

Towards the End of The Resounding Sound of Silence: How State Intervention Forces Multinational Companies (MNC) to Rethink their Operations Management (OM); The Case of Waste in The Food Plastic Packaging Industry

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Abstract

Purpose: The proposed paper departs from the puzzling evidence that International Business (IB) scholars consider Operations Management (OM) as ‘ancillary’, therefore researching little on it (JMTM 2019). It formulates the hypothesis that business innovation via digital supply chains is both a necessity and an opportunity.

Design/Methodology: Analyse the impact of innovation and regulation policies on the OM of food multinational companies (MNCs) through a case study. Those policies are these: the decision of Saudi Arabia State-owned enterprise (SOE) Saudi Aramco to invest massively into added-value packaging stream via its 2019 acquired SABIC; the decision of China to ban the importation of packaging waste as of 2018; the 2018/852 amending directive of 94/62/EC European Union Packaging and Packaging Waste Findings: The management of plastics packaging waste impacts the OM of MNCs in many ways, sometimes contradictory and uncertain as knowledge builds up. This requires more agile and faster supply chains. Innovation policies of China and of the EU also intend to foster change in OM, and as part of those policies disruptive digital supply chains will arise.

Originality/Value: The paper applies to OM a theory borrowed from international studies and international business: The National Systems of Innovation (NSI) theory

Keywords: International relations; National system of innovation; International business; Operations management; Plastic packaging; China, EU, Saudi Arabia; Multinational Companies

1. Introduction

The end of the Cold War created hope for the ‘End of History’ (Fukuyama, 1989) with the idea of a permanent democratic peace under the protective hegemony of the US, and with it of the Global North. The concept of liberal capitalism flourished, with markedly less state intervention and freer movement of capital and goods. Multinational Companies (MNC) could find an ideal period of business internationalisation and of globalisation. Within this, the Operations Management (OM) role in those MNC was essentially to enable globalisation. Success was measured by the ability of OM to adapt to and to enable international business expansion and financialization, and the best recognition for OM was silence in the boardroom, which meant essentially that OM succeeded in enabling that goal. However, the big assumption of democratisation of the world is proving wrong. Authoritarian states, essentially in Asia, have adopted capitalism to sustain their authoritarian stance, which has led to the expansion of state capitalism through the funding of State Owned Enterprises (SOE) and Sovereign Wealth Funds (SWF). This model of capitalism also prevails in China and in Saudi Arabia and creates the conditions to challenge the historic Global North Global South power equilibrium. In several democracies, in the aftermath of the 2008 Financial Crisis, populist and nationalistic governments take power, in particular in the US, in Brazil and in some EU countries, which creates the potential for more trade and physical isolationist walls. In parallel, International Governmental Organisations (IGO) have succeeded in making states governments realise that resources were not infinite, that globalisation and growth was accompanied by climate change and that there was no planet B (UN Ban Ki-Moon, 2014). All this converges to more State intervention in International Business. In this paper, the author argues that OM role is due to come under the spotlight, and that rapid technological change and digitalisation is the one single most opportunity that OM has to embrace for MNC to successfully negotiate this turning point in IB. To that end, this paper focuses on the food plastic packaging industry. It first scopes the problem. It then analyses conjointly three cases of State intervention in that industry. Cases are these: the decision of Saudi Arabia State-owned enterprise (SOE) Aramco to invest massively into added value packaging stream via its 2019 acquired SABIC; the decision of China to ban the importation of packaging waste as of 2018; the 2018/52 amending directive of 94/62/EC European Union Packaging and Packaging Waste. The methodology is based on secondary literature analysis and on the use of the Lundvallian National System of Innovation (NSI) theory. NSI theory borrows to international relations and international business literature, here applied to hypothesize the impetus to innovate OM digital processes towards more agile, flexible, shorter and faster supply chains.

2. The contours of the problem

2.1. Scoping the problem

Plastics have taken over circa 40% of the food packaging industry and are foreseen by the industry to continue growing significantly in the near future, essentially helped by the itemisation towards single serve packaging and foreseen growing population and demand in Asia. The International Energy Agency (IEA, 2018) provides a view of the place of packaging in the total chemical sector (Figure 1) and estimates that packaging weighs currently 36% of the total plastic demand, however with a significant demand gap in developing markets at 4 KG of resin per person compared to a 55-80 KG resin demand in developed markets. A similar market analysis and demand forecast has led Saudi Aramco, a State-Owned Enterprise of Saudi Arabia, to invest massively into this High Value Chemicals (HVC) business and acquire SABIC in 2018 (Saudi Aramco, 2018).

