Business Innovation for Consumer Adoption of Lower Carbon Practices across Europe: an Empirical Analysis using a Coevolutionary Framework

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Abstract. Coevolutionary frameworks have been proposed for analysing transitions to a low carbon economy, but empirical analyses for consumer goods are few. Carbon emissions arising from using consumer goods are considerable and reducing them has been seen as an aim of businesses and policy makers across Europe. This research studies laundry detergents in Europe, which generate the majority of their lifecycle carbon emissions in the consumer use phase, and detergent manufacturers have sought to reduce consumer emissions, some of these through initiatives led by their European association. Recently a particular initiative was led by this association and implemented nationally, in five countries. Data was gathered directly from the international association[1], from interviews with participants from this pilot initiative, and from individuals who have also worked on or close to these initiatives over a period of time, from the extended value chain. A coevolutionary framework and business case drivers framework were used to analyse the data. Evidence was found of coevolutionary influences between business strategies and institutional systems, and the technological system, leading to possible lock-in for the future. Unless these aspects are taken into account in planning for future campaigns, they might limit the success in achieving the end result of consumer emission reductions.

[1] This research has been undertaken with the generous cooperation with A.I.S.E (Association Internationale de la Savonnerie de la Détergence et des Produits d'Entretien), the European Association for Soaps, Detergents and Maintenance Products. A.I.S.E. also facilitated access to some of the interviewees. The analysis and views expressed were reached independently by the researchers and do not necessarily represent the views of A.I.S.E., or of its members.

1 Introduction

Coevolutionary frameworks have been proposed for analysing transitions to a low carbon economy, but empirical analyses using them are few, particularly for mass-market consumer industries. One such industry is laundry detergents, which generate the majority of their lifecycle carbon emissions in the consumer use phase. Laundry detergents, as a product sector, are part of a system of products and infrastructure for domestic clothes laundering, which also include washing machines, drying appliances and irons, clothing itself, water and energy. Washing and drying clothes at home is of interest as an opportunity for energy reduction; in the UK, as an example, it consumes 14% of all energy used by domestic appliances (Department for Energy and Climate Change, 2014).

From a detergent manufacturer's perspective, the use phase has been shown to account for 60% of the total lifecycle energy demand for clothes washing powder (A.I.S.E., 2013a). From another perspective, it has been shown in the UK that clothes laundering accounts for around one-quarter of the carbon footprint of clothing (WRAP, 2012).

These different perspectives build on Shove's (2003) finding that consumer practices for domestic laundry arise from complex systems of provision. In any such system, an evolutionary analysis identifies three attributes: variation, selection and inheritance; and shows how variation is generated, how the population is subject to selection and how features are retained from one generation to the next (Kallis, 2007). A coevolutionary analysis seeks to find the ways in which systems exert influence on each other (Norgaard and Kallis, 2011) and has been used to analyse systems, especially those in energy generation and supply (Stenzel and Frenzel, 2008, Bolton and Foxon, 2011, Unruh, 2000), but there has been little empirical research using coevolution outside this sector, although simulation models have been developed for consumer goods, designed to inform the efficiency and effectiveness of environmental policies (Safarzynska and van den Bergh, 2010, Janssen and Jager, 2002).

Briefly, in developed countries such as those in Western Europe, domestic clothes washing takes place using home-based appliances such as washing machines. Domestic penetration of washing machines in Europe is 90% (A.I.S.E., 2013a) and these appliances require the use of specifically designed laundry detergents to work effectively. The system also relies on other infrastructure and institutions: electricity and hot water infrastructure in the home, supplied by piped water, waste water systems and on-demand electricity supply. Multiple supermarkets, electrical goods suppliers and clothing shops, which sell the detergents, machines and clothes respectively, ensure their widespread accessibility, and hence serve this system too. Shove (p91, 2004) finds that, for the laundry market, it is 'clear that commercial

rather than government organizations dominate the specification of service' and large, international detergent and appliance manufacturers seek to sell their products to the mass market in similar ways across the world (Shove, 2004). The annual UK sales value of detergents and fabric conditioners is £1434m (Mintel, 2011) and for washing machines and tumble driers is £984m (Mintel, 2010), therefore more money is spent by households on the consumables for this system, than on related the associated appliances.

This system as a whole achieves a valued desire for cleanliness and freshness as a required standard of personal and domestic hygiene and appearance (Shove, 2003, Shove, 2004). This has not always been the case; a few hundred years ago it was common to sew children into their clothes for the winter (Shove, 2004) and until relatively recently 'boiling was considered essential for getting the wash really clean and germ-free' (p176, Zmroczek, 1992) (from interviews amongst older respondents in the early 1990's). Over time, leading detergent manufacturers have formulated their products to be effective when used at progressively lower temperatures (Business in the Community, 2008, Unilever, 2012a). This technological progress and its adoption by users has changed what would have been seen as 'normal' (Shove, 2004) until relatively recently; it is reported that in 2007 17% of UK consumers were washing clothes at 30°C compared to only 2% five years earlier (Business in the Community, 2008), the scientific knowledge of climate change issues having been seen by the detergent industry as a driver for their efforts to contribute to a change consumer behaviour.

This paper proceeds as follows; the next section explores the theoretical basis for the research, and this is followed by the methodology, including the background to the organisation and the initiatives studied. The next sections set out the results, firstly from the coevolutionary analysis of the systems and secondly the analysis of the business case drivers. These are followed by a discussion, the limitations of the research, and conclusions.

2 Theoretical Basis

Transitions are long term, multi-actor processes in socio-technical systems. They involve a substantial deployment of technical innovations in society to achieve radical shifts in those systems (Geels and Schot, 2011), since 'artefacts by themselves have no power, they do nothing' (p19, Geels, 2004). Many researchers from economics and environment disciples declare that a transition to a low carbon future will include the need for new technologies to be invented, demonstrated and widely deployed into mainstream society (Stern, 2007, Foxon, 2011). It is said that it is not the invention step that has become the key issue for climate change mitigation, but the lack of widespread deployment of technological options that are already available

(Metz et al., 2007)), even when they would also be cost effective (Enkvist et al., 2007, Unruh, 2000).

