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SUSTAINABLE INNOVATION

FUTURE OF PACKAGING ANNUAL REPORT 2024

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Contents

CHAPTER 1: THE NATURE OF INNOVATION

Innovation, like invention, comes from need. Arguably, it reflects our needs more directly than invention. Many inventions will not become widely available unless they are deemed to be useful enough to be developed into viable innovations[1] . Our environment determines that need. For businesses, this could be market trends, competition or new regulations. In human history, it has often been changes to our natural environment that have required us to innovate. Increasingly, we are changing the environment ourselves, generating further need for innovation.

This Future of Packaging annual report considers the contemporary challenge of sustainable innovation. It looks at the organisational conditions that help to foster innovation and those needed to develop new sustainable products and processes. This includes a summary of recent research into sustainable innovation and the role of individuals and consumers in the process. The report presents insights into the topic from interviews with leading practitioners from the packaging industry, including retailers, brand owners and packaging manufacturers. However, it starts with a potted history.

As we try to comprehend the potential effects of climate change, past periods of fluctuation indicate its potential scale. Perhaps the best-known significant climate fluctuation is the last Ice Age, or 'glacial maximum', which ended around 19,000 years ago. The rising temperatures following the glacial maximum had a significant impact on the migration patterns and lifestyles of all early humans. In his 2023 book, The Earth Transformed [2], historian Peter Frankopan charts the relationship between environmental change and human development. For example, lower sea levels (due to the glacial maximum) around 22,000 years ago enabled the arrival of the first modern humans to North America as the appearance of an archipelago of islands effectively turned the Bering Straits into a series of stepping stones. Later improvements in climatic conditions correspond with more permanent settlement across the Americas.

Innovation, like invention, comes from need. Arguably, it reflects our needs more directly than invention.

The end of the Ice Age was followed by a long period of stable warmer conditions, which generated prodigious demographic expansion and innovation, especially the development of agriculture. Frankopan suggests that early attempts at plant cultivation were in response to food shortages – a classic example of need leading to innovation. Further developments in tool manufacture, livestock domestication and choice of environmentally favourable locations sparked the beginning of villages and towns, writing systems, religions, complex economies and new social and political structures. The simultaneous emergence of farming in different parts of the world also suggests a pivotal role for climatic and environmental change in inspiring innovation.

Humans were also having an increasingly large impact on the environment. A sharp population rise, and increasing use of land for agriculture around the world changed the habitats of animals and plants and possibly even influenced the climate through deforestation. Farming may have prevented a new glacial period developing during this time, although this is very difficult to prove.

Frankopan also notes more recent interactions between human development and environmental impacts. As capitalist societies emerged, increases in global commerce led to greater demand for resources as people saw opportunities for profit making. This included expanding extraction of crops such as sugar, coffee and cotton. The ecological consequences were soil degradation and deforestation, which could at times be economically catastrophic if it led to excessive depletion of fuel and other resources. Soil conditions and land fertility became concerns of governments with anxieties about production and about supply keeping up with the growth of populations and cities. The acquisition of new colonies was one solution for meeting the increased demand for resources. New ways were also found to work the land more intensively. The introduction of the humble potato exemplifies human invention as its introduction helped to mitigate adverse weather conditions, enhance food security, improve health and increase life expectancy.

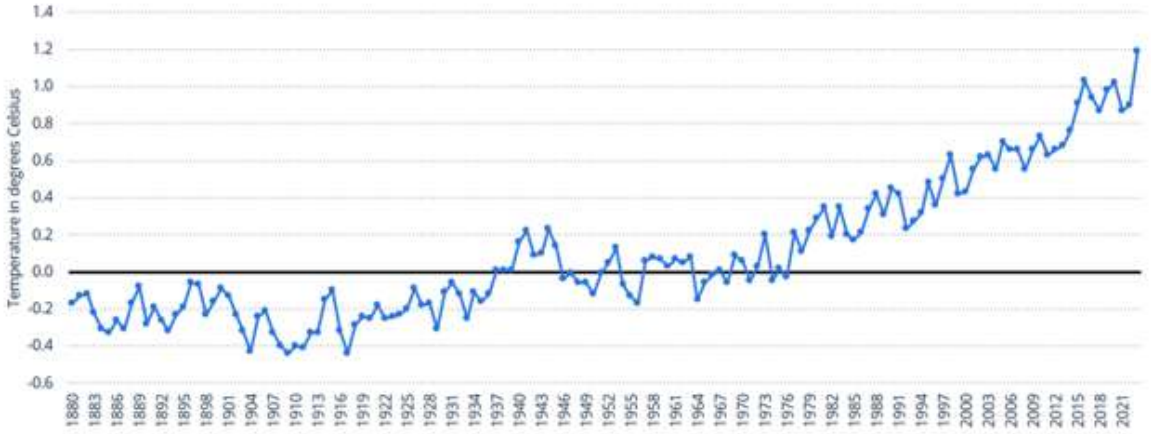
In his 2020 book, How Innovation Works [3], Matt Ridley also acknowledges prehistoric innovation, noting the momentous significance of the adoption of farming and the likely role of climate change in that development. He also discusses the domestication and breeding of animals (especially dogs) and the use of tools as important landmarks in human development. He notes a commonality between these innovations and much more recent ones, suggesting that "innovation is a lot less directed and planned even today than we tend to think"[4]. Other typical features of innovation are that it is often gradual, serendipitous, involves trial and error and, despite popular conceptions of solitary genius inventors, usually involves many people sharing ideas, working together or building upon the previous breakthroughs of others.

