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‘I Prefer 30°’: Business Strategies for Consumer Messages to reduce carbon emissions; An Empirical Coevolutionary Analysis

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December 2016
Sustainability Research Institute
Paper No. 102

Centre for Climate Change Economics and Policy
Working Paper No. 290

SRI PAPERS

SRI Papers (Online) ISSN 1753-1330

First published in 2016 by the Sustainability Research Institute (SRI)
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ABSTRACT

A series of voluntary business initiatives have been taken in Western Europe since 1997 to persuade consumers to wash their clothes in cooler water. This would contribute to reducing carbon emissions, as well as saving money for consumers, but these initiatives have had limited success. This paper uses a coevolutionary framework (Murmann 2003, 2013; Foxon, 2011) to analyse the factors affecting the relative success of these voluntary business initiatives. This examines the interrelationships between populations of businesses' branded messages and of user laundry practices. Along with other consumer practices, domestic laundering needs to become substantially less carbon intensive, in order to meet EU policy targets to reduce greenhouse gas emissions by 20% by 2020 (from a 1990 base) (European Commission, 2015a). Given that future emission reduction targets are likely to be even stronger, following the 2015 international Paris Agreement on mitigating climate change, it is important to understand better the factors influencing business strategies aiming to influence their customers' actions in more environmentally friendly directions.

ACKNOWLEDGEMENTS

This paper has been developed independently of A.I.S.E. and does not necessarily reflect the perspectives of any of the organisations or companies cited in the report. We nevertheless thank representatives of A.I.S.E. and the organisations and companies interviewees for their assistance.

KEYWORDS

Carbon, Business, Strategy, Consumer.

Submission date 09-05-2016; Publication date 13-12-2016

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1. Introduction

A series of voluntary business initiatives have been taken in Western Europe since 1997 to persuade consumers to wash their clothes in cooler water. This would contribute to reducing carbon emissions, as well as saving money for consumers, but these initiatives have had limited success. This paper uses a coevolutionary framework (Murmann 2003, 2013; Foxon, 2011) to analyse the factors affecting the relative success of these voluntary business initiatives. This examines the interrelationships between populations of businesses' branded messages and of user laundry practices. Along with other consumer practices, domestic laundering needs to become substantially less carbon intensive, in order to meet EU policy targets to reduce greenhouse gas emissions by 20% by 2020 (from a 1990 base) (European Commission, 2015a). Given that future emission reduction targets are likely to be even stronger, following the 2015 international Paris Agreement on mitigating climate change, it is important to understand better the factors influencing business strategies aiming to influence their customers' actions in more environmentally friendly directions.

Laundering is important because washing with household laundry equipment, including the energy used, makes a 2.4% contribution to global warming, from analysis of total life cycle impacts of societal consumption (Tukker and Jansen, 2006). Since 1997, large European detergent manufacturers, individually, as well as through their industry association, have developed various consumer campaigns to urge consumers to reduce washing temperatures for laundry. These campaigns have ranged from TV advertising for their individual brands, for example (Business in the Community, 2008), to industry-wide on-pack messages (A.I.S.E., 2012), to a coordinated, multi-sector, pan-European campaign called 'I Prefer 30°' (A.I.S.E., 2013a).

A coevolutionary approach has been adopted for this research because it allows businesses' strategies and their customers' actions to be analysed as interdependent entities, recognising that there are links between managerial actions, institutional influences, and technological and social interactions (Lewin et al., 1999).

In the next section we set out the theoretical basis for the coevolutionary analysis of the two systems in focus, and link this to business strategies and user practices. Section 3 sets out the methodology used and the empirical setting for this research and Section 4 sets out the evidence and derives the linkages between the systems. Section 5 provides a discussion of the findings and Section 6 our conclusions.

2. Theoretical Basis

2.1 The coevolutionary framework used for consumer goods businesses' messages and users' practices

This research explores consumer goods markets for clothes and laundering in Western Europe using a coevolutionary framework to analyse the interactions and influences in these markets. It sets out to find insights that might be useful to both consumer goods

businesses and to policy makers seeking to influence consumer behaviour for environmentally driven ends.

Murmann's (2003, 2013) seminal coevolutionary explanations of the history of the 60-year development of the synthetic dye industry form an important theoretical source for this analysis. These use a comparative historical method across five countries to identify the causal mechanisms that acted as levers on the fundamental mechanisms of evolution. He first inductively proposed three mechanisms that linked two populations, in that case industry and academia (Murmann, 2003), and subsequently developed evidence to show that those mechanisms amounted to coevolution (Murmann, 2013). In contrast, Kallis (2010) uses theoretical concepts from coevolutionary theory to connect events and interpret changes between water supply policies and water-demanding households, using a socio-constructionist approach, rather than seeking to prove coevolution happened. This research builds on these two approaches, by using an evolutionary perspective to deduce the processes of variation, selection and transmission in two populations, that of business' consumer messages and user laundry practices, in a manner similar to Kallis (ibid.), and inductively speculates two causal linkage mechanisms between them, as did Murmann (2003). This is useful because it combines an interpretation of events with the rigour of specifying the coevolutionary mechanisms in each of two populations. Also, it allows the relative contribution between intentional actions and the results of unplanned ex post selection processes to be identified (Murmann, 2013).

Drawing on these theoretical advances, Foxon (2011) developed a coevolutionary framework that provides the underpinning mental model for this research, to analyse coevolutionary interactions between user practices, business strategies, technologies, institutions and ecosystems. Hannon et al. (2012) developed it, putting business strategies at the centre of the analysis. We use a similar framework here, directly focused on relevant systems for consumer laundering, shown in Figure 1. Business strategies here are defined as the deliberate choices made by businesses about the set of activities they will pursue in order to deliver their objectives, in their competitive context (Porter, 1985). A brief explanation follows of how the concepts of evolution and coevolution have been defined and used in ways that are relevant for this research.

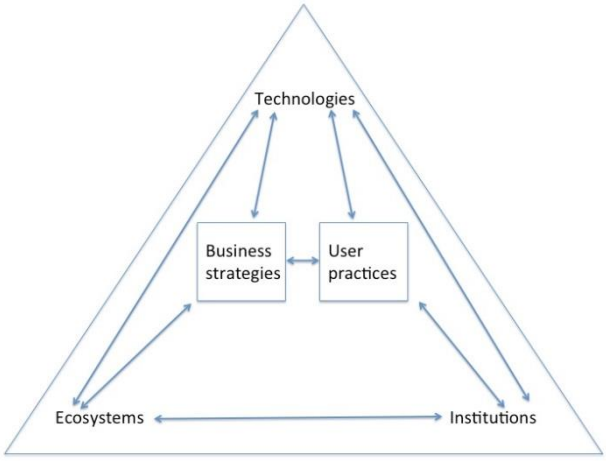


Figure 1: An integrated analytical framework illustrating the coevolutionary relationship between business strategies and the various dimensions of the wider socio-technical system. Adapted from Norgaard (1994), Foxon (2011) and Hannon et al. (2013)

Murmann (2003) asserts that an evolutionary explanation must specify its primary selection processes, by setting out the unit of replication and the unit of 'environmental' interaction, or its context and uses the term coevolution in the sense that 'two evolving populations coevolve if and only if they both have a significant causal impact on each other's ability to persist' (2003, p210). Murmann (2003) sets out two steps: firstly, that the industry and important factors of its environment can each be conceptualised as populations that undergo change through evolutionary processes and, secondly, that reciprocal causal mechanisms can be identified. We use these requirements to specify the populations in Tables 1 and 2 that follow in Section 3.

Markets comprising producers and consumers can be seen as 'supply' and 'demand' systems, for instance, by Kallis (2010), in a coevolutionary historical narrative, for public goods. Supply and demand systems across manufacturers and consumers have also been conceptualised as coevolutionary in a number of modelling studies, focussing on goods that exhibit variation through technological change (Saint-Jean, 2003, Janssen and Jager, 2002, Safarzynska and van den Bergh, 2010). The supply of consumer messages seems to be important, because advertising is often a vital aspect of consumer goods' companies' strategies (MacInnis et al., 2002, Vakratsas and Ambler, 1999) and consumer messages are a public manifestation of their brands' strategies (Gabriel and Lang, 2006, McCracken, 1990).