Turning to the use of a coevolutionary framework to analyse transitions, coevolution is said to take place where two or more evolving systems are linked in a way so that the changes of one system interact with changes in another so that one population's evolution causally influences another population's evolution, and vice versa (Norgaard and Kallis, 2011). As Kallis (2007) points out, coevolution is therefore path dependent, building on Arthur's (1988) analysis. For Norgaard and Kallis (2011), the strength of a coevolutionary approach is that it can facilitate 'mental experiments' for how low carbon future systems might be planned to evolve.

The related concept of path dependency arises from a shared view of mechanisms for performance, which determines a 'technological trajectory' (Foxon, 2011, Dosi, 1982) that builds technological interrelatedness and this influences change so that it occurs only in particular directions.

Norgaard (1994) proposed a framework to provide a way of thinking about whole systems, developing the idea of coevolution to consider mutually influencing systems of populations comprising five platforms. This was further interpreted by Foxon (2011) to include user practices, business strategies and technologies as alternative platforms of the five because this might be more useful in some circumstances; the meaning of the 'institutions' platform is in terms of North's (1990) 'rules of the game' and include, regulatory frameworks, and standard modes of business organisation.

Figure 1 compares the two frameworks. Because Foxon's (2011) framework includes platforms for user practices, institutions and business strategies, it has been chosen for use in this research.

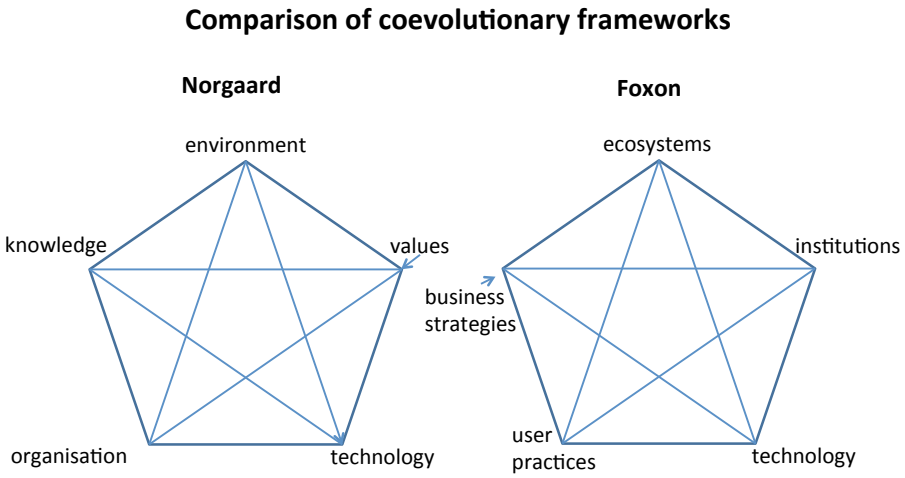

Fig. 1. Comparison of Norgaard's (1994) and Foxon's (2011) coevolutionary frameworks

The research question is, can the use of Foxon's (2011) framework coevolutionary framework shed light on where, in these clothes laundering systems, linkages might be reinforced or barriers unblocked, in order to promote new approaches to reduce carbon emissions in consumer use.

The difficulties of using coevolutionary theory in analysis of systems are set out by Norgaard and Kallis (2011). Coevolutionary theory has been used to set out why systems fail; for instance, Norgaard's (1994) original description of outcome failures of development projects in the Amazon basin, but the effectiveness of planning policies that are based on a coevolutionary approach is by no means yet proven (Nill and Kemp, 2009) and its usefulness for current policy challenges or economic growth of transition pathways (Foxon, 2011) is yet to be fully demonstrated. However, we chose this particular coevolutionary framework because it allowed us to analyse the links between large businesses' strategies for corporate sustainability, with user practices, technologies and the institutional context for the businesses. Because the businesses' strategies are the starting point, we have reordered the perspective in the framework such that they are central in the analysis, shown in Figure 2.

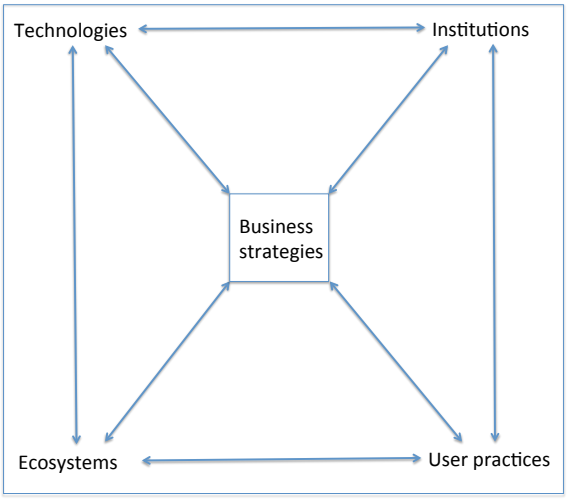

Fig. 2. An integrated analytical framework illustrating the coevolutionary relationship between business strategies and the various dimensions of the wider socio-technical system (adapted from Hannon et al. (2013), itself adapted from Foxon (2011) and Norgaard (1994))

It is worth noting at this point, because it is relevant to the influences between institutions and business strategies, that, across Europe, national governments' public policies vary for their relationship with businesses in connection with fostering corporate responsibility (Albareda et al., 2007), as shown in Table 1.

Table 1. Models of government action in the development of CSR-endorsing public policies in 15 EU countries (Albareda et al., 2007)

Model	Partnership	Business in the Community	Sustainability and citizenship	Agora
Characteristics	Partnership as strategy shared between sectors for meeting socio-employment challenges	Soft intervention policies to encourage company involvement in governance challenges affecting the community (entrepreneurship and voluntary service)	Updated version of the existing social agreement and emphasis on a strategy of sustain-able development Regulatory	Creation of discussion groups for the different social actors to achieve public consensus on CSR
Countries	Denmark, Finland, Netherlands, Sweden	United Kingdom, Ireland	Germany, Austria, Belgium, Luxembourg, France (Regulatory)	Italy, Spain, Greece, Portugal

Businesses' strategies for corporate sustainability can be seen in the context of variations in the institutions within countries that result (Matten and Moon,

2008) and that institutional pressures, rather than strategic analysis of social issues and stakeholders, can be identified as guiding decision-making with respect to CSR (Husted and Allen, 2006).

