SUSTAINABLE INTERNATIONAL BUSINESS MODEL INNOVATIONS FOR A GLOBALIZING CIRCULAR ECONOMY: A REVIEW AND SYNTHESIS, INTEGRATIVE FRAMEWORK, AND OPPORTUNITIES FOR FUTURE RESEARCH

WEB APPENDICES

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Web Appendix 1:
Sustainable International Business Model Innovations and Designs

Sustainable International Business Model Innovation 1: Circular Inputs

Defined as the "use of renewable energy, bio-based or potentially completely recyclable materials" (Lacy, Long, & Spindler, 2020: 19), circular inputs have two distinct designs: (1) build to last and (2) circular supplies (Arponen, Juvonen, & Vanne, 2018). Based on the notion that resources are scarce (Lieder & Rashid, 2016), the first business application creates products that withstand the test of time and are not difficult to repair as they are redesigned for modularity (Bocken, de Pauw, Bakker, & van der Grinten, 2016; Ghisellini, Cialani, & Ulgiati, 2016; Stahel, 2016). This occurs at the product design stage in Figure 1 and allows for easy upgrade or extended life of the product with considerably less waste in the supply network than manufacturing and delivering a completely new good or service (Geissdoerfer, Morioka, de Carvahlo, & Evans, 2018; Kirchherr, Reike, & Hekkert, 2017; Su, Heshmati, Geng, & Yu, 2013; Wang, Zhang, & Guan, 2016). This could be applied as a convenient adaptive response to different informal institutional perceptions of product use and life across countries (Dow, 2006; North, 1991; Scott, 1995). Relating this CE example to national cultural values (Hofstede, Hofstede, & Minkov, 2010), countries that are high in uncertainty avoidance may prefer the stability of more frequent product upgrades, as they have an aversion to the unknown of possible product malfunctions through extended use. Meanwhile, nations low in uncertainty avoidance could be more likely to emphasize extended use as their cultural focus may accept the ambiguity such actions represent. The result is that the cross-national SME or MNE must adjust their processes internationally to design their marketing efforts for these various conditions.

The second design, circular supplies, relates to the renewable or non-renewable supply resources used for the regeneration and development of products (Arponen et al., 2018; Lacy & Rutqvist, 2015; Sitra, 2015). Utilizing the idea that a firm's production processes for goods and services benefit from recyclable supplies (Feng & Yan, 2007; Liu & Bai, 2014; Vickerson, 2016), the use of a variety of materials can be applied at the sourcing stage as found in Figure 1. For example, while 320 tons of gold

are required to manufacture new electronics every year worldwide, enacting proper recycling practices could yield a 50% recovery in developing countries and 95% in developed economies (LeBlanc, 2019). As they are seen as no longer usable, developed countries usually send their leftover electronics to developing economies for disposal (Wang et al., 2016). This creates many possibilities for adaptative applications to procure circular supplies across international SMEs and MNEs in the same industry, as many use similar components and materials for their products. For instance, firms can configure their supply networks based on the countries with the highest concentration of their needed materials for specific products. As the supply of the materials diminishes, the company would move to other nations to source more materials. Such adaptation could be required to keep up with customer demand.

Sustainable International Business Model Innovation 2: Sharing Platforms

The second CE business model focuses on sharing platforms (Arponen et al., 2018; Korhonen, Nuur, Feldmann, & Birkie, 2018; Orasmaa, Laurila, & Liimatainen, 2020). Relating to "increased usage rates through collaborative models for usage, access, or ownership" (Lacy et al., 2020: 19), this facet of circularity addresses the need for firms to increase their capacity to provide a greater positive contribution to the environment, society, and profitability uniquely (Ellen MacArthur Foundation, 2018; Korhonen, Honkasalo, & Seppälä, 2018). As found in Figure 1, this design emphasizes continual product use. While consumers in Asia-Pacific markets favor sharing the most, those in Latin America, the Middle East, and Africa also find this business model innovation meets their needs (Lacy & Rutqvist, 2015). Significant examples in the transportation setting are Airbnb, Lyft, Uber Freight, and Zipcar in which assets are shared to create value for both individual consumers and corporate customers (Amit & Zott, 2001; Arponen et al., 2018; Lacy et al., 2020; Lacy & Rutqvist, 2015). Based on these issues concerning informal institutional influences such as cultural values related to sharing (Hofstede et al., 2010; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995), companies could adapt their product offerings by allowing different-sized vehicular capacities for the countries in which they operate. In other words, greater capacity per vehicle could be made available in collectivism-based nations which value sharing more.

Meanwhile, individualism-focused countries with minimal sharing emphasis may have less capacity per vehicle but more transportation options offered.

Sustainable International Business Model Innovation 3: Product as a Service

The third CE business model, product as a service, emphasizes "product use with retention of the product at the producer to increase resource productivity" (Lacy et al., 2020: 19). Also referred to as servitization with the possibility to reduce a firm's environmental footprint by 20-50% usually but potentially up to 90% (Lacy et al., 2020; Tukker, 2004), this business model has at least two specific designs: (1) product as a service and (2) performance as a service (Arponen et al., 2018; Orasmaa et al., 2020). The first approach typically applies a subscription or usage-related charge rather than the customer owning the product outright. This application is meant to offer a product service system that allows the company to maintain the product through its complete usage cycle: design, use, maintenance, reuse, remanufacture, and recycling (Kirchherr et al., 2017; Lacy & Rutqvist, 2015; Tukker, 1995). In Figure 1, this approach is based on repetitive product use. An example of this design lies with Michelin, which creates value by permitting truck fleets to lease tires rather than purchase them (Amit & Zott, 2001; Arponen et al., 2018; Lacy et al., 2020; Stahel, 2016; Zott & Amit, 2010). Such a design can be adapted internationally based on the roadway conditions in different countries. As an example, nations with relatively cold climates would require products restricted to winter requirements while more tropical locations would not have such needs. Therefore, differences in the global marketplace will impact the types of CE-based applications a firm may offer.