2.2 Corporate responsibility business strategies

Businesses' strategies for their branded messages are made in the context of organisations' broad corporate responsibility strategies and therefore it is relevant to explore differing approaches to corporate responsibility. Here we use an instrumental approach to corporate responsibility strategies (Garriga and Melé, 2004) because we aim to explore strategies from business managers' own eyes and this perspective has wide engagement within businesses (Aguinis and Glavas, 2012). Instrumental theories argue that corporate responsibility activities should aim for 'win-win' outcomes (Hahn et al., 2010, p218), in which business cases, made by the businesses themselves, determine the voluntary choices that they make for corporate responsibility activities; the best of these both benefit society and contribute to successful business strategy (Porter and Kramer, 2006). As Margolis and Walsh (2001) point out, there are empirical challenges to instrumental approaches for corporate responsibility, because they are usually assessed only in terms of their benefit to the business, rather than through their outcomes for the wider world. In this paper we assess this explicitly. We turn now to the business case drivers.

Business case drivers are what directly or indirectly influence commercial success (Schaltegger et al., 2012), so whilst sustainability actions are voluntary, they are generally in the interest of the business. Schaltegger et al.'s (2012) literature review summarises six core business case drivers: costs, sales or profit margin, risk, reputation, attractiveness as an employer and innovative capabilities, and this categorisation is used to analyse the business strategies behind the consumer messaging. As Okereke (2007) points out, attempts to understand businesses' drivers

for corporate emissions reduction actions have been few; exceptions are Hoffman (2006) and Kolk and Pinkse (2004). Yet many large consumer goods companies and large retailer businesses have undertaken sustainability initiatives under a climate change agenda, see, for example, for manufacturers, Van Hoof et al. (2003), Agrawala et al. (2011) and Morrison et al. (2009), and for retailers, Gouldson and Sullivan (2013).

2.3 Changing User Practices in Laundering

The understanding of user practices in laundry builds on the work of Shove. Contemporary laundering is a complex, composite task 'whose accomplishment depends on the active coordination of a multitude of relatively independent sociotechnical systems' (Shove, 2004a, p117) and it is 'clear that commercial rather than government organisations dominate the specification of service' (2004b, p91). Indeed, there are relatively few large, international detergent and appliance manufacturers that sell their products to the mass market in similar ways across the world (Shove, 2004b). The system as a whole achieves a valued desire for cleanliness and freshness; a socially constructed standard of personal and domestic hygiene and appearance (Shove, 2004a, 2004b, Dombek-Keith and Loker, 2011), but this external outcome is achieved through a domestic practice of 'inconspicuous consumption' (Shove, 2004a, p2).

Analysing data from Unilever's own research on users in the UK, Shove (2004a) finds that there are many interdependent elements that have led to a shared understanding of what is seen as normal. These include types of fabrics used for clothing, the design of household kitchens, as well as detergents themselves. The increased availability of in-home washing machines has largely determined how clothes washing is now done, and this has contributed to the reduction of average washing temperatures, in part because washing at boiling point is not available within automatic machine programmes. However, there may be completely different ways of ensuring clothes are maintained for wearability, with dramatically less need for emissions in the process. For instance, there are already washing machines that work without heating large amounts of water (Xeros, 2012). There may be clothes that don't need to be washed or cleaned at all; these would be a threat to the status quo within many established industries. This is brought to life in the 1951 British comedy film 'Man in the White Suit' (Mackendrick et al., 1951, Lees-Maffei, 2009, Street, 2009). Given the interdependencies identified in the laundry system, new business models would be needed to turn such inventions into successful innovations (Boons and Lüdeke-Freund, 2013).

Turning to ways in which shoppers and consumers can be influenced to act to benefit the environment, there are many factors that influence consumer behaviour (Jackson, 2005). Furthermore, from Young et al.'s (2010) consolidation of the literature, green values play a relatively weak influence on the purchase decision process in the context of habits, brand strength, demographic characteristics, lack of information, lifestyles, personalities and complexities of trading off between different ethical factors. Noting the disciplinary dominance of different approaches, guidance has been published for policy makers seeking to influence consumer behaviour change for environmental purposes (Southerton et al., 2011, Dolan et al., 2010, van Bavel et al., 2013, Darnton

and Evans, 2013), and also in the specific context of domestic energy use (Faiers et al., 2007). All of these serve to emphasise that providing consumers with information is unlikely, of itself, to lead to behaviour change.

Abrahamse et al. (2005)'s review of thirty-eight evaluations performed (within the field of social and environmental psychology) of consumer messaging interventions to influence behaviour change for reduced carbon emissions finds only isolated successes and little attention paid by researchers to measuring the environmental impact of the resulting energy savings. There is relatively little empirical research based on specific businesses seeking to influence consumer behaviour change for environmental benefit; an exception is Morgan et al. (2015), who concluded that there is scope for retailers to include mechanisms from wider disciplinary contexts, for more successful outcomes.

We expand on and update the work of Shove (2004a) on changing laundry practices by adding examination of the behaviours, strategies and choices of the range of actors within incumbent businesses. This helps us to understand the processes of change in consumer practices, connect events and analyse an important linked system: businesses' strategies for consumer messages.

In particular, retailing strongly influences the choices that consumers make, because detergents have to be shopped for, and are shopped for frequently (Mintel, 2011b). Large retailers are important because of their influence as intermediaries on shopping behaviour, through their sourcing of products and organisation of the assortment on display (Carrero and Valor, 2012, van Nierop et al., 2011) and therefore their potential for influence on final consumption emissions (Bocken and Allwood, 2012) . A number of retail businesses in the UK have undertaken initiatives to reduce carbon emissions by end consumers, including in laundering, over this period (Morgan, 2015, Morgan et al., 2015). Thus, including retailers' strategies in analysis of coevolving business strategies and consumer practices provides an important advance on the work of Shove (2004a).

3. Methodology and Setting

3.1 Data Selection

The underlying intention for data collection was to analyse the issues and initiatives as perceived through the perspective of sales, marketing and public relations managers within detergent and retailer businesses because these actors design their businesses' consumer messages. Primary data were obtained directly from 23 semi-structured interviews and 3 email exchanges, conducted by the principal researcher with individuals employed by businesses (either directly or as consultants), who had created or deployed consumer messaging initiatives to reduce laundry temperatures in any one of five Western European countries; Belgium, Denmark, France, Italy and UK. These countries were chosen because they all took part in a consumer communication campaign from 2014 led and coordinated by the European Association of Detergent Manufacturers (A.I.S.E), called 'I Prefer 30' (IP30), which provided a

rationale for contacting potential respondents. There were three further sources of primary data; the first of which was provided by A.I.S.E. itself and comprised both published and unpublished, private data, about initiatives to reduce laundry-washing temperatures across Europe, once of which was the IP30 campaign. An agreement was made between the University of Leeds and A.I.S.E., which allowed access to this data, and access also to individuals who had been involved in consumer-facing initiatives of the organisation. The public data were in the form of reports dating from 1998 to 2015. The second source of primary data was publicly available material relating to low temperature washing related to activities from 2000 to 2015, derived from corporate reports, press releases, video footage, journal papers and published interviews from large detergent manufacturers and individual employees, and from three large UK clothing retailers. Finally, these were augmented by secondary data collected during the research process from the Sustainable Clothing Action Plan (WRAP, 2015) and from independent market research and audit companies. Secondary data also came from qualitative and quantitative reports about how the initiatives were perceived and acted upon by consumers, having been commissioned by A.I.S.E., its members, and its business partners, and made available subsequently to the principle researcher on a selective basis. It was not possible to collect primary consumer data in this research, due to time and budget constraints.

3.2 Data analysis

Data were analysed to determine changes in manufacturing and retailing businesses and consumer practices over a period of eighteen years, 1996 to 2015. Data were also input into a proprietary software programme, NVIVO, to enable coding. For large reports and videos this was not practical, so the data were searched individually for statements or phrases that included the key words: emissions, carbon, user, consumer, customer, temperature, detergent, washing. The data inputted into NVIVO and the non-NVIVO statements were coded. Codes were deduced from each of two theoretical standpoints. Firstly, instances of the causal processes of variation, selection, and inheritance were identified according to the descriptions given in Tables 1 and 2 that follow, and coded; the selection coding was subdivided into ‘shopper’, ‘consumer’, ‘manufacturer’ and ‘retailer’. Secondly, from the interviews only, the underlying business strategy motivations behind the consumer messaging initiatives were systematically coded according to Schaltegger et al.’s (2012) six core business case drivers, in order to assess which of these theoretical business case drivers were behind the initiatives.