For the business strategies system itself, we used an underpinning theoretical framework and this is now briefly described and justified. We took an instrumental perspective of businesses' corporate responsibility actions, that is, that businesses are primarily a means of wealth creation; theories about the role of corporate responsibility have been categorised as instrumental, ethical, political or integrative (Garriga and Melé, 2004). Instrumental theories assume that there can be a 'win-win paradigm' (p218, Hahn et al., 2010) in which business cases, made by the businesses themselves, determine the choices that they make in undertaking corporate responsibility activities; the best of these both benefit society and contribute to successful business strategy (Porter and Kramer, 2006). Furthermore such approaches balance shareholders' needs for profitable growth as well as solutions to environmental problems, for instance, through increasing resource productivity (Lovins and Lovins, 2001). It is recognised that achieving this balance is difficult and that the outcomes may not represent the best outcomes for sustainable development (Hahn et al., 2010), but nonetheless, the businesses' strategies are at the heart of the approach being taken in this research.

Within those institutional theories, we have assessed a number of frameworks for categorising the business case drivers for voluntary actions; business case drivers being those that are seen to directly influence commercial success (Schaltegger et al., 2012).

Schaltegger et al. (2012) review this territory to devise a six-point summary of business case drivers. Okereke (2007) reviews the same with particular focus on carbon management, based on a review of the 100 largest companies on the London stock exchange, and this is especially appropriate, given the focus on carbon emissions for this research. As Okereke (2007) points out, attempts to understand the drivers of corporate emissions reduction actions have been few (exceptions are Hoffman (2006) and Kolk and Pinkse (2004)). Table 2 shows a comparison of some of the business case drivers identified and indicates common and differing themes for them. For this particular study, Schaltegger et al.'s (2012) framework was chosen because it seems to cover the biggest scope of different drivers, through six categories; costs, sales or profit margin, risk, reputation, attractiveness as an employer and innovative capabilities and because it has straightforward and clear category terminology, to which it was easy for interviewees to respond.

Table 2. Comparison of business case drivers and themes

Themes	Schaltegger et al. (2012)	Bansal and Roth (2000)	Porter and Kramer (2006)	Okerere (2007)	Hoffman (2006)	Kolk and Pinkse (2004)
Costs reduction	Costs and cost reduction					Compensation: emissions trading and other forms of offsets
Risk reduction	Risk and risk reduction			Future fiduciary obligations Risk of future losses	Strategic timing Influence policy development Establish appropriate level of commitment	
Business growth	Sales and profit margin	Competitiveness; potential to improve long term profitability	Building shared value both to society and to the business through building strategically coherent competitive advantage	Profit	Creating business opportunities	
Reputation	Reputation and brand value	Legitimation; to improve its actions within an established set of norms, values and beliefs Environmental responsibility: concern for its social obligations and values		Credibility with policy makers Ethical considerations leading to increased trust		
Employee recruitment, retention and motivation	Attractiveness as employer					
Innovation	Innovative capabilities					Innovation: Process improvement Product development New product/ market combinations

3 Methodology

We approached the European Association for Soaps, Detergents and Maintenance Products, called A.I.S.E. (Association Internationale de la Savonnerie de la Détergence et des Produits d'Entretien) and asked for their agreement to use consumer-facing initiatives led by them, over some years, as a basis for a case study. A.I.S.E. is the trade association of European detergent manufacturers, based in Brussels. It currently represents about 900 companies from large multinationals to small SMEs, through Associations in 39 countries (A.I.S.E., 2013b). It also represents nine multinational companies directly.

The history of voluntary industry initiatives led by A.I.S.E. is well documented since 1996 and is publicly available through their own website. A.I.S.E. state that the industry vision is:

"*We benefit society by contributing to the sustainable improvement of the quality and comfort of life through hygiene and cleanliness in a free, competitive and innovative way."*

A.I.S.E. also state that their mission is to communicate the values embodied in the industry's vision and any related policies to all appropriate stakeholders effectively and objectively, while taking these stakeholders' views into account. This is said to be done by: acting as the voice of the industry in Europe, working with other organisations as appropriate; ensuring stakeholder dialogue takes place in an atmosphere of trust; improving the economic and legal environment in which the industry operates.

A.I.S.E. state that their stakeholders include, amongst others, the European Commission, Member States and Non Governmental Organisations (p2, A.I.S.E., 2003). Before 1996 A.I.S.E. had not undertaken initiatives to influence consumer behaviour. Its activities had been focused on developing harmonised approaches for industry statistics, tax, customs and standards, environment and human safety legislation, within the context of the increasing impact of European Union legislation (A.I.S.E., 2002). In 1996 the A.I.S.E. developed a voluntary 'Code of Environmental Practice' for household laundry detergents, designed to reduce the environmental impact of household laundry detergents across 15 countries of Western Europe and one of the objectives within the Code was to encourage consumers to be more closely involved in reducing environmental impacts, by using the products properly (A.I.S.E., 2003). In July 1998, an European Commission Recommendation for the labelling of detergents and cleaning products (89/542/EC) endorsed this Code (1998). The Code was followed in 1997 by the 'Washright©'campaign, an integrated consumer communication campaign, developed to meet the consumer-related objective of the Code, by raising

awareness amongst the industry's consumers of good washing practice and the benefits of changing their washing habits (A.I.S.E., 2003).

From 1998 onwards, over 90% of European household laundry detergent packages were said to have included the 'Washright©' communication panel, each in their own language, the English version of which is shown in Figure 3.