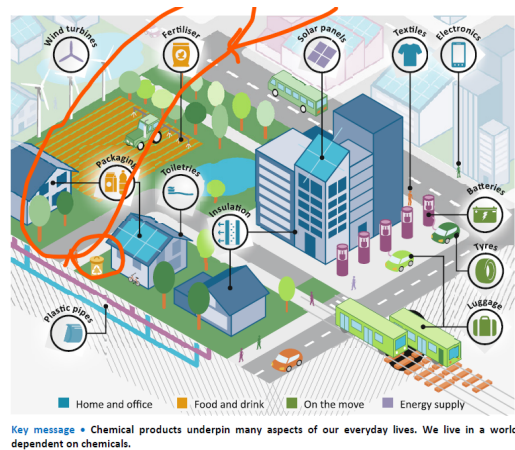


Figure 1. The various roles of chemical products in modern society (IEA, 2018).

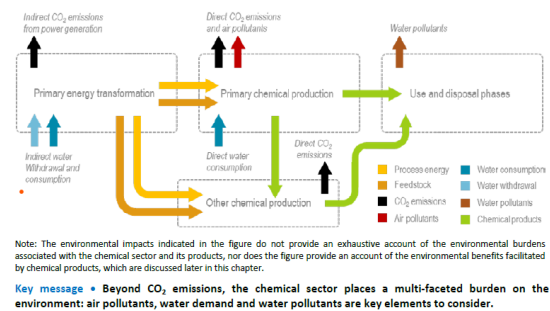


Figure 2. Scope of environmental considerations (IEA, 2018).

In developed markets however, there has been mounting pressure on plastic, especially the disastrous visible effects of spillage and pollution (IEA, 2018; Figure 2). In addition, end of life plastics value chain relied heavily on China, and now finds itself blocked since China has banned their import for transformation (China, 2017). Furthermore, NGO, and Governments especially in the EU have taken aim at the environmental impact of plastics, especially the ocean waste, and the EU issued regulations towards recyclability and or biodegradability of such materials (EU, 2018). In a move towards corporate social responsibility, major multinational companies, such as Coca-Cola, Nestlé, Pepsi, or Unilever issued public commitments towards the transition to 100% of recyclable or compostable plastics by the mid-2020s.

2.2. Positioning the impact of MNCs commitments

The commitment of MNC towards the use of recyclable or compostable plastic materials creates an innovation challenge in the plastics R&D, especially a race towards bio-based plastics (IEA, 2018; Figure 3). However, those bio-based plastics still only amount for roughly 1 % of the total plastic consumption as of today.

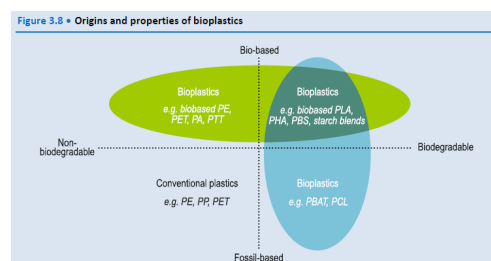


Figure 3. Origins and properties of bioplastics (IEA, 2018).

This race is not without humanitarian and environmental challenges either, especially related to the fact that bioplastics (non-fossil based) compete with food and water supply availability for human consumption in geographic areas of scarcity, namely the Middle East (water security issues) and China (food and water security issues). In addition, bioplastics still require the use of chemicals as fertilisers for their upstream production. Taking

economic conditions into consideration, in the US only up to 15 % of land could be converted to energy crop by 2040 (USDE Billion Ton Report 2016, tab 4.4 base case at 60 USD and high yield scenario, p.159), even if the biomass goes to energy biofuels and not bioplastics materials. This method also requires significantly more water resources withdrawal. One dry ton of corn requires 32 m³ of water to produce 200 to 270 gallons of oil equivalent in the US. This roughly equates to more than fifty times the amount of water withdrawn for fossil fuel equivalent (0.8 m³/ton of fossil fuel water withdrawal). Additionally, while this method only requires approximately 5% of oil feedstock for fertilizers compared with 100 % of oil feedstock for fossil fuel production, fertilizers waste significantly impact water pollution.

