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LUMINOUS INSIGHTS

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Commentary

Thoughts on Sustainable Business, Circular Economy, and Circular Supply Chain Management

Masaaki Kotabe[a,b]

[a] *School of Commerce, Waseda University, Shinjuku-ku, Tokyo, Japan*

[b] *Department of Marketing, The Shidler College of Business, University of Hawaii at Manoa, Honolulu, Hawaii, United States*

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1. Introduction

Global supply chains, more traditionally referred to as global logistics,[1] have played a major role in the growth and development of trade and investment and in the intertwined nature of business operations on a global scale. The primary objective of global supply chain management is to develop a cost-efficient delivery mechanism. Global supply chain management is defined as the design and management of a system that directs and controls the flows of materials into, through, and out of the firm across national boundaries to achieve its corporate objectives at a minimum total cost. It encompasses materials management, sourcing, and physical distribution (Kotabe and Helsen, 2023, p. 528).

In recent decades, however, two prominent issues facing global supply chain management have motivated many scholars and practitioners to rethink the role it plays in the ever-changing world. First, the growth and development of world trade over the years has also made us aware of the degradation of our environment on a global scale by the increased marine pollution with discarded plastic materials as well as climate change as a result of the increased use of fossil fuels, among others. The sustainability of our lifestyle as we know it is increasingly being questioned. As a result, we are now increasingly faced with corporate sustainability issues resulting from serious concerns over the negative impacts of industrial activities on the environment and on society in general. The threats to the well-being of our current generation, and the prospects of leaving a somber legacy to future ones, have led a number of stakeholders to demand higher accountability from firms whose actions result in the detriment of society and the environment (Wolf, 2023).

Second, the upsurge of global supply networks over the last few decades, resulting from the wide adoption of global outsourcing practices by firms seeking to reduce costs in the more competitive and globalized business environment, has led to a shift in stakeholder focus from the individual firm to its supply network. The argument is that in a context where global supply networks have become practically ubiquitous (Kotabe & Mudambi, 2009), corporate sustainability cannot be constrained to the corporate boundaries of an individual firm, but encompass the entire value chain of its products (Krause et al., 2009). This shift in stakeholder focus has raised the level of relational and managerial complexity as well as the relevance of sustainable supply chain management among academics, practitioners, and the media (De Góes et al., 2021).

Corresponding author:
Masaaki Kotabe | masaaki.kotabe@aoni.waseda.jp | School of Commerce, Waseda University, Shinjuku-ku, Tokyo, Japan.
Department of Marketing, The Shidler College of Business, University of Hawaii at Manoa, Honolulu, Hawaii, United States.

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2. Need for A Shift to A Circular Economy from A Traditional Linear Economy for Sustainability

At the fundamental level, supply chain management as we know it today has been based on a "linear economy" (i.e., make, use, and dispose) paradigm in which the primary role of firms is to develop, manufacture, and distribute products downstream to final consumers at a minimum total cost. The disposition of those products after their service life has not been woven into supply chain management thought. Historically, this issue had been critically addressed in such classic works as Thornstein Veblen's *The Theory of the Leisure Class* (Veblen, 1899) and the Club of Rome's *The Limits to Growth* (The Club Of Rome, 1972). While they raised the sustainability issue, they never came close to providing potential solutions to it. However, in 1977, Walter Stahel and Geneviève Ready-Mulvey advocated the idea of a "circular economy" (i.e., make, reuse, remake, and recycle) in their report to the European Commission, which was later expanded and published in a book, *Jobs for Tomorrow* (Stahel & Reday-Mulvey, 1981). A circular economy would turn products that are at the end of their service life into resources for others by creating a closed-loop industrial system to minimize resource inputs and reduce waste, pollution, and carbon emissions (Stahel, 2016). Circular systems employ re-use, sharing, repair, refurbishing, re-manufacturing, and recycling for the sake of resource sustainability in industrialized economies. It is a powerful proposition.

To enable this circular economy paradigm to work, however, the stakeholders in the globally dispersed supply chain must collectively manage resources (i.e., materials, components, and finished products) by reusing, refilling, reprogramming, repairing, remanufacturing, and upgrading technologically for improved efficiency. Let us call this effort "circular supply chain management."