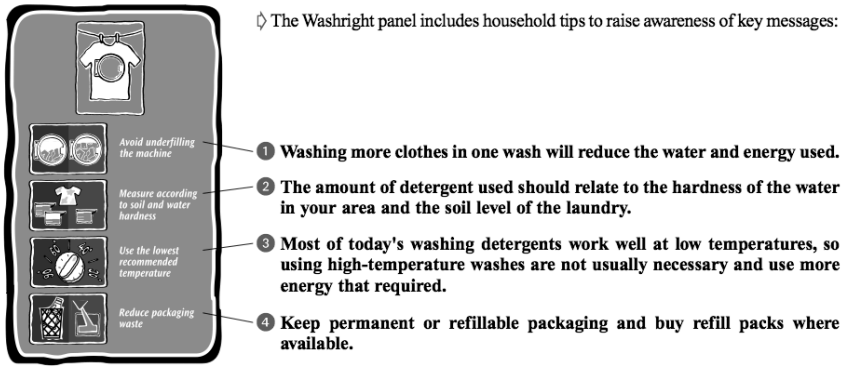

Fig. 3. An example of a panel included on laundry detergent packaging (A.I.S.E., 2003)

Also from 1998, the Washright campaign was communicated through print advertising, developed from a universal template and adapted for each of the 15 European Union countries of the campaign, and through a dedicated multi-lingual website in 13 languages. From 2000 a pan-European television advertising campaign was devised by A.I.S.E. and shown to promote the Washright message (A.I.S.E., 1999), and this was extended into 2001 and 2002. The campaign's estimated value was said, in 2002, to be 10 million euros each year (A.I.S.E., 2003). Television advertising was said to be the main method that detergent manufacturers used to communicate with its consumers (A.I.S.E., 2003) and therefore was used for the campaign even though it was acknowledged by A.I.S.E. as a costly method of consumer communication.

A new consumer-facing initiative was designed by A.I.S.E., starting in 2012, and this became the particular focus of the research. An agreement was reached between the University of Leeds and A.I.S.E., which allowed access to information and to individuals who had been involved in consumer-facing initiatives, especially focusing on this latest initiative, operational during 2013

and 2014, called 'I Prefer 30°' (IP30)[2] The agreement included access to certain confidential information. This initiative was run in two phases, in five countries; Belgium, Denmark, France, Italy, and the United Kingdom (2013a). There was a business-to-business phase to engage businesses right across the sectors, starting in June 2013, and a business-to-consumer phase, run from January to November 2014.

Through this access, the principle researcher interviewed twelve individuals across Europe currently directly connected with A.I.S.E., through employment with one of the partner companies, or one of the national associations, and familiar with the IP30 campaign. Each of the individuals was informed by A.I.S.E. itself about the research and invited to agree to take part. We also interviewed nine others who currently or previous had worked with the industry or its associations across Europe, from government bodies and former consultants, each of whom were aware of the A.I.S.E. initiatives and could provide additional perspectives. All interviews took place anonymously, both for individuals and for the organisations they represented or that employed them. Interviews took place between March 2014 and April 2015.

Once agreement to be interviewed had been received, the business discipline background of these individuals was investigated, using their self-declared LinkedIn profile, representing the information that individuals themselves want to be available publicly, not necessarily their full personal or professional history. All but three of the respondents were found on LinkedIn. All the interviews were conducted in English and used a question guide. The background to the individuals and interview type is shown in Appendix 1. The question guide allowed for free responses to questions about the motivations for taking the initiatives, and then asked respondents to comment on key drivers from Schaltegger et al. (2012) as motivators.

In addition to the interviews, documents and other materials available from the A.I.S.E. website were analysed, to draw out the history, planning and results from voluntary initiatives to influence consumers, over the whole period from 1996 to 2014. In addition, the principle researcher had access to A.I.S.E. questionnaires that were completed by partners in the IP30 campaign, once the consumer campaign for 2014 had finished.

[2] In exchange for access, the principle researcher agreed to prepare a draft of the final report for the IP30 initiative, as a Consultant, and was paid expenses for one visit to A.I.S.E.'s offices in Brussels in order to gather information for the report writing. No other funding was sought or received.

4. Coevolutionary analysis of the systems

A number of linkages between systems identified in the co-evolutionary model were noted. These were between technology and business strategies; technology, business strategies and institutions; institutions and business strategies; and user practices and business strategies. These will be described in turn.

4.1 Technology and business strategies

Firstly, in terms of technology, there is a shared view of the way in which detergents work to clean clothes. This was originally based on what is universally known in the industry as 'The Sinner Circle', named after Dr Sinner (1960), who was a former head of Research and Development at Henkel, one of the largest international detergent manufacturers. This had four interdependent elements: chemical action, mechanical action, temperature and time. An additional element, water, was subsequently added to these four, by Stamminger (2010). The refined Sinner Circle is included within the A.I.S.E. (2013a) Substantiation Dossier for the IP30 initiative. Respondents from businesses and other bodies concerned with clothing, detergents and washing appliances seem universally describe this as the only way to manage the performance of clothes' laundering processes, with variations possible only by increasing or decreasing the five interdependent elements. Laundry detergent and laundry appliance manufacturers have introduced a number of technological innovations based on this view of the mechanism of clothes washing. Large incumbent businesses have not brought radical innovations to the market, but initiatives such as IP30 have served to influence the way in which future new product variations are developed and launched into the consumer market.

4.2 Technology, business strategies and institutions

There are links across the three systems, technology, business strategies and institutions ('rules of the game'). Through adding the increasingly technologically sophisticated enzymes (which can act as catalysts to speed up chemical reactions) either or both of the temperature, or the time taken for washing, can be decreased. This leads to the potential consumer benefits of reduced washing temperature or shorter washing time (A.I.S.E., 2013a). In the past, the potential benefit of reduced washing temperature has been linked by a number of detergent manufacturers to their company and brand strategies in connection with sustainability, for instance, Procter & Gamble's (2008) campaign 'Turn to 30' for their Ariel brand, starting in 2006, Unilever's

Sustainable Living target to encourage consumers to wash at lower temperatures (2012b) and 'longstanding research' into the technical solutions to low temperature washing (p24, Henkel, 2014).

4.3 Institutions and business strategies

One institutional link arises because A.I.S.E. is based in Brussels and there is a strong link with the European Commission in that city as A.I.S.E. seeks to represent the interests of its members within the European Commission, amongst other bodies. Connie Hedegaard, European Commissioner for Climate Action, wrote the forward for the A.I.S.E. (2013a) Substantiation Dossier for the IP30 campaign. In parallel, the IP30 campaign was launched at the European Commission's 'A world you like. With a climate you like' event in Milan, with its particular focus at that event on the fashion sector. This latter initiative from the European Commission was aimed at changing the narrative about climate change to demonstrate solutions and benefits of a low-carbon society (European Commission, 2014). Further to this, A.I.S.E. by the Commission submitted the project for an award in a competition connected with the European Commission's 2014 Sustainable Energy Week Policy Conference, one of 342 projects submitted (European Union, 2014).