3.3 Identifying patterns and linkages

Codes were induced from the data. Firstly the potential consumer benefits that were communicated within the messaging were identified. Secondly, the outcomes arising from the communication messages were identified and coded and, then, through a final stage of coding, linkages were found, over the twenty-year period, between the business strategies for consumer messages and the impact of the communication messages.

3.4 The empirical research setting

We have set out the context for this research as a map of supply and demand systems, following Murmann's (2013) first step to specify concrete instances of variation, selection and transmission (VST) processes and are specified in Tables 1 and 2. Here, we take the population that is 'supplied' to be the set of consumer messages designed by businesses to influence consumer behaviour to wash their clothes at lower temperatures. These messages are purposeful and voluntary interventions directed to consumers, guided by businesses' strategies, and delivered through a wide range of mechanics, such as advertising, in-store promotions, product labelling, information printed on packs, paid-for editorials, social media and websites.

It is worth noting that the selection environment for consumer messages for domestic energy reduction has been influenced by legislation requirements for washing machines. For instance, the European Union Ecodesign and Energy Labelling Directives (European Commission, 2015b), from 1996, which were designed to improve the energy efficiency of laundry appliances, through energy rating labelling. A later refinement of these Directives was that the measurement regime for the classification explicitly required data from washing cycles at 40° temperatures (European Union, 2010). These Directives have been effective in influencing the availability and purchasing of lower temperature cycle washing machines (Mills and Schleich, 2010, Sammer and Wüstenhagen, 2006), in part through choice editing of retailers (Sustainable Consumption Roundtable, 2006).

The strategies developed for consumer messages are a subset of businesses' total strategies. The scale of resources that large international consumer goods businesses devote to it demonstrates the importance of advertising as one element of consumer messaging. For instance, in 2010, main media advertising expenditure on washing detergents was £46.4m in the UK, 93% of which was spent by just two companies; this sum represented 3% of the total value of market sales (Mintel, 2011a). The population that represents 'supply' is shown in Table 1:

Role of the system	The 'Supply' system
Units of replication	This population of branded messages designed by businesses to impact consumers' behaviour to reduce laundering temperatures, a subset of their marketing and sales strategies.
Sources of variation	Intentional variation, through conscious planning, is created by different commercial entities, within different businesses, for corporate, marketing, sales and public relations purposes, and sometimes arises from opportunities that emerge because of new product technologies.
Selection processes	The 'environmental' interactions arising from the communication of the messages to consumers, as perceived by the businesses. Firms are uncertain as to which messages consumers will respond most positively, in part because they are not aware of competitive brands' messages beforehand, nor how consumers will respond to those. Scarce resources in the selection environment include the space on

	retailers' shelves, space on packs and advertising expenditure. Messages are duplicated over time either if they are perceived by the business entities as having led to successful outcomes, or for as long as no alternative messages have been created which are thought by businesses' decision makers to be potentially more successful.

Table 1: Population level causal processes of VST (Murmann, 2013): Consumer messages

Demand for detergents takes place in the context of the Clothing Use Chain shown in Figure 2.

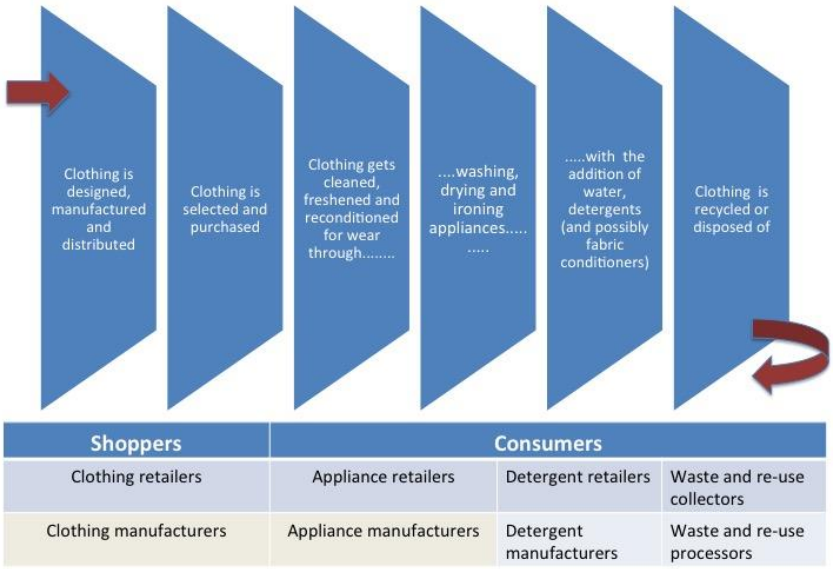


Figure 2: The Use Chain for clothing, derived from Shove (2004a), DEFRA (2010) and Morgan (2015)

The population that represents 'demand' is shown in Table 2:

Role of the system	The 'Demand' system
Units of replication	The population of ways in which households do their clothes laundering at home ('user practices'). Ways of laundering include the use of pre-set programmes in washing machines, the use of detergents and pre-wash products, the time taken to do the washing, and the way in which clothes are sorted for washing.
Sources of variation	Variation increases as new ways of laundering become available through new products offered for sale at supermarkets, or appliance retailers, and through households' experimentation and accidents
Selection processes	First stage (shopping): Households differentially select practices, ie adopt different ways of washing, based on 'environmental interactions with the appliances and detergents that are available for them to buy, (including laws that limit the variation available), and on consumer messages (such as advertising, sales promotion, pack messages, pricing), recommendation of others, and the perceived success of the methods used previously. They are limited by cost and storage space at home.

	Second stage (consuming): Households differentially select ways of washing based on the washing programmes and detergents available to them at home, having shopped, and the set of clothes they have to wash at the time; also from consumer messages, imitation of others, and the perceived success of methods used previously

Table 2: Population level causal processes of VST (Murmann, 2013, Durham, 1991): User practices as the units of replication

Having taken the first step of conceptualising the populations of businesses' messages and user practices as two evolving systems, we then identify the linkage mechanisms between them inductively.

3.5 Analysis of findings

The empirical findings are analysed as follows. Firstly, the way in which the detergent manufacturers' messaging strategies have evolved is analysed. Secondly, the influences between manufacturers and retailers are examined in the context of messages' outcomes. This enables identification of both the business case drivers that emerged and how businesses assess outcomes relating to them. The extent to which these messages have affected user practices is then examined. The analysis draws on the coding and uses quotations from the interviews to illustrate key points. From this analysis, the key causal linkages between the supply and demand systems are then identified.

4. Domestic laundering: coevolutionary linkages between business strategies for consumer messages and consumer use practices 1997-2015

This section describes the ways in which business strategies for consumer messaging are influenced by the institutional and technological systems, and how they differ across manufacturers and retailers, illustrated by quotes from interview responses. We then describe how user practices emerge through the shopping and using phases. The focus is on population changes, message competition and linkages between the supply and demand, and then to identify the extent to which the key linkages have affected user practices and businesses' strategies. We do not seek to prove that these are the only possible maps for the fundamental evolutionary mechanics of the populations, but to use them to find causal mechanisms between them, in order to create insights that might be useful for future design of messaging interventions for behaviour change in consumer markets.

4.1 Detergent manufacturers' strategies for consumer messages

This time period is one throughout which almost all households in Western Europe had automatic washing machines (Pakula and Stamminger, 2010), for which suitable detergents are needed. Detergent manufacturing is a competitive global industry, dominated by relatively few large international companies, Procter & Gamble (P&G),

Unilever and Henkel, each selling detergents under brand names such as Ariel, Tide, Omo, Surf and Persil . They each invest huge resource into researching consumer usage and shopping behaviour including in relation to sustainability (Shove, 2004a, Pearce, 2013, Stalmans et al., 2007, Stalmans et al., 2013). Their consumer brands are sold through relatively few large retailers in each country. Retailers also sell their own label brands, at cheaper prices, promoted through consumer messages in their shops, rather than by external consumer advertising.

European detergent manufacturers contribute to an industry association named A.I.S.E., based in Brussels, representing about 900 companies from large multinationals to small SMEs, through Associations in more than 30 countries (A.I.S.E., 2013b). A.I.S.E. act as the voice of the industry in Europe, working with other organisations; seeking to ensure stakeholder dialogue takes place in an atmosphere of trust, and to improve the economic and legal environment in which the industry operates. A.I.S.E.'s stakeholders are identified as, amongst others, the European Commission, Member States and Non-Governmental Organisations (A.I.S.E., 2003, p2). There is a shared technological view of the way in which detergents work to clean clothes (A.I.S.E., 2013a). This has five interdependent elements: chemical action, mechanical action, temperature, time and water. Respondents from businesses and other bodies concerned with clothing, detergents and washing appliances consistently describe this as the only way to manage the performance of clothes' laundering processes, with variations possible through increasing or decreasing the five interdependent elements.