For OM, the challenge is a priori such that:

- Global commitments of MNC do not necessarily equate with the strategies of Saudi Arabia's Saudi Aramco through SABIC and with forecasted future consumption in Asia, and local, regional or new global business champions might continue using standard plastic packaging instead. While competition with local champions is nothing new (Santos, Williamson 2015), this can increase competitive pressure on those MNC's operations management.
- Recyclability does not mean actually recycled and there might be continued pressure on, and effort by, MNC's operations to ensure actual recycling value chain reconfiguration especially since China's ban. China absorbed circa 40 % of the world plastic waste before the ban (IEA, 2018). Additionally, the EU amending directive 2018/852 sets a mandatory minimum of 50 % of plastic actually recycled in each of its member states by 2030, within a minimum of 65 % of all materials recycled. The combination of China's and EU interventions creates a need to move beyond just recyclability. Global plastic waste recycling is estimated at just 18 % in 2014 (IEA, 2018).
- The competition of bio-based plastics with human food and water consumption may lead to reconsideration of options for biodegradable bio-based plastics. For OM, this calls for caution and flexibility for fast implementation of technological changes in case of new MNC commitment or new regulation arising.
- Biodegradability or end of life recycling currently means significant risk on the physical characteristics of plastic packaging to protect the product adequately, implies severe restrictions on the total shelf life, and challenges current operations networks designs.

However, the recognised role of OM in OM academic literature still firmly stands on OM being the working arm of globalisation (Cheng et al., 2013; Demeter, 2015), even if recent OM research now considers circular economy (Mishra et al., 2019). Spring et al. (2017) confirm that State intervention through industrial policy has been considered irrelevant and argue for a more thorough academic focus in OM literature, however their own focus is on the role of industrial policy in fostering technology innovation and reshoring within a developed State. In parallel, technology advances enable disruptive innovation power of digital supply chains (Srai et al., 2017). A way to recognise the change of paradigm in State intervention in IB and in OM is to apply the 'national system of innovation (NSI)' theory (Lundvall, 1998). Lundvall argued for the relevance of the national level even if some scholarship attention considered this level too broad and proposed to adapt the theory at the company or sectorial levels (Lundvall, 1998). Since our focus here is on outlining the impact of state interventions in the food plastic packaging industry on OM of MNC, the NSI theoretical framework may be fit for purpose. Lundvallian NSI actually fills the gap to explain the Schumpeterian destructive innovation concept and observation that fuels 'modern' Capitalism, in that it embeds the fundamental uncertainty of innovation and learning into the rational decision process of neo-classical trade theory. That decision process is otherwise falsely deterministic and fully explained a priori by rational allocation of capital and labour underpinning sectorial competitive advantage and wealth of nations. This theory posits that Knowledge, together with Capital and Labour is not a free float variable that can be ignored in building understanding and decision (Lundvall, 1998). It also places active learning or learning as essential to Knowledge, more than pure science and technology research activities (Lundvall, 1998).

3. The NSI theoretical framework

The NSI theoretical framework addresses the importance of innovation for economic performance over existing resource allocation (Lundvall, 1998, p.408) and proposes that 'knowledge is the most important resource and learning the most important process' (Lundvall, 2007, p.99). Lundvall highlights those four critical decision factors to assess the role of the state in fostering innovation process for economic performance: first, a need for non-pure market rigidity involving relationship; especially authority, stability and trust (Lundvall, 1998, p. 409); second, the importance of 'institutions'; norms habits and rules underpinning 'economic agents behaviour' and interactive learning (Lundvall, 1998, p.409); third a focus on 'Economic structure and specialization' (Lundvall, 1998, p.411); fourth, some complementarity with styles of innovation and learning (Lundvall, 1998, pp.416-418). Overall, 'innovation and learning are at the centre of analysis', and knowledge is a key variable (Lundvall, 1998, p.418). The points on non-pure market and on the importance of the nation make the NSI all the more relevant in the current political context, even if Lundvall already stressed the relevance of that dimension at the time when globalisation was thought to be permanent (Lundvall, 2007, p.100). This dimension takes also all its importance

for MNCs, as MNCs have to take into account multiple systems of innovation. Equally, authority is expressed straightforwardly in authoritarian states with owned enterprises, and those SOE are integral part of the economic value chain in which MNCs also operate.