Over a number of years, A.I.S.E. and its national associations have worked effectively with European and national governments, as representatives of the industry, willing to lead consumer campaigns to help protect the environment, as well as other campaigns, for instance, for the safe use of products. In Belgium, there was a pre-existing (2009) national agreement, led by the government minister for environment and consumer protection, between the ministry, retailers, distributors and the national association for detergent producers with an objective (amongst other things) to reduce the average wash temperature by 4°C by 2015, compared to 2008, through promoting products able to achieve this in retail distribution.

A.I.S.E was fully aware of this multi-sectorial agreement through the Belgian association. Therefore, in the planning of the IP30 campaign, A.I.S.E. perceived that a particular novel aspect of the international campaign could also be that it would not only be led by the detergent industry, internationally and nationally, but also would be designed by A.I.S.E., from the start, to be opened to partners and stakeholders from other sectors in the value chain, in order for them to amplify the message.

There were other networks that were linked to the IP30 campaign; such as the Sustainable Clothing Action Plan, led by the WRAP organisation, a charity in the UK, which seeks to support the move to more sustainable patterns of consumption and production, and has strong longstanding relationships with government decision makers, from which it also receives funding (WRAP, 2015). There are also strong links between A.I.S.E. and

other international and national associations of raw materials suppliers, appliance manufacturers and retailers, such that A.I.S.E. and its national organisations see themselves as being in a position to collaborate with each of these other associations on issues of common interest.

A.I.S.E. and its national associations have members operating at two different scales; international and national. For instance, multinational detergent companies operate at both these scales; international and national, whereas there are also detergent manufacturers who operate in single countries and are members of the national associations only. There were inevitably challenges for A.I.S.E. in working on IP30 at these two different scales and across networks in five countries. It was helped in this by co-developing the campaign with the multinational companies because they were also going to help secure the effective roll-out of the campaign locally, but this was not seen as having excluded other players. In leading the initiative at European level, A.I.S.E. sought to overcome these challenges with the support of the Sustainability Communications Working Group ('Working Group') of experts, including people with both communications and marketing expertise, working in collaboration and consultation with the five individual country national associations, over critical stages of the implementation. Each of the national associations were engaged to facilitate the implementation of the campaign locally. At the same time, the detergent members at international level were asked by A.I.S.E. to engage their national country teams (in the five countries) into the campaign.

A.I.S.E. arranged the design of an extremely clearly articulated communications brief for the content of the IP30 initiative to consumers, which included the logo style and instructions for its use, shown in Figure 4, and this was followed consistently in each of the five countries. The brief also included design guidelines for partners to use the logo through their own communications channels, including advertising, websites, sustainability reports and point of sale materials.

Fig. 4. The four required elements of the IP30 campaign signature (A.I.S.E., 2013a)

The simplicity and directness of the logo design itself, together with a clear central communications brief, sought to ensure that a consistent design was used, translated into appropriate languages, with the same visual representation, in each country, across internet and printed media. There was a 'core campaign' that consisted of a pre-defined media strategy to be implemented by the core campaign leaders (multinational detergent manufacturers who had committed to the campaign) in each of the five countries, based on a media plan centrally created by A.I.S.E., with the help of a specialist media planning and buying agency; this consistent of web banners and, for most countries, a print campaign in women's magazines. In addition to this 'core campaign', national associations each had a local communications budget, which they could spend as they felt most appropriate to their market, but with the consistent objective to drive behaviour to lower temperature washing in their country. A summary of the activities that resulted is shown in Table 3.

Table 3. Summary of the IP30 activities within five implementation countries during the campaign period in 2014

Country	Core campaign activities, funded by core campaign leaders and purchased through their own media agencies	National communications activities, funded by a devolved budget from A.I.S.E. to the national association (simplified overview)
Belgium	Web banners on sites targeted to women	Facebook pages (in both Dutch and French) Street events. Social media and events in retail outlets.
Denmark	National outdoor posters, webpage and magazine advertising (all on advertising for Unilever's Biotex brand) Web banners on sites targeted to women	Outdoor posters, distribution of communication cards, editorial coverage in consumer presses.
France	Women's magazine advertising. Web banners on sites targeted to women.	Editorial appeared in more than 20 magazines, newspapers and on webpages, also TV. A particular women's magazine organised and publicised a trial with 200 participants. Two major grocery retailers used the campaign in stores at point of sale and in direct mail
Italy	Women's magazine advertising. Web banners on sites targeted to women.	Dedicated Facebook page. Online competition. Celebrity endorsement.
U.K.	Women's magazine advertising. Web banners on sites targeted to women. 250 stores of a retailer featured the campaign, on Unilever's Persil brand.	Partnership with National Union of Students (NUS) with online competition and sampling, also featured on NUS websites, a shared objective with NUS's 'Student Switch Off' campaign.

The core campaign consisted of consistent elements, consistently expressed through the IP30 campaign signature. The major detergent companies were expected to, and did, undertake the majority of the funding of external consumer advertising for the campaign. Regarding the local activity, it was perhaps inevitable that there was variation in way in which it was implemented; variation in the particular marketing mechanics chosen, for instance, from social media to street parties and variation in the target

consumers, for instance, students in the UK and housewives in France. These different strategies may have arisen from a number of factors, which are not mutually exclusive. Firstly, the strategy for the implementation of nationally led activities was determined by collaboration within groups made up of the national participants, who chose what was most likely to be effective for their country, as they perceived it. Secondly, the institutional context for each country's detergent manufacturers is different and this in turn may have led to what the national teams felt would be most effective, for instance, the pre-existing multi-sectoral agreement in Belgium influenced the implementation in that country. Thirdly, it could be that the capabilities and previous experiences of the principal leaders of the campaign in each country also influenced the decisions made. The major companies at international level are extremely influential in setting A.I.S.E.'s agenda. However, the large company representatives at international level (individuals who initially agreed the campaign with A.I.S.E.) may have different perspectives from the people who needed to secure the financial resources and do the work at national level, with backgrounds and current roles within a variety of disciplines; from Marketing (holding the consumer media budgets), from National Accounts (responsible for negotiations with retailers) and from Sustainability P.R./Communications (responsible for creating the public-facing external material for each of their businesses, or for the trade association itself), see Appendix 1.