For the purposes of this commentary, corporate sustainability in circular supply chain management is addressed in terms that correspond to the concept of the triple bottom line (TBL), as espoused by Elkington (1998), which has been later widely adopted and expanded into the so-called 17 Sustainable Development Goals (17 SDGs) by the United Nations (Purvis et al., 2019). This concept moves away from a purely economic view of a firm's purpose toward a perspective that makes allowances for the firm's environmental and social impacts and, consequently, its duties in relation to those additional dimensions. Hence, corporate sustainability is defined by firms' collective actions, behaviors, and initiatives that consider economic, social, and environmental performances as inextricably connected to one another (Carter & Rogers, 2008). However, the emergence of pervasive global supply networks and the disaggregation of value chains also imply that accomplishing seamless circular supply chains is no longer the result of an individual stakeholder, but that of a network of organizations that span across national boundaries, each being responsible for a share of that collective goal.

Proponents of sustainable marketing also stress such resource management needs to be market-driving, not just market-driven. Therefore, sustainability issues may not be just driven by the needs and wants of environmentally mindful consumers but have to be increasingly driven by stakeholder firms in conjunction with active government participation at local, national, and international levels by setting goals, policies, laws, regulations, and treaties to effect behavioral changes and economic activities that affect the environment and society (Sheth & Parvatiyar, 2021) .

3. Circular Supply Chain Management – A Distant Dream

A circular economy could be achieved if a functioning circular supply chain were made possible by the collective actions of stakeholders creating a closed-loop industrial system with government agencies' appropriate oversight and regulations. However, it seems much easier said than done.

Take the case of long-running simple recycling programs for aluminum cans, glass, and PET bottles, and plastic wastes around the world. Beverage cans are the global leader in recycling efforts. For example, aluminum can recycling rates are generally high in many countries, with Japan at 97%, the European Union at

the average rate of 73% (e.g., Germany at 99%; Finland at 98%; United Kingdom at 82%; Italy at 67%; Spain at 56%; and France at 45%), and the United States at 45% (Newswire, 2022; Statista, 2023c,a). The glass bottle recycling rate for the United States is roughly 33%, which sharply contrasts with the 90% recycling rate in Germany, Switzerland, and other European countries and the 69% recycling rate in Japan (Chemical & Engineering News, 2019; Statista, 2023). When it comes to PET bottles, Norway has the highest recycling rate of 97%, followed by Japan with 85%, the European Union with 58% and the United States trailing behind with only 29% (Statista, 2023b). Although one single statistical source is not available, overall regular plastic waste recycling rates are vastly different among Japan with 86% (Statista, 2018), the European Union with 33% (Economist , 2021), and the United States with a meager 5% (The Guardian, 2022). Although a one-on-one direct comparison should not be made without caution due to some measurement differences among the three regions, the observed differences in regular plastic waste recycling rates appear staggering. Such huge differences across countries and regions are not necessarily the result of a lack of technical recycling know-how, but due more to a lack of national and local governments' functioning regulatory governance as well as firms' and consumers' attitudes toward recycling.

Even the overall recycling rates for these easiest-to-recycle products are not only much less than 100%, but also vary significantly across different countries and regions. In general, Nordic countries, Germany, and Japan tend to lead the world with very high overall recycling rates, while the United States tends to trail significantly behind those leading countries. One would naturally expect that the more complex the products and components (e.g., computer motherboards), the more difficult it could be to refurbish, reuse, and recycle. Nevertheless, an increasing number of companies are outlining strategies for trying to embrace a circular economy. The efforts to re-use, refurbish, re-manufacture, and/or recycle give a boost to improving sustainable supply chain operations and realizing a circular economy. However, the fact remains that for those items that cannot be salvaged easily one way or another, almost 40% are still discarded rather than recycled (Forbes, 2021). To truly build a circular supply chain, companies and suppliers need to make the commitment to re-using, refurbishing, re-manufacturing, and recycling.