Since the 1990s the major detergent manufacturers have used their considerable scientific expertise to be at the forefront of designing products for improved sustainability, based on varying these elements. Increasingly technologically sophisticated enzymes (which can act as catalysts to speed up chemical reactions) enabled reductions in washing temperatures (A.I.S.E., 2013a). As businesses sought to improve their sustainability, across the period from 1997, manufacturers' scientists consistently identified the importance of carbon emissions from the use phase of the lifecycle (Saouter and van Hoof, 2002, Golsteijn et al., 2015).

Another benefit of increased use of enzymes is that the physical bulk of the detergents could be reduced (Novozymes, 2016). The industry has developed a narrative that concentrated product formats are beneficial to consumers due to their general environmental benefits, for example by reducing consumption of resources (same number of washes with less resources per pack), reduction in packaging, lower emissions in transport (Dombek-Keith and Loker, 2011), and the capacity to perform well at lower temperatures, thus saving consumers carbon emissions, energy or energy costs per wash, whilst also prolonging the life of the clothes (A.I.S.E., 2013a). From the early 2000's manufacturers reduced their costs in packaging and in transport in alignment with increasing the consumer environmental messaging for these types of products. The growing consumer interest in environmental topics gave an opportunity to reduce product and packaging sizes. Previously, this had been seen as too difficult to persuade consumers to accept, because shoppers equated the size of the packs on shelf with value for money. Manufacturers saw this as a 'win-win':

‘If you take something like Ariel, we have a gel which you can use at low temperatures and is very concentrated. In the manufacturing process, it makes 40pc less waste and uses 30pc to 40pc less water to make it. When we ship it, it’s got as much as 45pc less packaging and you need 50pc less truck space to move it than we did in the past. When the consumer washes their clothes, they use 20pc to 50pc less energy depending which temperature they choose.’

Huw Waters, Product Supply Director, P&G (quoted in Wilson, 2012, online)

A.I.S.E. developed a number of initiatives that resulted in consumer messages being delivered across Europe. In 1997 A.I.S.E. created the consumer-facing ‘Washright©’campaign to raise awareness amongst the industry’s consumers of the benefits of changing their washing habits, including reducing laundry-washing temperatures, and from 1998 onwards, over 90% of European household laundry detergent packs displayed the message (A.I.S.E., 2003). The campaign was also advertised in printed media in many languages, and included a multi-lingual website.

From 2000 to 2002, A.I.S.E. developed a pan-European television advertising campaign to promote the Washright© message (A.I.S.E., 1999), at an estimated cost said, in 2002, to be €10m equivalent each year (A.I.S.E., 2003). Television advertising was used for the campaign even though it was acknowledged by A.I.S.E. as a costly method of consumer communication.

In 2012, A.I.S.E. started to develop a new consumer campaign called ‘I Prefer 30°’ (IP30), with activity during 2014, in five European countries: Belgium, Denmark, France, Italy and the United Kingdom. This initiative was implemented not only through detergent manufacturers, but also invited retailers, appliance and textile companies, trade associations and government authorities to take part by using IP30 branding themselves, thus involving a wide variety of stakeholders in its outcomes. It was set to be repeated in four countries (as originally, but excluding Italy) during 2016 (A.I.S.E., 2015b).

A best case scenario of the potential for A.I.S.E’s initiative was given as total energy saving of 1898 GWh per annum in these five countries (A.I.S.E., 2013a), arising from an average nominal temperature reduction of 6-7°C below the 2013 average. This is equivalent to a substantial 21% reduction compared to average energy use of automatic laundering of 9258 GWh per annum (Pakula and Stamminger, 2015).

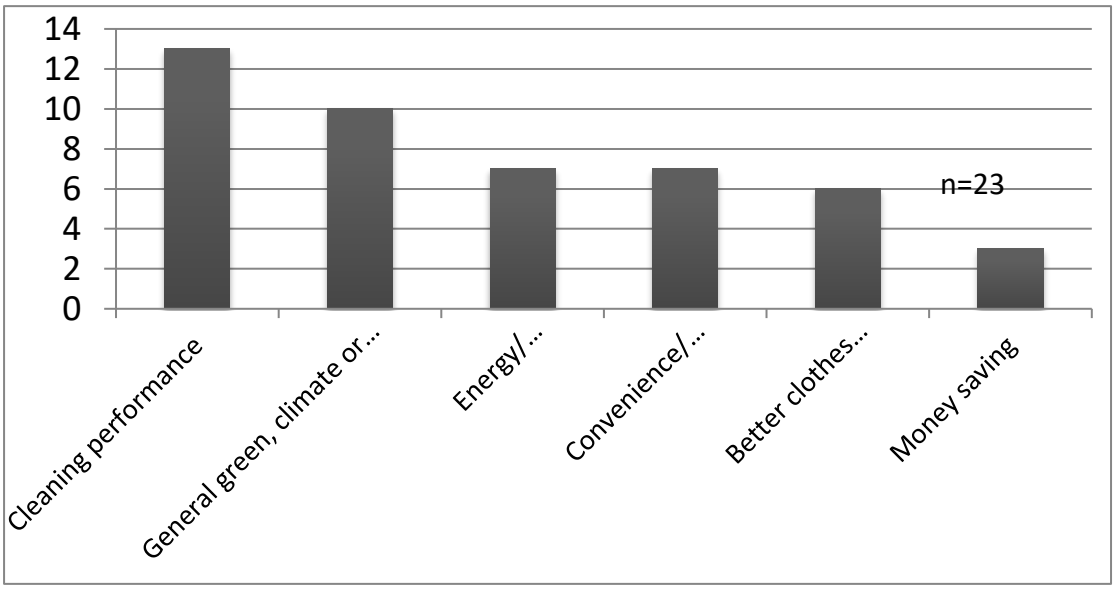
In parallel with A.I.S.E.-led initiatives over this period, individual detergent manufacturing businesses also created specific consumer communication campaigns setting out the benefits of low temperature washing. These were referred to within Sustainability Reports, for example, from Unilever (2002-2015) only up to 2012 (although Unilever became a campaign supporter for IP30 in 2014), and on a consumer website in 2012, from P&G (2006-2015) and also from Henkel (2009-2015). For their individual brands, P&G and Henkel have maintained low temperature washing promotion more consistently than Unilever, since 2012.

The variation in detergent manufacturers’ business strategies for consumer messages arises from differing technological, marketing and selling capabilities and from differing

strategic preferences, and, in part, from different geographical biases within the businesses. For example, P&G, as a US based company, are more strongly influenced by Walmart, whereas Unilever have almost no presence in the US (The Economist, 2012). Different strategies are exhibited through different product formats and various branded vehicles for consumer persuasion, for instance, advertising, packaging design and promotions.

Messages for consumers of washing at lower temperatures have included information about six types of benefits: saving money, improving cleaning performance, saving energy or emissions, benefitting the environment, improving convenience and ease of use, and improving clothing care. Chart 1 shows the number of respondents to this research stating that each benefit was a motivating one, for each of the types of consumer benefits.

Chart 1: Number of business respondents stating that the benefit is a consumer motivator



It is worth noting especially that saving money is considered least important as a motivating message by these business interviewees:

'the amount of money that you would save, the consumer would save, in the year by washing at 30 degrees, is £38. There's all sorts of questions about £38; it's a night out; it's not very much money. And again it's not why you would buy a product.'

(Author interview with Technical Manager, UK retailer, March, 2014)

Furthermore, Unilever's Marketing Director has publicly stated that the P&G campaign for Ariel called 'Turn to 30' did not change behaviour (Charles, 2010). He stated that this view was derived from market research carried out by the firm, in which consumers placed electronic chips in their washing machines to measure the temperature and length of washes.

We turn now to businesses' selection criteria. Sales revenue and profit (in part generated through cost reduction) is perceived as one of the most important of the business drivers for commercial managers:

'In terms of those measures of success …… as a sales organisation; it's what it done for us in terms of the sales line.'