4. An application of the NSI theoretical framework in relation to plastic packaging industry on OM of processed food industry MNC

The NSI theoretical framework is used to inform the reading of China's 13th five-year plan, the EU Horizon 2020 innovation policy, and Saudi Arabia's 2030 National transformation Programme, and is complemented with additional literature review, in view of understanding the impact of each state's innovation policy on plastic packaging industry and on operations management. While the EU is not a state, it is assumed here that policy making at that macro level makes the NSI relevant to the EU.

China's 13th five-year plan for economic and social development guiding thinking section is very clear: China is working on its development, and its development should be innovative and green (p.6). China's single political authoritarian regime (SPAR) (CCP) and control over a network of state owned enterprises (SOEs), together with the importance of bargaining (Lee and Zhang in Shue et Thornton 2018), clearly places it as a 'non-pure market rigidity involving relationship' state. It also buys its stability through own internal security grassroots management (Lee & Zhang in Shue Thornton 2018). Trust is probably a point of contention due to the intensity of bargaining, but overall, China appears to make progress in line with the philosophy of its 13th plan. In terms of 'economic structure and specialization', China's 13th plan clearly poses the ambition to make disruptive innovation breakthrough in all major 'frontier' knowledge and science driven technologies in particular. (pp. 23-4). Obviously, in light of this ambition, as well as the commitment for 'green development' (pp. 139-40), there is all reason for China to move away from collecting the waste of the world for inland recycling. Equally, China aims at key new materials research and application on strategic (p.25), while 'taking action against over packaging' on products (p. 125). In terms of manufacturing, China outlines the ambition to 'big data' and 'smart manufacturing and robotics' (p.25), opening the way for competitive digital supply chains. Furthermore, China places a strong emphasis on building knowledge through learning, as outlined throughout the 13th plan in conjunction with 'higher learning institutions', 'vast pool of talent' and 'cultural' dimensions (pp. 24-5, 27, 29, 60, 110, 126, 163-5, 175, 194).

The EU is highly regulated, which makes the question whether the EU regulation, especially 'stringent regulation', actually limits or fosters innovation relevant (Pelkmans and Renda, 2015). Since such regulation generates significant compliance costs, those MNC that can afford it can actually benefit from a competitive advantage in this case, especially if it requires innovation and R&D efforts. The stringent regulation on plastics recyclability or biodegradability can actually fit into that context, combined with NGO, political parties and equally major investment funds requests for actions on climate change. In parallel, the European Commission places emphasis on research and innovation policy, reflected with the EUR 80 billion budget of 'Horizon 2020' and in line with the Lisbon treaty. Authority, stability and trust appear solid as long as the EU does not fail as a union, and the research and innovation law places a strong emphasis on public private partnerships with open innovation fostering learning and knowledge build in the areas of sustainable innovations and of digitalisation. In particular, emphasis relevant to plastics and OM is put on bio-based industries, factories of the future, and sustainable process industry, where the relationship to food waste and packaging waste is relevant. Importantly, the state of the art 'knowledge for policy' report publication by the European Commission on the life cycle assessment study, while comprehensive, still omits the indirect impact on land use of bio-based versus fossil-based plastics, and points to lack of reliable data, either not available or not disclosed by the incumbent oil industry (EC knowledge4policy 2019). With those limitations outlined, the findings are that, while there is some environmental performance advantage for bio-based, this advantage is far from sufficient to meet the objectives of GHG emissions reductions set forth at 65% from 2021 onwards by the renewable energy directive (RED) (EC knowledge4policy, 2019, p.612). The report therefore raises the question of what 'the best use of the biomass from an environmental and climate change perspective' actually is (p. 612). Significantly, the report points to the importance of the end of life route and outlines a better environmental performance for recycled bio-plastics over bio-degradation, except when coupled directly with agricultural use (p. 609). However, recycling becomes less preferred when food waste is combined with plastic waste, and crucially, while for some materials like PET the recycling technology is in place, for some other materials such as PLA, there is no recycling technology available yet (p. 610). Furthermore, in the EU itself, feedstock coming from the EU itself does not provide any environmental benefit, due to lower yields than in the US intensive GMO based maize production. For OM, this implies higher agility in adopting technologies which will evolve together with knowledge build, higher flexibility in varying technologies based on the best environmental impact, and to continuously improve 'less is more' strategies, such as less packaging use, faster supply chains lead-times to eliminate waste and eliminate over-specifications in terms of oxygen and moisture protection barriers.