For example, refurbished parts, once brought back to their original factory condition, provide a new lease of life with the same quality and lifespan as the original parts. Refurbished parts thus can not only contribute to the circular economy but also maintain efficiency and shorten lead times. However, the 2017 GEODIS global supply chain survey shows that 62% of the companies surveyed had limited visibility into their supply chains, and 15% only had visibility into production (Bretschneider, 2022), and thus had difficulty finding the availability of, and quality assurance for, refurbished components.

There is also a sign of hope, however. One promising recent development to make components "visible" throughout the supply chain is Toyota's RESCUE (REinforce Supply Chain Under Emergency) program to 1) make the procurement network "visible" from 1st to 3rd suppliers and all the way to 10th suppliers on a global basis, 2) classify components into 1 to 8 categories according to differences in supply disruption risk, and 3) assess high-risk components together with suppliers for alternative procurement methods and a stable supply path. Although it has been developed to deal with global supply chain disruptions caused by natural calamities such as earthquakes and weather events, the program is designed to make visible where the alternative sources of disrupted supplies with quality assurances could be sourced from (Fortune, 2021).

The technical difficulties on the supply chain management side are one thing, which could multiply in magnitude once different countries with different laws and regulations are taken into account. Once we further add consumers' differing levels of commitment to recycling, achieving a functioning circular supply chain appears more like a distant dream than a reality despite its societal appeal to address various environmental concerns for sustainability. According to two leading authorities of circular supply chain management, the primary reason for a lack of functioning examples is

that successful circular supply chains tend to be quite localized and the products and services involved are made up of a relatively limited number of simple components (Soufani & Loch, 2021). In real life, most manufactured products tend to have exactly the opposite properties, involving many specialized parts with complex alloys and highly dispersed supply chain operations across national boundaries in order to optimize a performance-cost tradeoff. Consequently, circular supply chains remain inherently difficult to achieve with profit incentives alone. Although proponents of sustainable marketing may argue for educating consumers on the importance of circular supply chains for sustainability, one also wonders how willing consumers are to compromise on performance and cost.

4. Where Do We Go from Here?

One thing is clear. The invisible hand of free market economy alone is not sufficient. The interdependence of self-interested individual stakeholders in a free market economy alone cannot incentivize suppliers and manufacturers as well as consumers to do what is socially necessary. The environment in which we live has been taken for granted as a public good for long, of which individual stakeholders are not willing to pay an added price for protection. Since it is a public good, governments need to intervene.

At a macro level, various governments in conjunction with international institutions such as the United Nations may need to strive to develop some global standards for component and product specifications in much the same way as patents are getting harmonized across different countries so as to align laws and procedures among intellectual property systems to ensure consistency and clarity of rights for the innovators around the world. For example, technical harmonization in the automobile sector in the European Union, known as the Whole Vehicle Type-Approval System (WVTA), enacted in 2020, can be considered a movement in the right direction. Under the WVTA, an auto manufacturer can obtain certification for a vehicle type in one member country and market it throughout the European Union as a single market without further tests. The European Commission is responsible for the legislation on automobiles, providing rules for safety and environmental protection as well as the approval and market surveillance of automobiles, and of systems, components, and separate technical units (The European Commission , 2023). However, while this legislation may encourage auto manufacturers to improve acceptability of components and other technical units across member countries within the European Union, it falls short of establishing any rules on their convertibility or standardization yet. Nevertheless, such global standard setting efforts may make it possible for component suppliers and manufacturers to improve interchangeability of materials and components and reduce unnecessary wastes and redundancies in the supply chain system.

Another standard setting effort, for example, is the new carbon pricing framework developed and ratified by the European Union. Through this framework, EU member countries have collectively agreed to regulate industrial carbon emissions (Albert & Hopkins, 2023). Firms operating in the European Union will have to abide by the playing field for carbon pricing set forth by the EU authorities. One of the major reasons why Japan has generally much higher recycling rates for aluminum cans and glass and PET bottles as well as plastic waste than the United States is as a result of its overarching Container and Packaging Recycling Act (CPRA: enacted in 1995, put in enforcement in 1997, and further revised and updated in 2006), enforcing firms' specific recycling mandates.[2] On the other hand, the United States does not have any federal regulations on such recycling, and as a result, each state has its own separate regulations with inconsistent levels of enforcement.