(Author interview with Sales Manager, detergent manufacturer, April, 2015)

For respondents in commercial roles within businesses, achieving sales and profit was the critical and necessary objective for any initiative that resulted in consumer messaging. For respondents in technical or communications roles, however, there was frequent recognition that more senior managers in the company had to manage the balance between sales and profit and reputation:

'Senior management….playing the reputation about being a good corporate partner to government, to customers…and of course that directly leads into sales and profit because people think well of you and therefore they want to come and shop with you….'

(Author interview with Communications Manager, large UK retailer, July, 2014)

There are two separate, but related, aspects to these businesses' reputations: their brands' reputation amongst consumers and their corporate reputation amongst stakeholders. These are closely linked and reinforced across different businesses:

'We are a consumer goods company, so that means we have to produce consumer goods; that's when we are successful and that's crucial to ….our future goals, but at that same time, if we don't get the consumption part of the equation right then we will not be in business in 20 or 30 years from now.'

(Author interview with scientist, detergent manufacturer, July, 2015)

'Procter & Gamble and Unilever and you know they are also the ones that probably have the most to lose in terms of corporate reputation because they're very big brands.'

(Author interview with consultant to detergent manufacturers, July, 2014)

For these companies, their brand reputation is a competitive tool:

'Although a number of other companies added their own 'turn to 30' messages by the second year, independent research showed that 88 percent of consumers who changed their behaviour to wash clothes at 30 degrees associated the message with Ariel.'

(Case study, (Business in the Community, 2008))

This has the effect that a 'turn to 30' message was not selected by competitive brands to use for themselves:

‘Now what's the benefit for the others, of setting up their own campaign? There's not much, because P&G was the first to do it so either you go one better than P&G somehow, by saying don't wash at 30, but wash with cold water, or you say no, let's do this on a industry scale, ……this competitive element that started the whole movement, is being eroded by others and you can see how the different companies’ interests don't align.’

(Author interview with Sustainability Manager, appliance manufacturer, March, 2015)

‘ “I prefer 30” was a sustainable message, one that we had to support … but in terms of its success at a very business level I'm not sure that we ever thought it would move the dial.’

(Author interview with Marketing Manager, detergent manufacturer, April, 2015)

Businesses’ managers do not see themselves as ‘all knowing’. Even having done their own market research, they do not know beforehand how successful their deployed strategies are going to be until they are tested in the market against competitors. If a strategy damages sales, profit, corporate or brand reputation, it can be, and is, quickly changed, and such change can be managed to have a fast impact in sales, since these are frequently purchased consumer goods. Respondents thought that the other drivers (innovation, risk and employee attractiveness) were not of primary importance, even when prompted.

Since all these manufacturers’ sales are made indirectly, through retailers, it is through retailers that their success is measured and we now describe the processes taking place between manufacturers and retailers.

4.2 Influences between retailers and manufacturers

For the individuals in the commercial departments of retailing businesses, making buying and sales decisions on a day-to-day basis, their personal success is linked to the short-term sales revenue generated from the area of business for which they are responsible. We found that commercial success and failure are highly visible within, and across, the small number of large retail and detergent businesses in each country, with high awareness of successes and failures of competitors across and between both sets of businesses. This leads to reluctance to take a stand in limiting shoppers’ choice in the interest of emissions reduction:

‘I think that there is a nervousness about being seen to….only sell washing powders that only wash at 30°. And that's partly a commercial issue because...if you're the kind of customer who thinks it only gets it clean at 60, they go somewhere else. So it's partly a kind of nervousness about being seen to be a nanny, and a commercial issue.’

(Author interview with Public Relations Manager, UK retailer, April, 2015)

So, the strategies and tactics that generate growth in sales revenue and profits are repeated over time. To enable this, retailers seek feedback from shoppers assiduously:

“Practically every minute of every day, somebody in our business is asking shoppers and customers what they think …… against a number of different measures. And how they respond to promotions, what they think of products….”

(Author interview with Communications Manager, large UK retailer, July, 2014)

Retailers, most of which also sell clothes as well as household goods and food, are also sensitive to the impact that failures of detergent products in the past have had for their own reputation:

‘The reason for [leading retailer] being interested in detergents came from the reformulation of detergents with an aggressive action that damaged clothes. This resulted in garments being returned to us as being faulty.’

(Author interview with Sustainability Manager, UK retailer, March, 2014)

Retailers’ buyers do not see the environmental messages as sufficiently strong to deliver increased sales. It was explained that a major retailer did not take up IP30 because:

‘they [retailers] have to free up what is very valuable space and to use that for a campaign that's not….. it's hard to justify, given that it's not really going to move the sales line itself versus a price promotion….’. (Author interview with Sales Manager, detergent manufacturer, April, 2015).

Other interviewees argued:

‘Ultimately it would be interesting….. can we sell more…..can our customers sell more of the low temperature branded products? I would expect it would be difficult’

(Author interview with Public Affairs Manager, detergent raw materials manufacturer, March, 2015)

Retailers have additional ways of increasing their profits, through more efficient use of shelf space and this comes into consideration too because of more concentrated forms of detergents. For instance, Walmart, the largest global retailer by sales, had developed a policy for the United States from 2009 to eliminate the large physical packs required for dilute detergents, in the interests of sustainability (Crawford, 2013), and this subsequently influenced the international strategies of the major detergent manufacturers which had large US operations. However, this is a ‘win-win’ also for retailers because they can merchandise higher value products for each unit of shelf space:

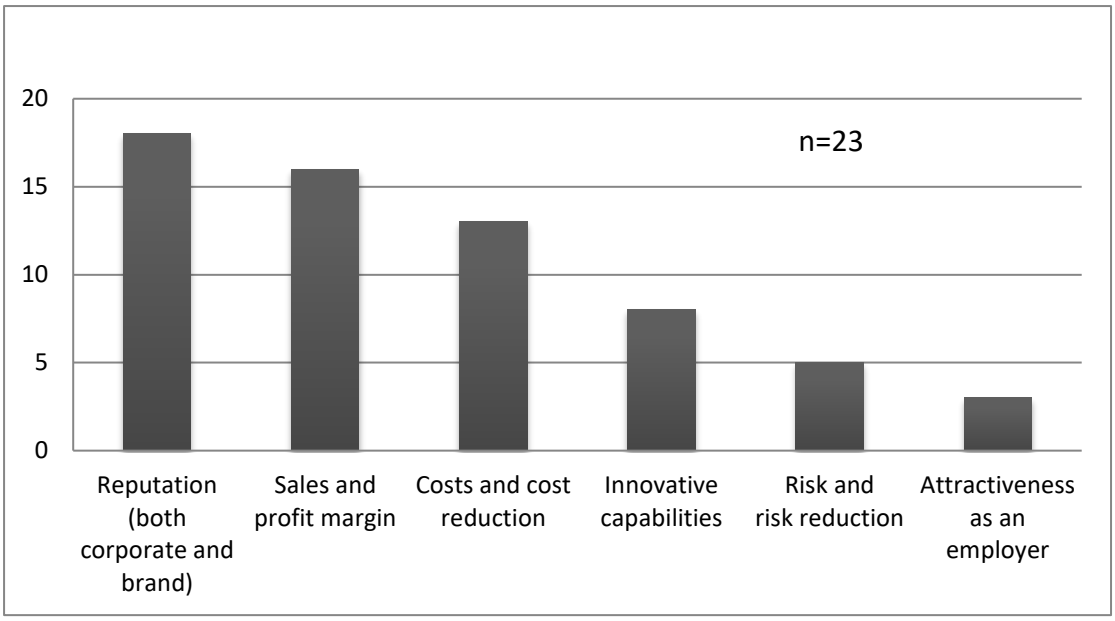
’Retailers welcomed compact detergents because it freed up shelf space and the overall mission of a retailer has to be to maximise the upturn from shelf area.. so if someone says I’m going to take less space….they’re going to bite your hand off really.’

(Author interview with long-term consultant to large UK retailer, July, 2014)

Therefore we have seen that manufacturers’ strategies themselves are constrained or enabled by retailers’ distribution, promotional and pricing strategies.

Chart 2 summarises business case drivers for consumer messages. Reputation (both corporate and brand) was found to be the most important driver, followed by 'sales and profit margin' and 'costs and cost reduction'. 'Innovative capabilities', 'Risk and risk reduction' and 'Attractiveness as an employer' were found to be less important as drivers.