The second design relates to performance as a service (Arponen et al., 2018). Stated differently, this method has offerings that provide service and quality levels that are predetermined and the firm guarantees results agreed to with the customer. Similar to the previous design, performance as a service is noted in Figure 1 as based on recurring product use. An example of this approach is found at Philips (Lacy & Rutqvist, 2015). In the company's lighting division, the types of lighting and levels of service are agreed to with business clients. As a result, Philips is motivated to transform its approach and capture value to be as efficient as possible in energy consumption to increase financial performance (Bocken et

al., 2016; Chesbrough & Rosenbloom, 2002; Lepak, Smith, & Taylor, 2007; Zott, Amit, & Massa, 2011). This approach can be adapted based on specific country-wide institutional regulations concerning energy consumption (DiMaggio & Powell, 1983; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995). For instance, if there are national laws encouraging energy conservation or other CE-specific goals, product offerings provided by the cross-national SME or MNE may be more detailed and complex to achieve those objectives. Meanwhile, in locations without or with very few such laws, the requirements are likely to be very basic.

Sustainable International Business Model Innovation 4: Product Use Extension

The fourth circular business model, product use extension, concerns the "prolongation of product use through repair, reprocessing, upgrading and resale" (Lacy et al., 2020: 19). This approach has four designs: (1) repair and maintain, (2) upgrade, (3) resell, and (4) remanufacture (Arponen et al., 2018). The first, repair and maintain, addresses the ability of the company to provide services that restore and retain its existing products for life extension. The relevance of this design is for firms to improve defective and/or old products so they may be restored to their original functionality and extend their life (Kirchherr et al., 2017; Lacy & Rutqvist, 2015; Stahel, 2016). As shown in Figure 1, this application is driven by persistent product use. An instance of this perspective comes from Nokia. In its implementation, the firm innovated to extend the value of its older equipment and decreased operating expenses by 20% (Arponen et al., 2018; Bocken et al., 2016; Chesbrough & Rosenbloom, 2002). The approach can be adapted by country as the defective and/or old products which exist internationally typically are not uniform. As in the example, there can be industry-specific differences in institutional standards and requirements across markets (DiMaggio & Powell, 1983; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995). By changing marketing efforts within specific countries due to this, the firm is more responsive to customer needs.

The next design, upgrade, includes the capacity of the organization to increase the performance of its products with an improvement of existing or the addition of new features (Arponen et al., 2018; Lacy & Rutqvist, 2015). Even though this is an incremental application within the CE context (Stahel, 2016), it nonetheless provides the firm the opportunity to create value by selling an update of the original product

(Amit & Zott, 2001; Kirchherr et al., 2017; Zott & Amit, 2010). Related to the previous design, this approach involves prolonging product use as noted in Figure 1. Adaptation would vary cross-nationally based on the informal institutional cultural values driving perceptions related to upgrading used products (Hofstede et al., 2010; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995). A country with a high long-term orientation may value more highly the opportunity to enhance an existing product to save money for other pursuits, while short-term-oriented cultures may be less inclined to do so. Based on these differences, the company would need to reconfigure its marketing practices to adapt.

The third design relates to reselling (Arponen et al., 2018). To define this approach more precisely, it focuses on the ability to offer products to second and third-hand markets either domestically or internationally (Ellen MacArthur Foundation, 2014). This reuse of goods or services reduces excess as it links original users of a product with those willing to utilize it even though it is less than new (Ellen MacArthur Foundation, 2017a, 2018; Kirchherr et al., 2017; Liu & Bai, 2014). The potential success of this approach is seen, for instance, in the fact that 60% of German and Chinese consumers believe they have more clothes than needed (Ellen MacArthur Foundation, 2017b). Taken further, the same study found clothing collected for reuse was 25% worldwide, 75% in Germany, and 10-15% in the United States and China. As noted in Figure 1, this design serves as a link from product use to marketing and sales. H&M has introduced a new offering by selling used clothes at some locations based on the notion that revenues can increase by as much as 50% to capture value with a reselling initiative (Arponen et al., 2018; Lacy et al., 2020; Zott et al., 2011). This practice already is pervasive in some locations like Uganda, where 81% of clothing purchases are in second-hand markets (Ellen MacArthur Foundation, 2017b). Design can be very country-specific, and locations with informal institutional norms and routines in place supporting product reuse will be much more open to this CE application, while locations without such traditions would be more difficult for firms to establish a presence (DiMaggio & Powell, 1983; Scott, 1995).

Remanufacture emphasizes the ability of the organization to take a product from the market, conduct top-quality restoration, ensure its functionality has been improved to its original standing, and

then remarket it at a lower price (Arponen et al., 2018). This approach allows for less strain to be placed on the supply network through a process of rebuilding the product while still providing social benefits in terms of employment (Ellen MacArthur Foundation, 2014). The goal of remanufacturing is to fix the discarded parts and products which may be considered irreparable by the first-hand market (Bocken et al., 2016; Kirchherr et al., 2017; Stahel, 2016). The application of this design can be seen in Figure 1 as relating product use to either manufacturing or sourcing, depending on the location of the value-added activities required. One approach can be found at Carwood, an international SME based in the United Kingdom, which provides refurbished automotive, electrical, and mechanical products to private and military customers in Europe, Asia, and Australia (Carwood, 2023). As such, multiple aspects of the marketing process can be adapted based on the distinct qualities of specific countries. For instance, nations with relational systems that encourage precision, industriousness, and materials recycling are more likely to produce and sell goods and services related to designs requiring these traits. Based on these issues, national differences on a global scale would need to be accounted for at the cross-national SME or MNE in its procedures.