However, a question remains as to whether government regulations with an adequate enforcement mechanism alone will be sufficient to improve the rate of conformity from firms as well as consumers. There could well be some fundamental differences in the level of conformity due to cultural differences. Cultural differences are well known to affect consumer behavior (e.g., Griffith et al., 2008). It could be interesting to see how consumers in different countries would react to such social issues as recycling.

More research in the comparative public policy

arena across different countries and regions is also called for. For example, one recent Japanese study on the effect of the Container and Packaging Recycling Act shows that in addition to policies promoting recycling in households, policies designed to encourage municipalities play an important role in the successful recycling of post-consumer plastic waste (Ishimura, 2022). Recycling enforcement of the national law implemented at the local level may be more effective than at the national level. If so, what policy implications could it have on the lackluster recycling results in the United States where recycling laws are different at the state level without any federal-level uniform regulations?

In a similar vein, the macro role of such international institutions as the United Nations, International Monetary Fund, and World Bank needs to be looked into. Clearly, the United Nations' 17 Sustainable Development Goals (17 SDGs) have a role to play in encouraging recycling and eventually leading the idea of circular supply chains to reality. Making concerted national efforts to contribute to the sustainable goals is no easy task at the national level, and it is particularly so in many developing countries. For example, the International Monetary Fund is known to have successfully allocated funds to direct developing countries' structural adjustment for economic development (Okoroafo & Kotabe, 1993). Therefore, the role that the International Monetary Fund could play for improved recycling in developing countries can be equally explored. In a similar vein, the World Bank could offer seed financing to leading recycling firms in developed countries to transfer expertise in recycling activities in developing countries through foreign direct investment.

Finally, at a micro level, one of the major characteristics of today's supply chain is its dispersed nature. No stakeholder is singly in charge of establishing its supply chain. So many stakeholders make up today's supply chains. We are not sure if functioning circular supply chains can be developed with so many diverse stakeholders with different profit and other motives. Similarly, we are not sure if we need a lead firm as a champion (or a platform leader) of the cause to manage various interactions of stakeholders in a supply chain. And if so, we will need additional research on effective ways to identify and empower such platform leaders (Barreto de Goes, Kotabe, and Geleilate, 2021).

Regardless of the levels of research implied above, technology, particularly information technology (IT), is changing fast. It would be equally interesting to see how new IT platforms, such as Platform as a Service (PaaS) and Mobility as a Service (MaaS) might facilitate needed changes and coordination among dispersed stakeholders both at macro and micro levels. PaaS is a complete development and deployment environment in the cloud, with resources that make it possible for stakeholders to deliver everything ranging from simple cloud-based applications to more sophisticated, cloud-enabled enterprise applications. MaaS is a type of service that, through a joint digital channel, enables stakeholders to plan, book, and pay for multiple types of supply chain services. The concept describes a shift away from individually-owned modes of planning and toward mobility provided as a service. Such systems combine supply chain services from public and private logistics providers through a unified gateway that creates and manages the entire supply chain (Rauchecker et al., 2011; Zhang et al., 2022).

The bottom line is that there is no turning back to the old ways of doing things in the linear economy of the past. If we are serious about sustainability in the face of environmental degradation and climate change, governments, firms, and consumers all will have to embrace a circular economy where we collectively strive to reduce waste and re-use scarce resources for our common good. Although I do not delineate any specific research agenda here, desired research directions are suggested for future researchers.

5. Endnotes

[1] Some authors (including myself) use the terms logistics and supply chain management interchangeably, while others generally define supply chain management somewhat more broadly than logistics. Although, in this paper, I try not to engage in this definitional debate over what functions are included in each, the Council of Logistics Management offers the following definitions. Logistics management typically includes

inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management of third-party logistics services providers. To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging, and assembly, and customer service. Supply chain management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the Logistics Management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance, and information technology.