Chart 2: Business case drivers for consumer messages, according to business respondents



4.3 User Practices

As we have seen, there are two stages that result in detergent use. The first is that the detergent has to be selected by shopping through a retailer before the second stage, when it is selected for use at home, almost always in a washing machine, whose set of programmes limits washing temperature choices.

At the first stage, variation in consumer buying of detergent products arises because of different consumer preferences for brand, or format (powder, tablet or gel), or fragrance, or price and other product attributes, which include environmental claims. The choice at the shelf is constrained by retailers' buyers' decisions about what will be made available, and influenced by retailers' decisions about shelf positioning and visibility. Shoppers' choices at the retailers' shelf are made from habit (influenced by brand and format loyalty), from the product's price, and their perceptions of performance to achieve the desired cleaning results. Price is clearly set out on the shelves; perceived product performance information comes from advertising, shelf and pack claims and previous use experience. Respondents declared that consumers find shopping for detergents uninteresting, to be done with speed, and want retailers to make it easy to find and choose quickly. For the majority of shopping decisions, products are selected from a small repertoire of previously used brands. However, a new, low-priced detergent, for instance a retailer's own brand, may provoke an experimental purchase.

From the early 2000s, messages about the environmental impact of detergents are said to have played a role in the shoppers' decision hierarchy. However, these aspects are not perceived to be the primary drivers of purchase, as we discussed above in section 4.1.

The second stage, laundering at home, is also seen as an uninteresting task. The requirement for detergents to perform to clean clothes effectively has changed as the type of dirt and staining has changed over the years. For most clothing, most of the time, it has become a freshening and hygiene-maintenance process, rather than a dirt-removal process; the exception to this is children's clothing. Also, user practices have been influenced by the evolution of garment design. Clothing increasingly uses fabrics that can be washed at lower temperatures; clothing retailers have reduced the temperatures at which they test their garments, thus accepting new configurations of materials, which may not have passed retailers' own standards for clothing longevity in the past.

In the laundry process, consumers first assess the types of cleaning or freshening required, and the types of clothing being washed (principally whites or coloured), based on habit, rather than by reading clothing labels each time. Then they select the washing programme on the machine. Most households habitually use no more than two of the available programmes and this choice results in the washing temperature being selected. As automatic washing machines became standard, boiling clothes at 90° was no longer possible or desired, consumers welcoming this because fading and shrinkages were common at such high temperatures. Notwithstanding the known advantages of abandoning the very high temperature washing of the past, there remains a widespread consumer view that higher temperature will give better results in terms of both cleaning and hygiene performance; this gives rise to a tension between the desired, higher order, outcome of clean, hygienic clothes, and the environmental or cost benefit of using lower temperatures.

The effect of EU appliance labelling legislation (European Commission, 2010) has been that it favoured appliance manufacturers who had more efficient programmes at 40° or below. So, newly installed machines now almost always have at least one programme that washes at temperatures of 30 degrees. Before these machines were widely in use, there had been a fear amongst both clothing and grocery retailers that 'wash at 30' messages would limit their sales because consumers would not buy clothing or detergents bearing this instruction if their machine did not have a suitable programme at 30 degrees.

4.4 Two mechanisms of coevolution

Having set out the evolutionary mechanisms within two populations, business strategies for consumer messages and user laundry practices, we now analyse the key events in the recent evolutionary histories of each of these populations, and interpret the linkages between changes in the two populations.

Consumers purchase detergents from retailers many times each year, who have, in turn, purchased them in bulk quantities, from manufacturers, many times each year. Detergent manufacturing and retailing businesses report their sales and profit results

at least biannually. From the coding, this leads to two linkage mechanisms identified as operating between the Supply and Demand evolutionary systems. These are short-term sales and consumer and customer feedback; together these drive the coevolutionary interactions between the two populations. Customers initiate short-term sales by purchasing at retailers, and retailers and manufacturers measure those sales, and this is what forms the first linkage. Businesses (either detergent manufacturers or retailers) initiate consumer and customer feedback and subsequently analyse the results; this is what forms the second linkage. We now look at these each in more detail.

4.4.1 Short-term sales

Based on our evidence, and on businesses' consumer research, it is clear that cleaning performance is seen by the businesses as the leading functional benefit in determining consumers' detergent choice, and is a major element of what they seek to communicate. Detergent manufacturers have increasingly promoted compact detergents' cleaning performance (often with pricing offers), and influenced their increased availability by retailers, in turn, influencing consumers to buy and use them. Over the same period, washing machine manufacturers developed and promoted washing machines designed to wash effectively at temperatures below 40°. Therefore lower temperature washing has occurred principally because both detergents and machines to do so were easily available, better advertised and price-promoted, and delivered good cleaning performance, rather than because consumers selected detergents primarily on the basis that they were effective at lower temperatures. Furthermore, clothing textiles have become increasingly more appropriate for washing at lower temperatures.

The picture that emerges is that consumers' behaviour has been driven by perceived cleaning performance and value for money of detergents, not by lower environmental impact or saving money on energy. Following P&G's 'Turn to 30' campaign' for its Ariel brand (Business in the Community, 2008), other brands subsequently have not led with the benefits of reduced washing temperature in their advertising. This is in part because it would not be competitively distinctive, but also that it is believed that this messaging would not increase short-term sales, nor be effective in changing behaviour. Nonetheless, the IP30 initiative was subsequently funded by the manufacturers (at European association level), but at lower expenditure than they would typically spend on their brands.

Mass-market grocery retailers stock conventional, well known branded products, measuring success by sales revenue and profitability per square metre of shelf space; there is less shopper demand for less well-known brands, including those for whom the consumer message is principally an environmental one. Large established detergent manufacturers seek to emphasise to retailers' buyers the benefits to retailers of their brands' high rate of sales and profitability, in turn benefitting retailers' short-term business performance. This discourages buyers from giving space to more niche alternatives in their stores. Therefore manufacturers of these smaller brands seek distribution through alternative channels; specialist 'natural' stores, upmarket

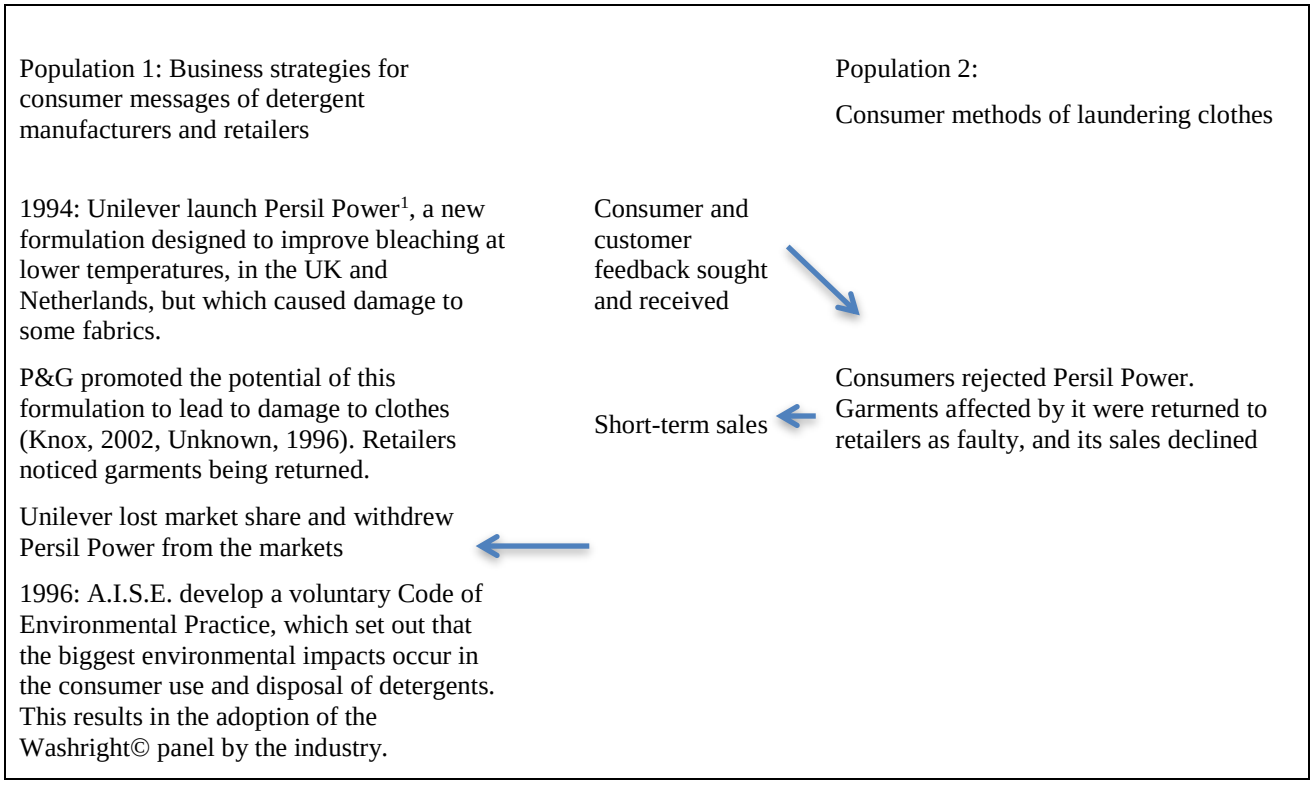
department stores, or on-line sites, thus further marginalising their appeal and availability to mass-market consumers.