Sustainable International Business Model Innovation 5: Resource Recovery

Distinguished as the "recovery of usable resources or energy from waste or by-products" (Lacy et al., 2020: 19), the last CE business model of resource recovery is popular among exporters and has five designs, ranging from possessing the most circularity to the least: (1) waste prevention and avoidance, (2) recycle in closed loops, (3) upcycle, (4) downcycle, and (5) energy recovery (Arponen et al., 2018; Lacy et al., 2020; Lacy & Rutqvist, 2015). This application has far-reaching effects as most of the designs involve the repurposing and/or reclaiming of material as critical to sourcing (Rose & Bharadwaj, 2023). The first, waste prevention and avoidance, is the most preferable design and in Figure 1 refers to the ability of the company and its customers and/or consumers to be efficient in product design, sourcing, manufacturing, logistics, marketing and sales, and product use so there is zero excess remaining (Lacy et al., 2020). This is seen particularly in countries with informal institutional norms that encourage conservation (DiMaggio & Powell, 1983; North, 1991; Scott, 1995). Within the context of the SME or

MNE, this design would be particularly successful if products that require minimal resource usage were offered in these nations. This could be a product adaptation for a large market that diverges from the typical company offerings. As a result, this alteration would account for an adjustment to customer tastes at the national level in the global environment.

Identified in Figure 1 as connecting disposal to sourcing, the second design focusing on recycling in closed loops is typically applied by taking agricultural, industrial, or human waste in countries such as Kenya and the United Kingdom and using specific processes to create products like animal feed or soil-enriching and crop-specific fertilizer (CCm Technologies, 2023; Ellen MacArthur Foundation, 2023a, 2023b; Safi Organics, 2023; Sanergy, 2023). An adaptation approach would be appropriate as there are different soil and crop conditions worldwide. For instance, some countries have specific laws put in place by national institutions concerning recycling plastics, metals, glass, and compost while others have minimal such regulations (DiMaggio & Powell, 1983; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995). This variation provides ample opportunity for firm-level adaptation to develop and offer products. As the governmental rules in place can influence perceptions and behavior toward recycling efforts so countries with stronger CE-oriented institutions can encourage citizens and companies to act more aligned with CE principles, it is expected that the international SME or MNE may change approaches across countries.

The next design deals with upcycling and emphasizes the application of waste to produce something of higher quality than previously (Lacy et al., 2020). Like the previous approach in Figure 1, this design ties disposal to sourcing and is done frequently in the textile industry (Savage, 2022). One firm that deploys this approach is Dow, which diverted 100 tons of plastic waste from landfills and converted it into 40 kilometers of durable roadway in India (Sitra, 2020). Other industrial applications related to building materials such as steel and cement can be dismantled, diverted, traced, redesigned, and upcycled for a net-negative carbon impact in new building constructions (Fennell, Driver, Bataille, & David, 2022; Sanderson, 2022). The different informal institutional norms and cultural values across countries concerning the sourcing of materials for products and their meaning to the consumer become a

basis for a company's adaptation (DiMaggio & Powell, 1983; Hofstede et al., 2010; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995). For instance, in conditions where indulgence is high, upcycled products may be less popular as these consumers prefer pleasure and leisure since the upcycling process could be deemed as reflective of hardship. Meanwhile, in nations with high restraint, the use of upcycling may be more successful due to national customers that delay gratification.

The fourth design, downcycling, is the opposite of upcycling and instead uses waste to develop a product of lesser value than before (Lacy et al., 2020). Similar to the previous two approaches, this design is seen as relating disposal to sourcing in Figure 1. Currently, this is a widely used application of CE principles that avoids sending materials to landfills. European Union (EU) policy has decreased landfills as the destination for 36% of construction and demolition material through downcycling efforts and directs the reuse of concrete, for instance, to contribute to road construction or new building foundations (Di Maria, Eyckmans, & Van Acker, 2018; Zhang et al., 2020). As such, the conditions for creating downcycling-based products are distinct and can require adaptation based on the formal country and regional institutional laws concerning the disposal of many types of waste (DiMaggio & Powell, 1983; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995). Since a more economically developed region such as the EU would likely have regulations encouraging the increased reuse of discarded waste for downcycling, adaptation for more potential business opportunities may exist in comparison to many developing countries. In fact, in nations without a legal framework in place to encourage such behavior, there is considerably less possibility for firms to source or manufacture products through downcycling.

The last design is energy recovery and relates to the remains of the production and/or consumption process used as energy (Ellen MacArthur Foundation, 2020; Kirchherr et al., 2017). Typically, processes such as anaerobic digestion, composting, and incineration of municipal solid waste are used in the conversion process and can address up to 50% of energy demand (Boloy et al., 2021; Tomić & Schneider, 2018). There are two different instances of this design in Figure 1. The first is similar to the previous designs and links disposal to sourcing. However, the second example relates manufacturing and/or logistics, depending on the location of the energy use, to sourcing. More precisely,

an application of this design can be found in Walmart. The company has innovated its business model to convert more than 500,000 tons of used cooking oil to produce biodiesel and other products (Lacy & Rutqvist, 2015). There is the potential for adaptation internationally with energy recovery, as well. For instance, in countries with greater governmental and institutional control over the disposal of potential energy sources such as compost and/or cooking oil (DiMaggio & Powell, 1983; Ioannou & Serafeim, 2012; North, 1991; Scott, 1995), a company will be more likely to conduct energy recovery as part of its business processes. Meanwhile, in locations where there is little regulation on the dumping of reusable energy supplies, the firm would be less likely to apply this design.

Combining Sustainable International Business Model Innovations

While each of the CE business models presented above is vital for firms to heighten their sustainability efforts, this does not mean their applications are mutually exclusive. In fact, 70% of firms utilizing CE applications use one circular business model (Lacy & Rutqvist, 2015). As such, to create, deliver, and capture more value, firms sometimes find it more beneficial to combine these business models to intensify their impact (Bocken et al., 2016; Lepak et al., 2007; Zott et al., 2011). For instance, as 20% of CE firms use two sub-strategies and 10% use three or more, an internationally-focused SME or MNE could integrate multiple circular business models to span product development, sourcing, manufacturing, marketing and sales, product use, and disposal to implement circularity very effectively (Lacy & Rutqvist, 2015). Below, seven examples are provided of international companies combining circular business models.