Finally there may have been an unintended impact arising from previous history with competition law in the industry. Amongst commercially orientated individuals in the large companies (Marketing, National Accounts and Corporate Communications), there was an expressed fear of being vulnerable to European Competition Act rules. The European Commission found in 2011 that three large international companies (Procter and Gamble, Unilever and Henkel) had been operating a cartel in eight EU Member states in the market for household laundry powder detergents between 2002 and 2005, when implementing an initiative through A.I.S.E. to improve the environmental performance of their products (European Commission, 2011). A.I.S.E. and its national associations operate a clear protocol for meetings and communications to ensure that Competition Act rules are completely respected, however, in spite of this, a number of people did not attend meetings for campaign planning because they would have been in the same room as competitors. Technical people who were interviewed expressed this concern much less frequently. This diverse approach, and the fear of taking part actively in meetings, possibly exacerbated the communications difficulties for the campaign, at least amongst the national employees of the large companies. In this way, competition rules may have lead to more limited interactions and therefore these rules may work against progress towards more sustainable consumption.

4.4 User practices and business strategies

There has historically been considerable variation in average washing temperatures across the countries in Europe, and this remains the case; the extremes are 33.9°C in Spain to 45.3°C in Sweden (A.I.S.E., 2013a). However, within individual countries, the consumer selection environment does not favour the creation of variation; there is 'lock in' due both to habit formation and the technological interrelatedness of domestic space and equipment, because laundry equipment is designed to fit within the constraints of a particular room in a house and its water supply and wastewater arrangements. Furthermore, replacement of washing machines, for instance, is on a multi-year cycle. It is only relatively recently that most machines have a programmed cycle to enable washing at 30°, for older machines still being used, the lowest temperature possible is 40°. In addition, clothing choices most often derive from considerations of personal identity and economy rather than sustainability impacts (Fisher et al., 2008), such as their design to be washed at 30°. Given these barriers to change, A.I.S.E.'s (2013a) stated view, in their substantiation dossier for the campaign, is that only a multi-stakeholder campaign would be able to achieve a change in consumer habits such as reducing the temperature of laundering clothes. It was also seen as a modern and interesting type of stakeholder campaign, both by fitting into the spirit of the European Commission's 'A world you like' campaign, and also by seeking alliances, such that the message would be spread by a number of relevant organisations. The driver for influencing consumer behaviour that was chosen by A.I.S.E. relied upon communicating that reducing washing temperature was becoming a more socially acceptable practice (Figure 4). A.I.S.E. went to the considerable trouble to consult academic home hygiene experts to validate the low temperature choice in the substantiation document for the initiative (A.I.S.E., 2013a) and took great care that the advice was detailed, specific and validated independently, for the document, before it was published.

There were four potential benefits for consumers set out for the campaign (A.I.S.E., 2013a); cleaning performance, energy or emissions savings, better clothes care and money saving. The first two of these were the most mentioned internally and by respondents. It seems that, because the scale of the financial benefit to individual households (potential annual savings were quoted variously from 10€ to 38€), saving money was considered by a number of respondents to be too low to be meaningful as the driver for action, and did not feature heavily in consumer communication as the primary benefit. Another benefit to consumers of lower temperature washing is that clothes keep their new appearance for longer, and therefore extending the useful life of the clothes. This is promoted by the detergent companies, see

Figure 5, but not by clothing retailers, perhaps highlighting the different business interests of these sectors.

Fig. 5. An item of clothing pictured after 10 washes at 20°C and 40°C (Procter and Gamble, quoted in A.I.S.E., 2013a)

The scale of the advertising budget commitment to the campaign in each of the countries is rather low in relation to the financial resources of the large international consumer goods companies generally deployed in consumer brands advertising. The detail of this is confidential to the companies involved; however, it is a matter of fact that the media that was chosen, planned and implemented was internet-based communication and consumer press advertising. Television advertising would have been considerably more costly, and is the media channel that would historically have been chosen for advertising consumer laundry detergent brands themselves, certainly before the opportunities now afforded by social media and internet advertising (A.I.S.E., 2003) .

Target setting, monitoring and measurement of the impact of the initiative were relatively unsophisticated. Again, the detail of this is confidential, but large international consumer brand companies themselves would typically set clear numerical targets to be achieved within certain timescales and amongst explicit target markets. They would engage professional advertising tracking and monitoring agencies to undertake detailed campaign message analysis and research. There is wealth of business literature describing the ways in which the effects of advertising can be measured and monitored, see, for example, Vakratsas and Ambler (1999), More recent trends in internet and social media marketing have not yet been extensively researched academically, with the exception of Chu and Kim (2011) and Smith et al. (2007), although these do not provide frameworks based on multiple examples of assessments of this type of media.

There were two ways A.I.S.E. measured the campaign. Firstly, at the international scale, and since 2008, A.I.S.E. has regularly funded and commissioned an independent market research agency to undertake a quantitative international consumer market research panel to find out the washing habits of several thousand consumers across 23 countries of Europe. There have now been three such research studies, in 2008, 2011 and the most recent in 2014, shortly after the consumer communication phase of the campaign had ended.

Secondly, a questionnaire was designed by A.I.S.E. to elicit responses from people who had been involved in implementing the campaign. Of the 39 companies and associations who were asked to complete the questionnaire, 17 were completed, some of which included quantitative data about the achievements of the campaign (the consumer reach, the number of internet impacts etc.), but the responses provided were expressed in non-comparable terms, so that A.I.S.E. could not easily consolidate the results. For respondents, the outcomes of the campaign were predominantly described as either in terms of the number of consumers who were engaged in some way with the campaign, or, qualitatively, for example, stating the benefits of working together with, and engagement within, the extended network, rather than measures of demonstrable consumer behaviour change (which they might have expected to be done through the A.I.S.E. commissioned survey mentioned earlier). Several respondents commented on the difficulty of both measuring and achieving the latter, especially that there were only a few months of consumer activity, set against the challenge of changing consumer behaviour.