4.4.2 Consumer and customer feedback

An important example of consumer feedback is A.I.S.E.-commissioned consumer research, which included gathering self-reported temperature selection, in five quantitative surveys from 1997 to 2014. From these, average temperatures of a machine wash in Europe reduced from 48° (1997), to 46° (2002), to 43° (2008), to 41° (2011) and increased to 42.6°C (2014), due to a decline in the number of colder washes. Both these research results, and other consumer research surveys cited to the researcher (but not in the public domain), show that progressive lower temperatures are not being achieved in recent years. They have also indicated that consumers themselves do not perceive that their own behaviour has the potential to substantially reduce carbon emissions, nor is this a feature of how they make their choices.

4.4.3 Linking across the two populations

Figure 3 provides a causal map of the coevolutionary dynamics between the two populations, showing a simplified timeline of key events and interactions between the business strategies for consumer messages and changes in user laundry practices, following the template in Murmann (2013).



[1] The story of Persil Power is not the main focus of Figure 3, but serves to support the identification of the coevolutionary link that consumers' shopping behaviour and the nature of competition between manufacturers and retailers affects short-term business performance.

1997

In A.I.S.E's first quantified survey of consumers' views on household laundry habits, 48° is average temperature of machine wash in Europe (A.I.S.E., 2003).

1998: Over 90% of laundry detergent packs included Washright© panel.

Consumer and customer feedback sought and received

2000-2002 A.I.S.E. television advertising campaign for Washright©

2002: 2% of UK washes at 30° (Business in the Community, 2008)

2002: 46° is average temperature of machine wash in Europe (A.I.S.E., 2013a)

2006: P&G's Ariel brand runs a campaign called 'Turn to 30°'

Consumer and customer feedback sought and received

2007: Marks and Spencer 'Plan A' includes a commitment to a major educational campaign, for one year, to encourage consumers to wash at 30° (Marks and Spencer, 2007)

2007: 17% of UK washes at 30° (Business in the Community, 2008)

Consumer and customer feedback sought and received

Peak of consumer 'concern about the environment' (IPSOS MORI, 2014)

2008: Henkel launch Persil Gold, effective at 20°

2008: In a repeat survey, 43° is the average (A.I.S.E., 2013a)

2009: Henkel launch Persil ActicPower, messaging its effectiveness at 15°

2010: Unilever Sustainable Living Plan (USLP) includes a target to encourage consumers such that 70% of machine washes by 2020 will be a lower temperature

Short-term sales

2010: revised measurement regime for EU Energy Labels on washing machines, requiring testing at 40°

Consumer and customer feedback sought and received

2011: In a repeat survey, 41° is the average (A.I.S.E., 2013a)

2013: P&G announce their target that 70% of all machine loads to be done at lower temperatures by 2020

Short-term sales

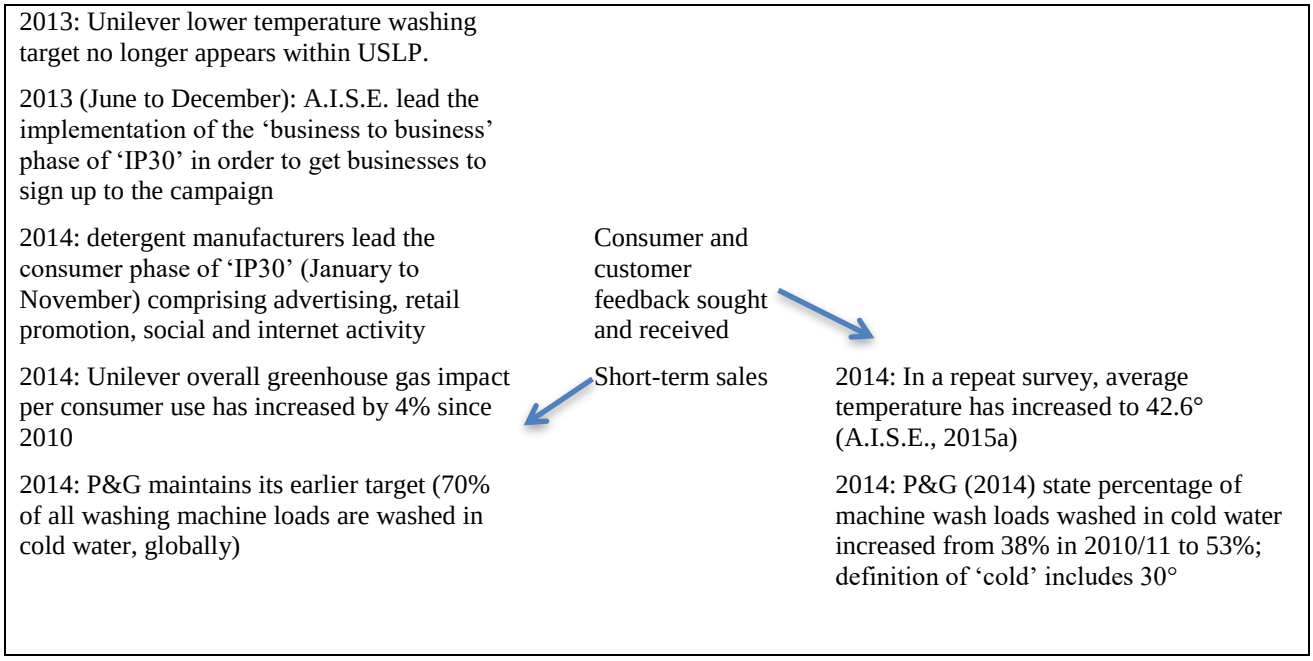


Figure 3: Map of coevolutionary dynamics, showing two linkage mechanisms, developed by authors, following Murmann (2013)

4.5 The Linkage Mechanisms

We have defined the three evolutionary processes in each of two populations, and identified inductively the two causal processes, namely 'short term sales' and 'consumer and customer feedback'. Following Murmann (2013), as we have identified these two causal mechanisms with an effect both on the evolution of the consumer messages and on user practices, there are a possible twelve causal effects. These are shown in Table 3 and Figure 4, based on Murmann's 'Mechanisms of Coevolution' (ibid.) and illustrate where we have found evidence for eleven causal effects.

Short term sales		Consumer and customer feedback	
Consumer Messages	User Practices	Consumer Messages	User Practices
Variation			
Sales arising from users' purchases and use patterns prompt sales and marketing managers to devise new consumer messages about environmentally friendly behaviour	Consumer messages generated by businesses give users ideas for new ways of using detergents	Feedback and suggestions from consumer and shopper market research leads to new messages being communicated	Not observed
Selection			
Messages that are perceived to generate the best sales (in relation to competitors' sales performances) are	Users buy detergents based on the messages that they perceive will meet their needs,	Types of consumer messages that are well perceived by retailers' buyers and in consumer and shopper market	Users feedback to retailers and manufacturers which brands they consider to

likely to be used. Retailers select products for their shelves by judging which messages will generate most sales revenue in the space available	amongst all those on display	research are adopted in the limited space or resource available, on pack, on shelves and in advertising.	be in the repertoire of the ones they will buy
Transmission			
Businesses' consumer messages that are thought to have contributed to generating sales are retained	Users who feel that the detergents' messages have been fulfilled in use will buy and use them again	Businesses' consumer messages that are replicated over time will more readily be fed back by users, through, for example, their loyalty to particular brands	Users retain loyalty to certain brands on the basis of their features and benefits, as they perceive them

Table 3: Causal Mechanisms and Their Effects on the Evolution of Consumer Messages and User Practices