The first case relates to operations at Agricycle (now Field Better) which is based in the United States. Due to the processing technology, it sells to companies such as the Jali Fruit cooperative, their solutions apply two sub-strategies of resource recovery – waste prevention and avoidance as well as downcycling – by drying produce to significantly increase shelf life and also using the product's remains for compost, farmer wages increase by as much as seven times the average local wage (Field Better, 2023; Ellen MacArthur Foundation, 2023c). The second approach addresses the processes De Clique, based in the Netherlands, has in place. The company gathers food and other organic by-products to apply

another two sub-strategies of resource recovery: upcycling and downcycling (Lacy et al., 2020). For upcycling De Clique partners with companies such as Peelpioneers and De Leckere to make cleaning products and beer, while the firm works with Rotterzwam to use the organic by-products as compost to grow tea, mint, and raw materials which become popular snacks (De Clique, 2023; Ellen MacArthur Foundation, 2023d). The third instance relates to Gerrard Street from the Netherlands, as well. In its synthesis of CE business models, the firm applies the product as a service and resource recovery examples to provide a subscription service for modular headphones with 85% of re-usable components so they can be recovered and recycled at the end of the product's usage life (Ellen MacArthur Foundation, 2023e; Gerrard Street, 2023).

The fourth application is found in Nike. As a part of its Grind brand, circular principles are applied by using the circular inputs and resource recovery business models for utilizing pre- and post-consumer waste to supply companies with raw materials to manufacture products as varied as cellphone cases, bike-share e-stations, and basketball courts (Lacy et al., 2020; Nike Grind, 2023). The fifth example is Dell. The firm uses the product use extension and resource recovery business models in its Reconnect program to encourage donations or buybacks of computers and accessories which results in a 35% recycle rate, parts used in about 90 products, and savings of about $2 million (Deck, 2016; Lacy et al., 2020). The sixth instance relates to ABB. Employing the circular business models of circular inputs and product use extension, the company has a very stringent sustainability sourcing strategy and offers the ABB Drive Exchange and ABB Transformer Remanufacturing and Engineering Services programs to provide considerable cost savings to customers through the product refurbishment process (ABB, 2006, 2018; Arponen et al., 2018). The last example concerns Volvo. Applying the circular inputs and product-as-a-service circular business models, the firm's trucks are made from about 33% recycled materials while its Volvo Gold Contract includes a maximum level of uptime, diagnostics, upkeep, and repairs for truck fleets (Arponen et al., 2018; Volvo, 2020, 2023). As a whole, these seven examples indicate how international marketers at both cross-national SMEs and MNEs can utilize multiple CE business models and sub-strategies to maximize performance.

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Web Appendix 2:
Method Details

The articles included in this study resulted from the syntax searching the title, abstract, author-supplied keywords, and reference identifiers in the WOS database (Clarivate Analytics, 2021; Foroudi, Kitchen, Marvi, Akarsu, & Uddin, 2020). The first intellectual structure is based on a seminal marketing and sustainability study but extends it by using the specific journals and keywords related to these themes and then modifying the search to fit the purposes of the current research (Chabowski, Mena, & Gonzalez-Padron, 2011). Based on our goal to examine business model innovations in an international setting, this starting point was expanded to include the international (Cuervo-Cazurra, 2012) and business model (Zott, Amit, & Massa, 2011) contexts which resulted in two intellectual structures: one on the international sustainability and business model innovation interface[1,2,3] and the other on the international marketing and CE interface.[4] The resultant data gathered 12,651 citations in 184 articles (5,331 citations in 74 articles for the international sustainability and business model innovation interface and 7,320 citations in 110 articles for the international marketing and CE interface). Next, the retrieved data were examined for consistency and each article was given a unique identifier for citation and co-citation analysis. Editorial material, book reviews, biographical items, method-related articles, and other non-theory-related research were excluded from the study's data to maximize the opportunity for theory-based representation (Zha, Melewar, Foroudi, & Jin, 2020).

Once the citations were evaluated, the most influential (i.e., most highly cited) publications for each intellectual structure were determined. Typically, in bibliometric research, ideal goodness-of-fit (low stress) values can be achieved with about 25 of the most influential publications in a given two-dimensional intellectual structure (Ramos-Rodríguez & Ruíz-Navarro, 2004).[5] For the international sustainability and business model innovation results, 31 influential works were included due to identical citation counts, and 26 publications resulted for the international marketing and CE intellectual structure.

Since bibliometric analyses use MDS as a method to visually illustrate domains, the data were normalized with Ochiai coefficients as this approach is better than applying cosine or Pearson similarities

because the co-citation matrices in this study included co-occurrence and binary data (van Eck & Waltman, 2009; Zhou & Leydesdorff, 2016). Co-citation data reflect the closeness of publications based on the number of times they are cited together in articles in the sample gathered from the WOS database, thus making the value of a co-citation proximity-based model critical. This necessitates the use of the MDS function PROXSCAL (Commandeur & Heiser, 1993).

To test the veracity of the models in the study, the stress values of the two intellectual structures were calculated and evaluated. Specific thresholds have been established in the literature which indicate the fit quality of a particular model: 0.00 to 0.025 is a perfect fit, 0.025 to 0.05 is an excellent fit, 0.05 to 0.10 is a good fit, 0.10 to 0.20 is a fair fit, and 0.20 and higher is a poor fit (Kruskal, 1964; Ramos-Rodríguez & Ruíz-Navarro, 2004). After assessing both models, the international sustainability and business model innovation intellectual structure had a stress value of 0.05914, indicating a good fit to the data, while the international marketing and CE results were at 0.04819, showing an excellent fit.