[2] The CPRA promotes recycling in cooperation with the government, municipalities, consumers, and firms, and proactively encourages partnerships among these parties. The law applies to all medium to large-scale business entities that manufacture, use, import, or sell containers or wrapping. The law provides for a collaborative system according to the principle that all parties in society, including manufactures, municipal governments, and consumers, should collaborate in realizing the rational and efficient recycling of waste containers and packaging, Actual oversight and implementation of the recycling efforts are executed at each municipality government level by the Japan Containers and Packaging Recycling Association (JCPRA) as a government-designated organization. The quantity of recyclable materials handled by each business is estimated annually, and the total cost of recycling those materials is projected, by the municipal government in collaboration with businesses. The total amount of recycling expenses that were actually required falls below the total amount of expenses initially projected for each business, specified business entities must pay a monetary amount equivalent to half of the difference in expenses as "payment for rational recycling" to the municipal government. For practical purposes, (half of) the unrealized recycling expenses are treated as a penalty allocated to specific businesses. Therefore, businesses are encouraged to comply with the recycling law by implementing various methods to collect recyclable materials from consumers. For more details, see Ministry of Economy, Trade and Industry, Japan (2003).

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References

Albert, R.J., & Hopkins, A. (2023), The New EU Carbon Pricing Framework and Its Impact for Business. Retrieved from https://news.bloombergtax.com/daily-tax-report-international/the-new-eu-carbon-pricing-framework-and-its-impact-for-business

Bretschneider, S. (2022), Circular Supply Chain Can Ease Manufacturing Problems. Retrieved from https://supplychaindigital.com/sustainability/circular-supply-chain-can-ease-manufacturing-problems

Carter, C.R., & Rogers, D.S. (2008). A Framework of Sustainable Supply Chain Management: Moving toward New Theory. *International Journal of Physical Distribution and Logistics Management*, *38*(5), 360-387. https://doi.org/10.1108/09600030810882816

Chemical & Engineering News (2019), Picking up the Pieces of US Glass Recycling. Retrieved from https://cen.acs.org/magazine/97/09706.html, accessed date 2023-02-01.

De Góes, B., Bruno, M., Kotabe, J.M.G., & Geleilate (2021). The Diffusion of Corporate Sustainability in Global Supply Networks: An Empirical Examination of the Global Automotive Industry. In A. Verbeke, R. Van Tulder , E. L. Rose, & Y. Wei (Eds.), *The Multiple Dimensions of Institutional Complexity in International Business Research*, volume 15 (pp. 435-458). Emerald Publishing Limited.

Economist (2021), Plastics and Circularity – Closing the Plastic Loop: Can New Technologies Accelerate Plastic Recycling in Europe?". Retrieved from https://impact.economist.com/ocean/ocean-health/plastics-and-circularity-closing-the-plastic-loop

Elkington, J. (1998). *Cannibals with Forks: The Triple Bottom Line of the 21st Century*. Stoney Creek, CT: New Society.

Forbes (2021), The Circular Supply Chain: A Push for Sustainability. Retrieved from https://www.forbes.com/sites/stevebanker/2021/06/

29/the-circular-supply-chain-a-push-for-sustainability/

Fortune (2021), How Toyota Kept Making Cars when the Chips were Down. Retrieved from https://fortune.com/2021/08/02/toyota-cars-chip-shortage-semiconductors/

Griffith, D.A., Cavusgil, S.T., & Xu, S. (2008). Emerging Themes in International Business Research. *Journal of International Business Studies*, *39*, 1220-1235. https://doi.org/10.1057/palgrave.jibs.8400412

Ishimura, Y. (2022). The Effects of the Containers and Packaging Recycling Law on the Domestic Recycling of Plastic Waste: Evidence from Japan. *Ecological Economics*, *201*. https://doi.org/10.1016/j.ecolecon.2022.107535

Kotabe, M., & Helsen, K. (2023). *Global Marketing Management* (9 ed). Hoboken, NJ: Wiley.