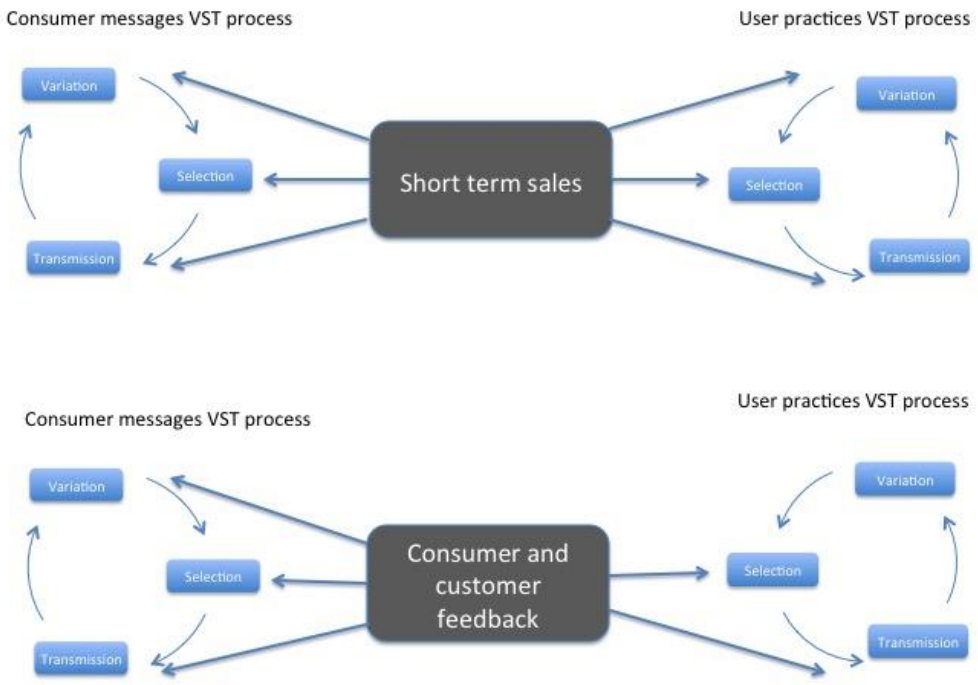


Figure 4: Two Mechanisms of Coevolution

5. Discussion

We have found that this coevolutionary analysis of the supply and demand systems has challenged the simplistic narrative that detergent manufacturers have driven washing temperatures down in order to achieve environmental benefits. The benefits of washing temperature reduction do not feature as important aspects of selection for detergent manufacturers, retailers or their consumers. The requirement for ever-improving commercial performance, measured by sales and profit, inhibits diversion from conventional paths of communication, e.g. of radical product improvements for environmental ends, and is in tension with businesses' desire to influence consumer behaviour for environmental ends. Furthermore, businesses' perception that cleaning performance is the key driver of consumer choice is continually reinforced in consumer messaging, and this has led to path dependency, serving to limit technological variation.

The coevolutionary analysis presented here has built upon Shove's work (2004a, 2004b). She showed the path dependency arising from the dominance of installed domestic washing machines. We have shown coevolutionary selection pressures arise from the system through which retailers interact with manufacturers, through a close examination of initiatives designed to reduce laundry temperatures, over a shorter and more recent time period. This research suggests that progressive regulation for appliance energy use, leading to changes in machines and in washing programmes installed in them, has been a main reason for wash temperature reductions in Europe, linked also with garment fabric changes.

Detergent manufacturers and retailers have implemented strategies to present consumers with the benefits of low temperature laundering. This analysis has shown the relative lack of impact that the messages have had on consumer behaviour. This can be seen in the light of the two identified mechanisms. Firstly, the commercial selection pressures exerted in the market for manufacturers' and retailers' short term sales have led to the messages being weak in the context of other, more motivating, consumer messages. Secondly, feedback to manufacturers from both retail customers and consumers is that reducing washing temperatures is not a compelling reason for selection, compared to other features in the detergent market. Firms can influence environmental behaviour only within the realms of what consumers feel is important. This finding is also consistent with Jackson's (2005) review and other previous theoretical (Faiers et al., 2007) and empirical (Abrahamse et al., 2005, Young et al., 2010) studies in that information provision alone is not enough; restructuring physical characteristics, cultural, social and emotional aspects may also be necessary, to drive substantial behaviour change. Washing temperatures have, nevertheless, reduced to an extent over the whole period of analysis, consistent with the availability and promotion of appliances featuring low temperature programmes.

The research finds that, of the business case drivers, reputation and sales and profit act as the most important drivers for the businesses, the latter strongly influenced by cost reduction opportunities. This research suggests that corporate risk, innovative capabilities or employer attractiveness are much weaker drivers. It may be that fast moving consumer goods businesses, both manufacturing and retailing, are especially

sensitive to reputation and short-term sales and profit. Thus, our research suggests that there are different classes of business case drivers, at least for these two sets of consumer-facing businesses, which could be explored in further research. The two linkages that emerged inductively from the data could be seen as subsets of two of Schaltegger et al.'s (2012) six drivers; short-term sales being related to the driver of sales, and consumer feedback, which is linked to reputation and brand value, for decision-makers in both manufacturers and retailers.

Schaltegger et al.'s (2012) business case driver framework provided clear category terminology, to which it was easy for interviewees to respond, and from which relevant codes for analysis could be developed. However, the inclusion of the consumption outcomes, indicated by the washing temperature survey, complemented it. The Clothing Use Chain was further validated, since clear links and influences across and between industries within it were identified.

There were a number of limitations to the research. Firstly, it was difficult to gain access to information from the businesses in these sectors. The detergent manufacturer respondents are limited to those who agreed through A.I.S.E., having taken part in the IP30 activity. It would have been valuable to have data from others who had chosen not to take part in AISE's initiative. There was insufficient data by country to make valid comparisons between them about the ways in which A.I.S.E. campaigns influenced, and were influenced by, businesses, consumers and institutions. This would also have been of value, since significant differences were noted in both average laundry temperatures across countries and in the implementation activities and messages of the IP30 campaign, led by different A.I.S.E. organisations in different countries.

Another set of limitations arose because secondary data obtained from businesses were selected by them and therefore may have excluded commercially sensitive aspects. Whilst the consumer market research studies made available to the researcher had been undertaken by professional market research agencies, they have not been independently validated, and their qualitative conclusions may have been influenced by our respondents' own perspectives. Thus, the consumer data was partially independent and partially construed by interviewees. Nonetheless, there was a universal consistency from the data that neither emissions, nor energy, nor in-use cost reductions are a major driver for consumers' detergent purchasing.

6. Conclusions

We conclude that, in spite of good intentions and considerable efforts and resources, neither consumer nor business initiatives will drive sufficient change, either separately or together, to deliver the scale of reduction in carbon emissions across the laundry 'system of systems' that would be consistent with European aspirations to reduce emissions by 20% by 2020, and higher carbon emission reduction targets in future years. The narrative of progress and achievement from the detergent industry is by no means unwarranted. However, our conclusion has implications for policy aiming to reduce consumption emissions at scale, if it continues to rely on voluntary actions from businesses and on consumer exhortation. This research suggests that policy could be developed to take a more systemic approach into account, which may include further

and firmer encouragement for joint efforts between policymakers, industries and stakeholders.

Through linking our analysis with business strategy literature, we have identified business case drivers relevant to consumer behaviour change, in the context of the commercial selection pressures that consumer businesses face. We have provided directional coevolutionary explanations for changes in the ways detergents have been presented to consumers over a 20-year period. Path dependencies arise across and between manufacturers and retailers and their consumers because of cross-industry narratives that serve to limit the variation of products created, because of selection pressures, and because of transmission of habits for products that do not hold the interest of consumers. We have shown also that retailers are highly influential within the system of what is made available to consumers.

Reflecting on the use of the frameworks, the use of a coevolutionary framework was able to shed light on the two systems being studied. The merit of the coevolutionary analysis is that we were able to inductively infer the process of change across the systems, by piecing together the story of that change, through combining documentary analysis with interviews, and identifying and mapping coevolutionary linkages. In addition, the coevolutionary approach here has bridged intentional actions and ex post selection processes (Murmann, 2013) as explanations of firms' strategies in a market where manufacturers compete for retailers' space and consumer sales, and consumer practices are influenced by wider social and cultural factors, as well as directly by messages from businesses.

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