Standardized Euclidean distances are normally used to construct research groups in business literature MDS co-citation analyses. Therefore, a standardized Euclidean distance of 0.25 or less between two publications was applied to make research publications into groups (Akbari et al., 2022; Colmekcioglu, Marvi, Foroudi, & Okumus, 2022; Foroudi et al., 2020; Zha et al., 2020). As a result, research groups could be formed, but also research cliques (groups with three or more publications) and research chains (interconnected groups) are applied in bibliometric analyses (Borgatti, Mehra, Brass, & Labianca, 2009; Chabowski, Kekec, Morgan, Hult, Walkowiak, & Runnalls, 2018; Wasserman & Faust, 1994). The terms used for each research group and clique were decided based on the nature of the works in the group itself as well as their related articles appearing in the WOS database.

[1] The syntax used for the international sustainability and business model innovation interface intellectual structure is available from the authors upon request.
[2] Syntax was included for this search using the term "ethic*" as the concept is presented in the seminal sustainability work of Carroll (1979) to clearly indicate that ethical conduct is a critical social responsibility of firms.
[3] The 35 journals included for the international sustainability and business model innovation interface intellectual structure included: *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *California Management Review*, *Decision Sciences*, *European Journal of Marketing*, *International Journal of Advertising*, *International Journal of Market Research*, *International Journal of Research in Marketing*,

Industrial Marketing Management, *International Marketing Review*, *Journal of Advertising*, *Journal of the Academy of Marketing Science*, *Journal of Business-to-Business Marketing*, *Journal of Business & Industrial Marketing*, *Journal of Business Research*, *Journal of Consumer Psychology*, *Journal of Consumer Research*, *Journal of International Business Studies*, *Journal of Interactive Marketing*, *Journal of International Marketing*, *Journal of Management*, *Journal of Management Studies*, *Journal of Marketing*, *Journal of Marketing Research*, *Journal of Product Innovation Research*, *Journal of Public Policy & Marketing*, *Journal of Retailing*, *Journal of Service Research*, *Long Range Planning*, *Marketing Science*, *Marketing Letters*, *Management Science*, *Organization Science*, and *Strategic Management Journal*.

[4] The syntax used for the international marketing and CE interface intellectual structure is available from the authors upon request.

[5] Typically, for bibliometric studies, two dimensions are used for analysis. While more dimensions can be specified, many of the goals for using MDS as a bibliometric tool include depicting the intellectual structure of a domain and suggesting future research opportunities. This is based on the requirement that results are interpretable and meaningful (Hair, Anderson, Tatham & Black, 1998). As a result, this study follows established protocol in the bibliometric literature using MDS.

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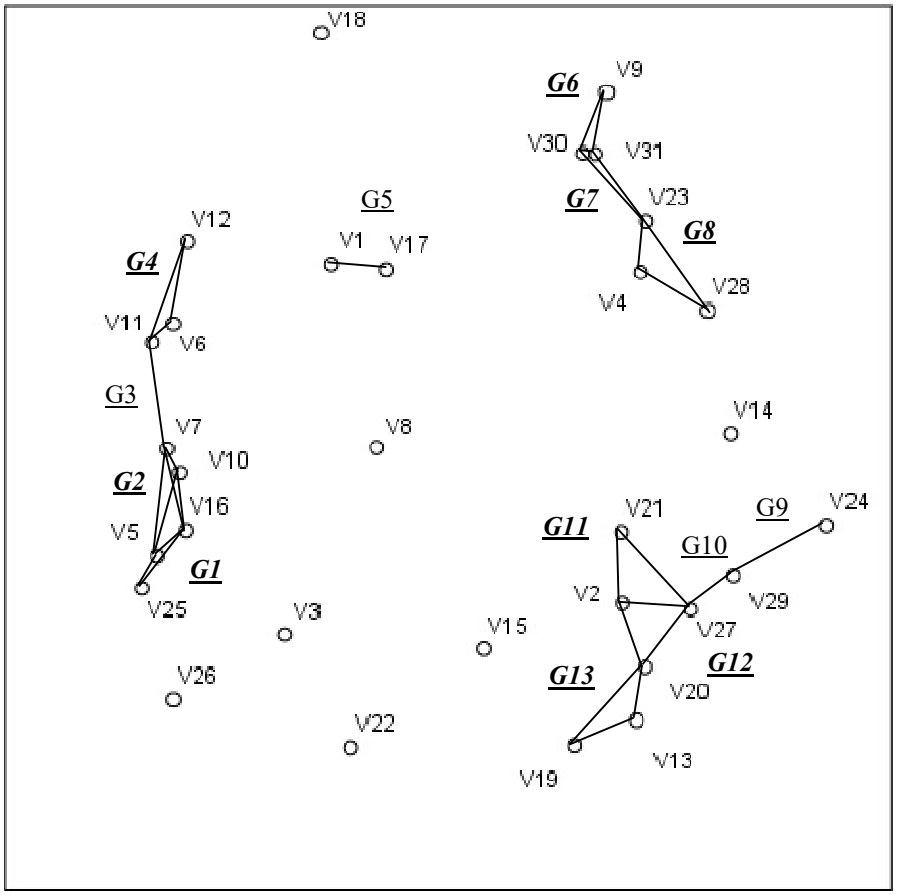
Web Appendix 3:
International Sustainability and Business Model Innovation Interface Intellectual Structure