5 Analysis of the business case drivers

Open ended questions were asked, as a first stage, during each interview, but no additional business motivations were identified as a result of this stage, other than those which fitted at least one of Schaltegger et al.'s (2012) drivers. The potential benefits to the businesses that were described by respondents were driven by reputation and brand benefits, through being seen to promote more environmentally responsible behaviour. Table 4 shows the identified business case drivers.

Table 4. Identified business case drivers based on Schaltegger et al. (2012) framework. There was insufficient data to include appliance manufacturers.

Business case drivers	Laundry detergent manufacturers	Clothing and grocery retailers	Raw material suppliers
Costs and cost reduction			Possible impact on helping to consolidate the number of varieties of raw materials that are made available to detergent manufacturers
Risk reduction	General, rather than specific mentions, in relation to IP30		
Sales and profit margin	Increased brand reputation amongst consumers leading to greater trust and brand loyalty for those brands and hence long term sales		Technologically advanced raw materials can secure premium prices if they enable the detergent manufacturers in turn to increase sales or reduce costs
Reputation and brand value	Sustainability is an important element of consumer brand and corporate reputation. The campaign built good corporate and industry reputation with policy makers and with other networks in the value chain	Signing up to multi-sectoral campaign adds to sustainability reputation.	Sustainability is an important element of corporate reputation.
	Links brand (or retailer or supplier) to the public debate about climate change; 'there is something you can do…'		
Attractiveness as employer		Not mentioned overtly	
Innovative capabilities	Increasing attention paid to washing temperature increases internal research attention. Organising an innovative, multi-stakeholder campaign set out to builds the network's capability		Increasing attention paid to low temperature washing itself increases internal research attention

6. Discussion

Firstly, from a coevolutionary perspective, there is a shared view across detergent manufacturers, their association, appliance manufacturers and clothing retailers that there is one technological system for laundering clothes. At a macro level, this indicates a level of path dependency because this view determines a 'technological trajectory', limiting variation.

Thus, the large and established manufacturers and retailers of detergents, appliances and clothes provide the means to undertake the same task, incrementally more sustainably, in order to maintain clothes to a useable standard, rather than seeking to promote a new system for the societal need of clean clothing. This shared view can be seen perhaps an example of 'lock-in' to an existing system, one that reproduces itself, and which may, in effect, protect the system against new modes of consumption being deployed.

Secondly, there are numbers of linkages and influences at both European and national scale, influencing in both directions, between institutions and business strategies. There is interdependency between the activities of the European association for detergents, other international and national associations, and the European Commission; each uses the others to help it build its reputation; on one hand the trade associations wish to be seen as responsible and proactive, and on the other, the Commission wishes to be seen as supporting businesses' projects aimed to deliver more environmentally conscious behaviour. This also can happen at national scale, for instance, as in the multi-sectoral agreement in Belgium. Each has used the other's activity to do so, and are each influencing each other, in a coevolutionary sense. The detergent industry itself is dominated by international businesses, but at country level, national organisations have also had influence in the detailed implementation. Even though this was an internationally developed and led campaign, in a sector with a high participation from multinational businesses, there was variation in the implementation in the five countries, and this perhaps reflects the national institutional context, as well as the inherited experience of individual national actors. The multiplicity of relationships used in running the campaign is shown in Figure 6 and includes the internal communication channels within the multinational companies from international to national organisations. The complexity of these communications channels for a single consumer campaign, across five countries, requiring new processes across multiple organisations, can easily be underestimated. In the light of this, the organisation and the processes were seen to have worked well for this campaign.

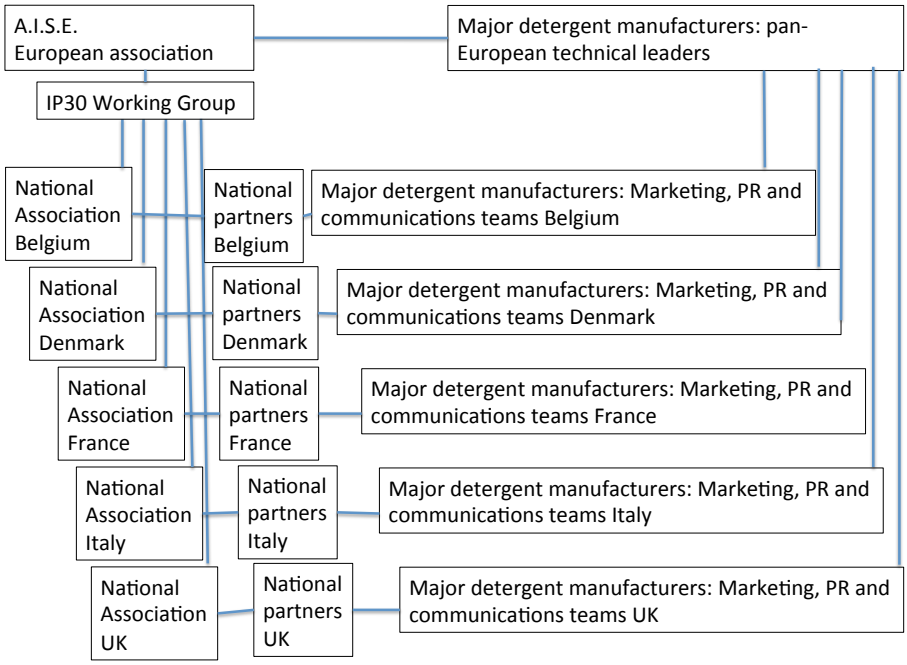

Fig. 6. A simplified view of the implementation structure of communications for IP30 campaign

Thirdly, the drivers of the business case for IP30 were to build reputation for environmentally conscious proactivity with policy makers and other stakeholders, and to build brand reputation amongst consumers. The first of these seems to have been the more salient. Because this was a new style of campaign to be run internationally, it was seen to have contributed to building innovative capabilities.

