developing sustainable partnerships within a CE.

We contribute to the growing body of literature found at the intersection of CE and QHM literatures (Durán-Romero et al., 2020). We offer the means for those who manage or aim to coordinate CEs (i.e., incubators, governments, or even a joint-stakeholder collaboration) to identify potential sources of opportunities or conflicts, as well as reflections on current and future stakeholder engagement processes. Different stakeholders from various helices can evaluate the extent to which partnerships have been developing, and the extent to which their efforts have overlapped or remained separate. Therefore, it may encourage different societal stakeholders to look beyond their own perspectives and take on a more systemic, inclusive approach. This is relevant for theoretical discussions on how knowledge is developed, applied, and distributed,

and also for managers to understand how to set up CE principles and partnerships.

Additional insights through a more elaborate, systematic literature review could further complement or confirm the proposed model. The three building blocks identified provide a valuable starting point for future research efforts, especially for research methods other than literature reviews. For instance, Alhawari et al. (2021) called for more empirical research, and Pesce et al. (2020) for more quantitative research. Furthermore, we identified a lack of dynamic and network-centric perspectives in the literature. This suggests a need for a more holistic, longitudinal perspective when analysing the different mechanisms and building blocks of sustainable partnerships. As we found just four linear models for sustainable partnership development, the creation of a circular or iterative development model would seem to be the next logical and evolutionary step.

We suggest developing a contingency theory that would allow the literature to incorporate a more fine-grained analysis of the dynamics between the enabling and hindering mechanisms associated with different helices, in different phases of sustainable partnership development. This would allow for more efficient or optimised quintuple helix constellations for CEs to be developed. Besides our own suggestions, various calls for future research were present in the literature, mainly requesting more critical, organisational, and stakeholder-themed research.

Brown et al. (2021) called for more practice-based research in case studies, in order to avoid potential retrospective, subjective biases. Pesce et al. (2020) also required a more critical perspective on possible discrepancies between the actions, beliefs, and commitments of quintuple stakeholders towards CE and one another. Aid et al. (2017) called for more insights into shared values, activities, and objectives across different (circular) business models. Furthermore, Ghisellini and Ulgiati (2020) refer to various organisational characteristics that may influence the organisational capabilities to enter into sustainable partnerships. Pesce et al. (2020) also called for more research into CE strategies, how various quintuple stakeholders perceive them, and how they turn these strategies into practice and activities. Understanding how technology may influence the development of sustainable partnerships for CEs is

also of great interest for both research and practice (Aid et al., 2017; Campbell-Johnston et al., 2019; Ibn-Mohammed et al., 2021).

Alhawari et al. (2021) called for a better understanding of why some stakeholders are so much more important to or influential than others. Maruccia et al. (2020, p.10) called for more research into “multi-stakeholder compositions”, and Türkeli et al. (2018) expect it to be fruitful to discuss stakeholder engagement for CEs at the international level rather than the local or regional level. Sumter et al. (2020) called for more research into the CE competencies of stakeholders. Finally, Arsova et al. (2021, p. 4916) called for more research to better understand the borders and barriers between “each stakeholder when engaging in CE activities”. Stakeholders within the academia helix of the QHM are ideally positioned to contribute towards the development, dissemination, and application of knowledge for the CE, but insights are currently limited regarding their roles, involvement, and potential. Based on the various calls for future research previously mentioned, we think there is a need for this helix to further intensify their efforts in terms of community involvement and to look past their classical roles as researchers and educators.

Conclusion

Although collaborative efforts are vital for solving the myriad of sustainability issues our societies face, insights into how to develop such efforts across different sectors, including industries, academia, governments, and civil society organisations, are still nascent. Considering that each stakeholder has unique strengths, priorities, and ways of working, it is not a straightforward answer to developing complementary, long-lasting partnerships that span sectors and focus on joint efforts to eradicate wicked problems. Through this literature review, we developed a theoretical framework, which may serve as a community-building tool to unite and guide those stakeholders mentioned above towards a mutual understanding of the possibilities of sustainable partnerships and the challenges for CEs. We have identified three building blocks (vision, stakeholders, and processes), nine underlying enabling mechanisms, and nine clusters

of obstacles that can influence the development of sustainable partnerships in CEs. There is a significant challenge impeding the sustainability transformation of our society, which can be attributed to partnerships that are either developed ad hoc or face high rates of failure or conflict. This represents a waste of time, effort, and resources that our model may overcome by identifying and focusing on those enablers and obstacles that lay at the foundation of the development of a sustainable network of partner stakeholders for the circular economy.

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