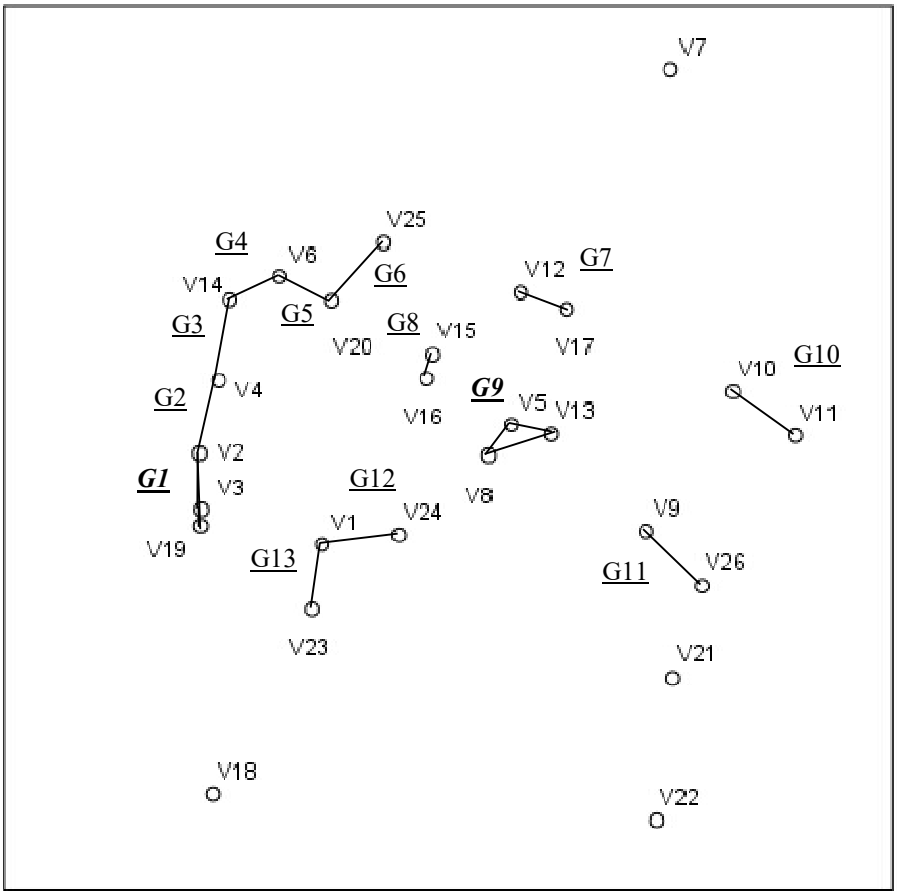


Notes: Stress value = 0.05914; standardized Euclidean distance ≤ 0.25; ***bolded and italicized*** research group abbreviations indicate research cliques.

V1 = Amit & Zott (2001); V2 = Anderson & Markides (2007); V3 = Barney (1991); V4 = Chesbrough & Rosenbloom (2002); V5 = Clarkson (1995); V6 = Coff (1999); V7 = Donaldson & Preston (1995); V8 = Dyer & Singh (1998); V9 = Eisenhardt & Martin (2000); V10 = Freeman (1984); V11 = Harrison, Bosse, & Phillips (2010); V12 = Lepak, Smith, & Taylor (2007); V13 = London & Hart (2004); V14 = Mair & Martí (2006); V15 = Margolis & Walsh (2003); V16 = Mitchell, Agle, & Wood (1997); V17 = Porter (1998); V18 = Porter & Kramer (2006); V19 = Prahalad (2004); V20 = Prahalad & Hammond (2002); V21 = Seelos & Mair (2007); V22 = Suchman (1995); V23 = Teece (2010); V24 = Teegen, Doh, & Vachani (2004); V25 = Vargo & Lusch (2004); V26 = Vargo & Lusch (2008); V27 = Webb, Kistruck, Ireland, & Ketchen (2010); V28 = Yunus, Moingeon, & Lehmann-Ortega (2010); V29 = Zahra, Gedajlovic, Neubaum, & Shulman (2009); V30 = Zott & Amit (2010); V31 = Zott, Amit, & Massa (2011).

Group 1 (G1) (V5, V16, & V25): Stakeholder Identification, Service Orientation, and Corporate Social Performance, Group 2 (G2) (V5, V7, V10, & V16): Stakeholder Identification, Corporate Strategy, and Social Performance; Group 3 (G3) (V7 & V11): Corporate Stakeholder Management and Competitive Advantage; Group 4 (G4) (V6, V11, & V12): Value Dynamics, Bargaining Power, Stakeholder Management, and Competitive Advantage; Group 5 (G5) (V1 & V17): Value Creation and Competitive Strategy; Group 6 (G6) (V9, V30, & V31): Business Model Design; Group 7 (G7) (V23, V30, & V31): Strategy, Innovation, and Business Model Design; Group 8 (G8) (V4, V23, & V28): Strategy, Innovation, Value Capture, and Social Business Models; Group 9 (G9) (V24 & V29): Global Governance, Value Creation, and Social Entrepreneurs; Group 10 (G10) (V27 & V29) : Base of the Pyramid Alliances and Social Entrepreneurs; Group 11 (G11) (V2, V21, & V27): Strategic Entrepreneurial Innovation Process, Profitable Market Creation, and Base of the Pyramid Alliances; Group 12 (G12) (V2, V20, & V27): Strategic Entrepreneurial Innovation Process, Profitable Services, and Base of the Pyramid Alliances; Group 13 (G13) (V13, V19, & V20): Emerging Market Strategy and Base of the Pyramid Service Profitability.

Web Appendix 4:
International Marketing and Circular Economy Interface Intellectual Structure



Notes: Stress value = 0.04819; standardized Euclidean distance ≤ 0.25; ***bolded and italicized*** research group abbreviations indicate research cliques.