Fourthly, analysing the business strategies of the companies involved in the IP30 campaign, it is undoubtedly true that large consumer goods companies have considerable brand marketing skills and resources to influence mass-market consumer behaviour. Whilst the international detergent companies committed to, and undertook, a certain amount of media resource for this campaign, it does not seem to have been at the scale that might have been possible for them, given the very substantial resources they already deploy to advertise their own brands. For some respondents, then, in some countries, the national organisations of these large companies did not give the IP30 the priority that the associations had expected that they would. Extending the analysis to all the different sectors; detergent companies, appliance companies and retailers; the IP30 signature could have been applied by all these participants across all existing brand advertising campaigns in each country, in order to increase awareness of IP30, however it was said, by some, that this

would contradict their overarching brand communication policies (which are not to include any elements that might be shared with competitors' communications). This is consistent with the fact that consumer brand reputation building was seen as a relatively less important aspect of the campaign, as stated above. Competition law also seems to have some unintended negative consequences for process of organisation of the multi-stakeholder campaign.

Overall, there is, as yet, no evidence that this particular short-term campaign directly changed user practices. However, consumer behaviour has certainly changed over the longer period of years, as detergents and washing machines have become available, and been promoted to wash effectively at lower temperatures, and as reported by A.I.S.E previously; laundry temperatures as reported by a sample of consumers in each of 15 countries in a diary were taken in 1997 and 2001 and a reduction in average wash temperature of 6.4% over that period was identified (A.I.S.E., 2003). It was ambitious to expect consumer behaviour change directly from the IP30 campaign, regarded by A.I.S.E. as having been a pilot. More research would be needed to explore possible coevolutionary processes over the longer time period.

No linkages or influences were found between the ecosystems platform and the other four platforms during the course of this research. This may be because of the relatively short time period on which the research focused.

7. Limitations

The research interviews were necessarily undertaken through a small number of individuals, relative to the size of the organisations they were being asked about and therefore there is a danger of personal bias, and lack of representativeness, colouring the output. Since respondents knew the provenance of researcher (from a sustainability research institute), it could also be the case that they were subject to a social acceptability response bias. This phase of the research focused on only one relatively short period of A.I.S.E's campaign and was limited by that.

8. Conclusion

The coevolutionary analysis identified linkages in complex systems that reinforce current user practices even where business actors are seeking to promote more environmentally beneficial consumption. The linkages were found across technologies, institutions and business strategies, even over the

relatively short period analysed. There were multiple influences at difference scales, from European to national country levels. This may lead to path dependency for future campaigns of a similar nature. Added to this, the planning, business case drive and capability focus towards policy makers and stakeholders might limit the future effectiveness of these types of campaigns to influence consumer behaviour to the extent desired.

Coevolutionary analysis of consumer goods businesses is of interest because there are many variations of goods being manufactured and offered for sale, and consumers select these over time, leading to new varieties being developed, which are based on the success of the past. There is a relatively short repurchase period for household consumables, such as detergents, which means these phases of change can be over the relatively short term. This is in contrast to washing machines, which have a longer life cycle, but the evolution of the two sets of goods are interlinked in terms of users ability to wash at lower temperatures. Further research, covering a longer time period, is necessary to explore possible coevolutionary processes connected with ecosystems, for instance, in connection with water scarcity for laundering.

Appendix

Table 5. Interviewees ('IP30' refers to the 'I prefer 30°' campaign)

Nature of interview	Interviewee Code	Rationale for interviewee selection	Interviewee's self-declared discipline from LinkedIn (2015)
Face-to-face recording and notes	A (Apricot)	Former sustainability manager from a major clothes retailer	Textile technologist
Email response to my questions	B (Banana)	Major retailer company expert with more than 20 years experience	Sustainability policy
Face-to-face recording and notes	C (Chilli)	Former Sustainability Manager for major international consumer goods company	Sourcing expert, especially textiles
Face-to-face meeting with hand written notes, written up and agreed by interviewee	D (Damson)	Founder of marketing consultancy company working with two leading consumer companies in these sectors, on sustainability issues, for many years	Chair of agency
Face-to-face recording and notes	E (Eggplant)	Independent consultant and researcher who worked as an academic on a major retailer's initiative, connected to this area, from 2007	Academic and technical environmental consultant
Face-to-face recording and notes	F (Fig)	Current employee of a major retailer in PR department	Public relations, corporate and consumer communications
Phone call recording and notes	G (Greengage)	Worked at a government department on the first programme of research to support sustainable consumption and production prior to 2007	Sustainability professional and environmental specialist
Phone call recording and notes	H (Hop)	At a government-funded agency from mid-2000s and subsequently in various consultancy roles in sustainability	Director and Project Manager for Sustainability
Phone call recording and notes	J (Jalapeno)	Worked in a government department on the first programme of research to support sustainable consumption and production prior to 2007	Not found on LinkedIn; within interview described as 'Sustainability expert'
Phone call	K (Kale)	Marketing in a large detergent manufacturer in one of the five IP30 countries	Marketing
Phone call	L (Lemon)	Marketing in a large detergent	Not found on LinkedIn:

		manufacturer in one of the five IP30 countries	Marketing job title
Phone call	M (Mango)	CR manager in a partner company for the IP30 campaign	Corporate Public Affairs
Phone call	O (Orange)	National association manager involved in the IP30 campaign	Corporate Public Affairs
Phone call	P (Pear)	National association manager involved in the IP30 campaign	Digital communications specialist
Phone call	Q (Quince)	National association manager involved in the IP30 campaign	Corporate Public Affairs
Phone call	R (Radish)	Corporate Citizenship Director of a large appliance manufacturer	Marketing and sales management
Phone call	S (Saffron)	National association manager involved in the IP30 campaign	Project management in research and development
Phone call	T (Thyme)	National association manager involved in the IP30 campaign	Not found on LinkedIn; declared 'Lobbyist' on other public forum
Meeting	V (Vine)	CR manager in a large clothing retail company not involved directly but aware of campaign through an associated network	Textile technologist
Phone call	W (Wasabi)	Manager in a institutional partner who actively supported in one country	Environmental and sustainability expert
Phone call	Z (Zig Zag)	CR manager in a partner organisation for the IP30 campaign	Environmental and sustainability expert

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