Kotabe, M., & Mudambi, R. (2009). Global Sourcing and Value Creation: Opportunities and Challenges. *Journal of International Management*, *15*(2), 121-125. https://doi.org/10.1016/j.intman.2009.03.001

Krause, D.R., Vachon, S., & Klassen, R.D. (2009). Special Topic Forum on Sustainable Supply Chain Management: Introduction and Reflections on the Role of Purchasing Management. *Journal of Supply Chain Management*, *45*(4), 18-25. https://doi.org/10.1111/j.1745-493X.2009.03173.x

Newswire, P. (2022), New Analysis Shows Significant Economic and Environmental Benefits of Boosting Aluminum Can Recycling Rate in U.S. Retrieved from https://www.prnewswire.com/news-releases/new-analysis-shows-significant-economic-and-environmental-benefits-of-boosting-aluminum-can-recycling-rate-in-us-301513888.html

Okoroafo, S.C., & Kotabe, M. (1993). The IMF's Structural Adjustment Program and Its Impact on Firm Performance: A Case of Foreign and Domestic Firms in Nigeria. *Management International Review*, *33*(2), 139-156.

Purvis, B., Yong, M., & Darren, R. (2019). Three Pillars of Sustainability: In Search of Conceptual Origins. *Sustainability Science*, *14*, 681-695. https://doi.org/10.1007/s11625-018-0627-5

Rauchecker, U., Meier, M., Muckenhirn, R., Yip, A., Jagadeesan, A., & Corney, J. (2011). Cloud-Based Manufacturing-as-a-Service Environment for Customized Products. *2011 Conference Proceedings, IIMC International Information Management Corporation*.

Sheth, J.N., & Parvatiyar, A. (2021). Sustainable Marketing: Market-Driving, Not Market-Driven. *Journal of Macromarketing*, *41*(1), 150-165. https://doi.org/10.1177/0276146720961836

Soufani, K., & Loch, C. (2021). Circular Supply Chains Are More Sustainable. Why Are They So Rare. *Harvard Business Review*.

Stahel, W.R. (2016). The Circular Economy. *Nature*, *531*, 435-438. https://doi.org/10.1038/531435a

Stahel, W.R., & Reday-Mulvey, G. (1981). *Jobs for Tomorrow: The Potential for Substituting Manpower for Energy*. New York: Vantage Press.

Statista (2018), Recycling Rate of Glass Bottles in Japan from 2018 to 2020. Retrieved from https://www.statista.com/statistics/1249961/japan-glass-bottle-recycling-rate/

Statista (2023a), Can to Can Recycling Rate of Aluminum Cans Japan FY 2012-2021. Retrieved from https://www.statista.com/statistics/1318117/japan-aluminum-cans-can-to-can-recycling-rate/

Statista (2023b), PET Plastic Bottle Recycling Rates in Select Countries as of 2018. Retrieved from https://www.statista.com/statistics/1166550/plastic-bottle-recycling-rates-in-select-countries/

Statista (2023c), Recycling Rate of Aluminum Cans in Europe in 2020. Retrieved from https://www.statista.com/statistics/239315/recycling-quota-of-aluminum-cans-in-europe/

Statista (2023), Recycling Rate of Plastic Waste in Japan from 2011 to 2020. Retrieved from https://www.statista.com/statistics/1169339/japan-rate-of-recycled-plastic-waste/

The Club Of Rome (1972). *The Limits to Growth*. New York: Universe Books.

The European Commission (2023), "Technical Harmonisation," Internal Market, Industry, Entrepreneurship and SMEs. Retrieved from https://single-market-economy.ec.europa.eu/sectors/automotive-industry

The Guardian (2022), US is Recycling Just 5% of its Plastic Waste, Studies Show. Retrieved from https://www.theguardian.com/us-news/2022/may/04/us-recycling-plastic-waste

Veblen, T. (1899). *The Theory of the Leisure Class: An Economic Study in the Evolution of Institutions*. New York: The Macmillan Company.

Wolf, M. (2023). *The Crisis of Democratic Capitalism*. New York: Penguin Random House.

Zhang, G., MacCarthy, B.L., & Ivanov, D. (2022). The Cloud, Platforms, and Digital Twins-Enablers of the Digital Supply Chain. In B. L. MacCarthy, D. Ivanov, ... (Eds.), *The Digital Supply Chain* (pp. 77-91). Elsevier. https://doi.org/10.1016/B978-0-323-91614-1.00005-8

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