V1 = Andersen (2007); V2 = Bocken, de Pauw, Bakker, & van der Grinten (2016); V3 = Feng & Yan (2007); V4 = Geissdoerfer, Morioka, de Carvalho, & Evans (2018); V5 = Geissdoerfer, Savaget, Bocken, & Hultink (2017); V6= Geng, Fu, Sarkis, & Xue (2012); V7 = Genovese, Acquaye, Figueroa, & Koh (2017); V8 = Ghisellini, Cialani, & Ulgiati (2016); V9 = Kirchherr, Piscicelli, Bour, Kostense-Smit, Muller, Huibrechtse-Truijens, & Hekkert (2018); V10 = Kirchherr, Reike, & Hekkert (2017); V11 = Korhonen, Honkasalo, & Seppälä (2018); V12 = Korhonen, Nuur, Feldmann, & Birkie (2018); V13 = Lieder & Rashid (2016); V14 = Linder & Williander (2017); V15 = Liu & Bai (2014); V16 = McDowall, Geng, Huang, Barteková, Bleischwitz, Türkeli, Kemp, & Doménech (2017); V17 = Murray, Skene, & Haynes (2017); V18 = Pearce & Taylor (1990); V19 = Preston (2012); V20 = Rizos, Behrens, van der Gaast, Hofman, Ioannou, Kafyeke, Flamos, Rinaldi, Papadelis, Hirschnitz-Garbers, & Topi (2016); V21 = Sauvé, Bernand, & Sloan (2016); V22 = Schroeder, Anggraeni, & Weber (2019); V23 = Stahel (2016); V24 = Su, Heshmati, Geng, & Yu (2013); V25 = Tukker (2015); V26 = Yuan, Bi, & Moriguichi (2006).

Group 1 (G1) (V2, V3, & V19): Product Design, National Practice, and Global Business Model Strategy; Group 2 (G2) (V2 & V4): Product Design, Supply Chains, and Business Model Strategy; Group 3 (G3) (V4 & V14): Supply Chains and Business Model Innovation Uncertainty; Group 4 (G4) (V6 & V14): National Indicator Systems and Business Model Innovation Uncertainty; Group 5 (G5) (V6 & V20): National Indicator Systems and Business Model Implementation; Group 6 (G6) (V20 & V25): Product Service Offerings and Business Model Implementation; Group 7 (G7) (V12 & V17): Global Circular Economy; Group 8 (G8) (V15 & V16): International Policies and Firm Awareness, Behavior, and Development; Group 9 (G9) (V5, V8, & V13): Manufacturer Environmental Economic Systems and Sustainability; Group 10 (G10) (V10 & V11): Sustainable Development and Implementation Challenges; Group 11 (G11) (V9 & V26): International Strategy Development Barriers; Group 12 (G12) (V1 & V24): Environmental Economics and International Implementation; Group 13 (G13) (V1 & V23): Environmental Economics and Systems Thinking.

Web Appendix 5:
Origins of Integrative Framework Variables

Variable	Source(s)	Term(s)/Phrase(s) Used
INTERNATIONAL RESOURCE DESIGN		
Organizational Culture		
Embedded Values	Anderson & Markides (2007); Korhonen, Nuur, Feldmann, & Birkie (2018); Lieder & Rashid (2016); Rizos et al. (2016)	business model (breakthroughs), norms, values, world views, company environmental culture
Practices and Targets	Lieder & Rashid (2016); Schroeder et al. (2019)	measure target, planned resource-conserving, practices, principles
Policies and Procedures	Lieder & Rashid (2016)	material flow, steady flow process
Cross-Functional Collaboration	Lieder & Rashid (2016); Murray et al. (2017); Schroeder et al. (2019); Su et al. (2013)	collaborative business models, wider … systems in business … decisions, transdisciplinary, international cooperation/ development programs,
Intrapreneurial	Ellen MacArthur Foundation (2020); Lacy et al. (2020)	intrapreneurial culture, (adopt) intrapreneurship, need change agents/intrapreneurs, "outside the box" thinking, innovative thinking, creative … thinking
Customer-Centric	Arponen et al. (2018); Lacy et al. (2020); Sheth et al. (2011); Sitra (2020)	customer-centricity, customer-centric
Leadership		
Innovative Vision	Anderson & Markides (2007); Teece (2010); Yunus et al. (2010)	strategic innovation, business strategy, and innovation, radical service innovation …[and] visionary leadership, pioneering established companies
Sustainability Focus	Geissdoerfer et al. (2018); Genovese et al. (2017); Ghisellini et al. (2016); Porter & Kramer (2006); Webb et al. (2010)	sustainable supply chain management, sustainable development, strategic CSR, entrepreneurship process in base of the pyramid markets
Proactive Management	Feng & Yan (2007); Geissdoerfer et al. (2018); Lieder & Rashid (2016); Rizos et al. (2016); Su et al. (2013); Suchman (1995)	development strategy, pro-active multi-stakeholder management, re-thinking of business models, networking, persuading, demonstrating success, proselytizing
Systems Thinking	Stahel (2016); Zott & Amit (2010)	systems thinking, activity system perspective
Long-Term Perspective	Geissdoerfer et al. (2018)	long-term perspective
Financial Support	Kirchherr et al. (2018); Rizos et al. (2016)	funding, start-up financing, capital
External Stakeholders		
Customers	Kirchherr et al. (2018); Prahalad (2004); Prahalad & Hammond (2002); Preston (2012); Rizos et al. (2016); Stahel (2016); Yunus et al. (2010)	demand network, customers, consumer(s), users