Saudi Arabia has recently decided to leverage its SOE, Saudi Aramco and issue debt. Saudi Aramco have acquired SABIC and have just announced a 20 % equity stake in India's Reliance group. It is clear that SA economic

structure depends on oil and their 2030 National Transformation Programme (NTP) aims at strengthening and leveraging added-value operations from the oil sector. Authority is not questionable since Saudi Aramco is part of the State. This also signals a strong South – South, rather Middle East –Far East intensification of business, at the expense of the North-South relations, which were also the normative sense of right or wrong (see Colonialism rules and heritage). Stability and trust currently deteriorate in the whole region, which can negatively impact the oil prices. Since the whole economic landscape is state controlled, there is also little incentive to innovate from the private sector. The NTP officially aims at contributing to ‘digital transformation’; however, this mainly consists in securitizing digital signature of government transactions. There is no mention of building knowledge through learning. In terms of OM, this means that the competitive landscape is likely to continue with plastic packaging more affordable than today due to the forecasted increase in Asian demand and a need to defend the high value chemicals business output. This likely will be done without much knowledge-based improvement incentive. The impact for those MNC committed to recyclable or biodegradable packaging is a need to compensate the competitive gap created.

5. Conclusions

This paper has proposed building on a theoretical framework developed in the field of international relations, the Lundvallian national system of innovation (NSI), for the purpose of its impact on the operations management of multinational companies active in the food industry. Through public diplomacy websites and complemented with scholarly publications in the fields of IR, IB and OM, the NSI was analysed for two states and for the EU, considering those issues relevant to plastic packaging and operations management. A combined outcome of those three NSI leads to the recommendation that digital supply chain innovation can help MNCs to regain competitiveness and flexibility while responding to their commitments, here on plastic packaging, while pre-empting being disrupted by competitors through digital supply chains. Making conjoint sense of China, EU, Saudi Arabia NSIs consequences for processed food plastic packaging and impact on OM, the findings are these: MNCs are better off embracing climate friendly strategies and pre-empting stringent regulations towards a better ratio of recycled packaging materials or biodegradable solutions. This will likely generate competitive pressure, for at least two reasons. First oil states such as Saudi Arabia will increase their focus on high value chemicals targeting the high growth regions of Asia, and this will likely ease the cost base of local or regional competitive landscape remaining on current plastic packaging. Second, China used to be the ‘easy’ existing recycling route, now closing down. In parallel, states such as China or states unions such as the EU place strong emphasis on the factories of the future, big data and robots, broadly in line digital supply chains landscapes (Srai et al., 2017). This means new champions and disrupters are likely to rise. MNC face therefore a need to embrace digital supply chains in the view of recreating competitive gaps and falling in the trap of Schumpeter’s creative destruction. Regulation towards the internalisation of the current external costs of setting and exploiting biodegradable and recycling routes is likely to occur, and will require flexible manufacturing network. In particular, bio-based packaging competes with land and water availability. In essence, bio-based plastic packaging, combined with weight reduction and elimination of over-specification reduces shelf life of the products, and requires an innovative supply chain to reduce food waste. For OM, this makes a strong point to embrace digital supply chain for higher flexibility, faster lead-times and ultimately lower costs of goods. OM therefore can enter into the spotlight and create innovative international business solutions through digital innovation, and move beyond the silent role of globalisation enabler it used to have.

Limitations are that this study remained single analytical desk case based only on secondary literature. It was not possible to analyse in depth the NSIs beyond the publicly shared information. The analysis provides a sense that innovation in OM is essential, not as a mere enabler of globalisation, but as a key actor of sustainable business transformation to remain relevant in the long run. It confirms that the process of learning and sharing knowledge beyond pure science and technology at company level is invaluable. However, it also highlights that more research based on primary sources can be done at MNC level to inform decision making more concretely.

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