Shareholders	Geissdoerfer et al. (2018); Yunus et al. (2010)	(social-profit-oriented) shareholders
Suppliers	Geissdoerfer et al. (2018); Genovese et al. (2017); Porter & Kramer (2006); Preston (2012)	suppliers, supply/value chain, global/ international supply chains
Investors	Geissdoerfer et al. (2018)	investors
Governments	Geissdoerfer et al. (2018); McDowall et al. (2017); Porter & Kramer (2006); Preston (2012); Stahel (2016); Su et al. (2013); Teegen et al. (2004)	(China's) government(s)
Non-Governmental Organizations	Su et al. (2013); Teegen et al. (2004); Webb et al. (2010)	NGOs, nongovernment(al) organization(s)
Communities/Societies	Feng & Yan (2007); Geissdoerfer et al. (2018); Lieder & Rashid (2016); Porter & Kramer (2006)	public participation, nations, society
Marketing Strategy		
Local	McDowall et al. (2017); Preston (2012); Teegen et al. (2004)	local level/scale/system, local dynamic forces
Regional	McDowall et al. (2017); Porter & Kramer (2006); Preston (2012)	regional competitiveness/scale
Global	Kirchherr et al. (2018); Teegen et al. (2004)	global consensus, global institutional context, global dynamic forces
MARKETING CAPABILITIES ADAPTATION		
Goods/Services		
Innovation/Product Development	Anderson & Markides (2007); Bocken et al. (2016); Feng & Yan (2007); Prahalad & Hammond (2002); Preston (2012); Stahel (2016)	developing affordable products and services, proprietary technological innovation, innovative … equipment, innovation product design
Lifecycle Stage Adaptability	Kirchherr et al. (2017); Lieder & Rashid (2016); Preston (2012); Rizos et al. (2016); Stahel (2016)	product lifecycle, product's lifecycle, the lifespan of products, lifetimes of systems and products, the lifetime of the product
Modular/Standardized Applications	Preston (2012)	modularization/standardization
Sales/Aftersales		
Customer Engagement	Arponen et al. (2018); Ellen MacArthur Foundation (2020); Lacy et al. (2020); Lacy & Rutqvist (2015); Sitra (2020)	(continuous) customer/consumer engagement/experience, engage/engaging customers
Customer Relationship Management	Arponen et al. (2018); Lacy & Rutqvist (2015); Sheth et al. (2011); Sitra (2020)	customer relationships/communities
Customer/Client Retention	Ellen MacArthur Foundation (2020); Lacy & Rutqvist (2015); Sheth et al. (2011)	customer retention/loyalty
Sourcing/Manufacturing		
Efficient Operations	Ellen MacArthur Foundation (2019); Lacy et al. (2020); Lacy & Rutqvist (2015)	optimize operations, enable greater efficiencies, productivity leapfrogs, increasing efficiency, closing the manufacturing loop
Sustainable Production	Genovese et al. (2017); Su et al. (2013)	regenerative production system, green reform in the production

		mode
Reverse Logistics/Return Chains	Arponen et al. (2018); Ellen MacArthur Foundation (2020); Lacy et al. (2020); Lacy & Rutqvist (2015); Sitra (2020)	take-back, reverse logistic channels, reverse logistics, global reverse networks, return chain (management), return chains, reverse supply chain
INTERNATIONAL PERFORMANCE		
Environmental		
Reduced Waste	Geissdoerfer et al. (2018); Korhonen, Honkasalo, & Seppälä (2018); Stahel (2016)	avoids/minimizing/low waste, reducing … waste, reduced wastes
Reduced Emissions	Korhonen, Honkasalo, & Seppälä (2018); Stahel (2016)	reduce … emissions
Reduced Untouched Natural Resource Disturbance	Ellen MacArthur Foundation (2020); Lacy & Rutqvist (2015); Sitra (2020)	displace virgin materials intake, reduce … use of virgin plastic, weaning … off virgin resources, reduce demand for virgin PET, replace virgin materials in … production
Cleaner Production	Geissdoerfer et al. (2018); Su et al. (2013)	minimizes/decreased emissions, cleaner production
Social		
Individual Well-Being	Murray et al. (2017); Preston (2012)	human well-being, wellbeing
Sustainable Consumption	Liu & Bai (2014)	minimize resource consumption
Employment Opportunities	Murray et al. (2017); Schroeder et al. (2019); Stahel (2016)	create jobs, job creation, (generates) jobs
Increased Sense of Community	Korhonen, Honkasalo, & Seppälä (2018)	increased sense of community
Economic		
Sales	Anderson & Markides (2007); Prahalad & Hammond (2002); Yunus et al. (2010)	revenue(s), sales revenues, top-line growth
Competitiveness	Arrfelt et al. (2015); Lieder & Rashid (2016); Porter & Kramer (2006); Su et al. (2013)	competitiveness, competitive advantage
Market Share	Lacy et al. (2020); Lacy & Rutqvist (2015); Sheth et al. (2011)	market share(s), market share gain
Brand Awareness	Anderson & Markides (2007)	brand awareness
Brand Improvement	Korhonen, Honkasalo, & Seppälä (2018)	image (economic win)
Brand Loyalty	Ellen MacArthur Foundation (2019, 2020); Lacy et al. (2020); Lacy & Rutqvist (2015)	brand loyalty, future-proof reputation
Customer Satisfaction	Hult et al. (2022); Su et al. (2013)	user/customer satisfaction, public satisfaction
Profitability	Anderson & Markides (2007); Geissdoerfer et al. (2018); Lieder & Rashid (2016); Prahalad (2004); Prahalad & Hammond (2002)	profitability increase, profit, profitability, profits
Shareholder Value	Anderson & Markides (2007)	market value
Customer Lifetime Value	Arponen et al. (2018)	customer lifetime value
Reduced Energy Costs	Korhonen, Honkasalo, & Seppälä (2018)	reduced … energy costs

Reduced Raw Material Costs	Korhonen, Honkasalo, & Seppälä (2018)	reduced raw material … costs
Reduced Waste Management Costs	Korhonen, Honkasalo, & Seppälä (2018)	reduced waste management costs
Minimized Scarce Resource Use	Korhonen, Honkasalo, & Seppälä (2018)	use of … scarce resources … limited
Reduced Value Leaks/Losses	Korhonen, Honkasalo, & Seppälä (2018)	Value, leaks, and losses … reduced
Risk Reduction	Arponen et al. (2018); Lacy et al. (2020); Sitra (2020)	mitigate risk, reduce(s)/reducing risks, risk reduction

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