Ridley also states that innovation is inexorable. He documents many examples of simultaneous innovation in which a technology emerges in multiple places but entirely independently from each other. In addition to prehistoric examples like agriculture and pyramids, Ridley notes that the light bulb was independently invented by 21 different people. They are all likely to have benefited from previous developments to the extent that it was effectively 'impossible for light bulbs not to be invented in the 1870s' [5]. Despite the apparent inevitability of many innovations, they are still hard to predict, partly because it is tough to estimate the pace of impact and because society's needs evolve constantly according to social, economic, technological and environmental change.

The changes the World faces in 2024 are considerable. Just one of many indicators is the rise in ocean and land temperatures since the late twentieth century (figure 1). Frankopan notes that global warming forecast for this century is expected to be about 65 times more rapid than the major deglaciation following the Ice Age, in which temperatures rose by between four and seven degrees Celsius over several thousand years. This is known to have led to changes in vegetation. The changes facing us now are likely to have significant impact on plant, human and animal life. It is a large problem creating a large need to innovate.

Innovation is a lot less directed and planned even today than we tend to think.

Figure 1: Annual anomalies in global land and ocean surface temperature since 1880, based on temperature departure in degrees Celsius (Statista, 2024) [6]



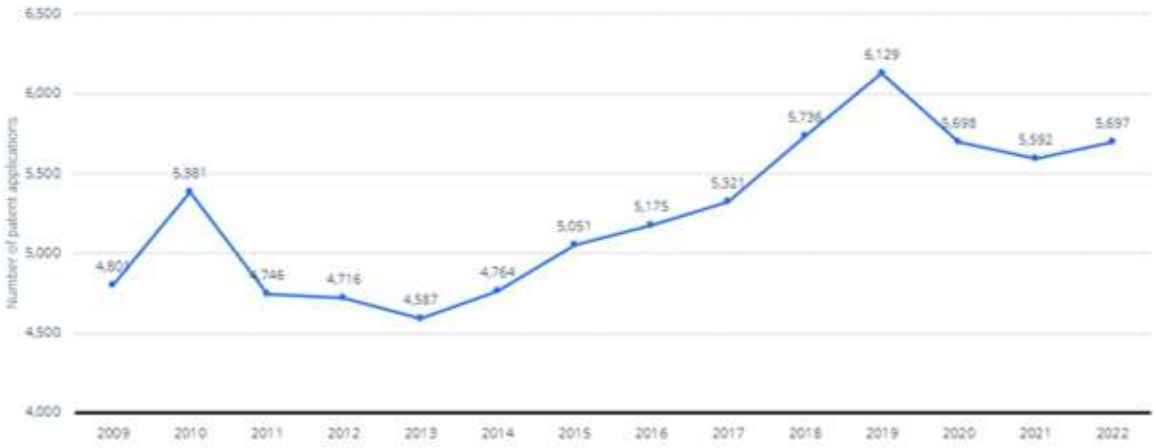
INNOVATION TRENDS, SUSTAINABILITY AND PACKAGING

The latest government data suggests that around 45% of UK businesses were 'innovation active' in the period between 2018 and 2020, with innovation more likely in large business (58%) than in small and medium enterprises (44%) [7]. Historical data indicates natural fluctuations in these trends, probably according to economic conditions and investments in research and development (R&D) by businesses. The Department for Business, Energy and Industrial Strategy also notes that, during the studied period, there had been a small rise in internal R&D investments to around 16% of businesses.

Office for National Statistics (ONS) data indicates that spending on R&D by UK businesses was around £50 billion in 2022 [8].

The results of this activity, and a further indication of innovation in the UK, are apparent in the number of patent applications filed at the European Patent Office (figure 2) [9]. A steady rise in applications from 4587 in 2013 to just over six thousand in 2019 was ended during the pandemic period but began to recover from 2022, with 5697 applications.

Figure 2: Number of patent applications filed at the European Patent Office from the United Kingdom from 2009 to 2022 (Statista, 2023)



The impact of Covid 19 is apparent in government data on drivers and barriers to innovation. Around 35% of businesses who reported that they had been innovating in the period up to 2020 said that issues relating to the pandemic were important in their decision to innovate, while a similar proportion (37%) identified it as a constraint on innovation activities [10]. Aside from that, the leading drivers of innovation were cited as 'improving the quality of goods and services', 'replacing outdated products/services' and 'meeting regulatory standards/requirements', which were all cited by between a third and two fifths of innovation-active businesses. After Covid 19, the leading barrier to innovation was 'excessive perceived economic risks' (important to 19% of innovator businesses in 2018-2020). This was followed by cost factors such as the availability of finance and direct innovation costs. Brexit was identified as a barrier to innovation among 13% of businesses, as were UK Government regulations.

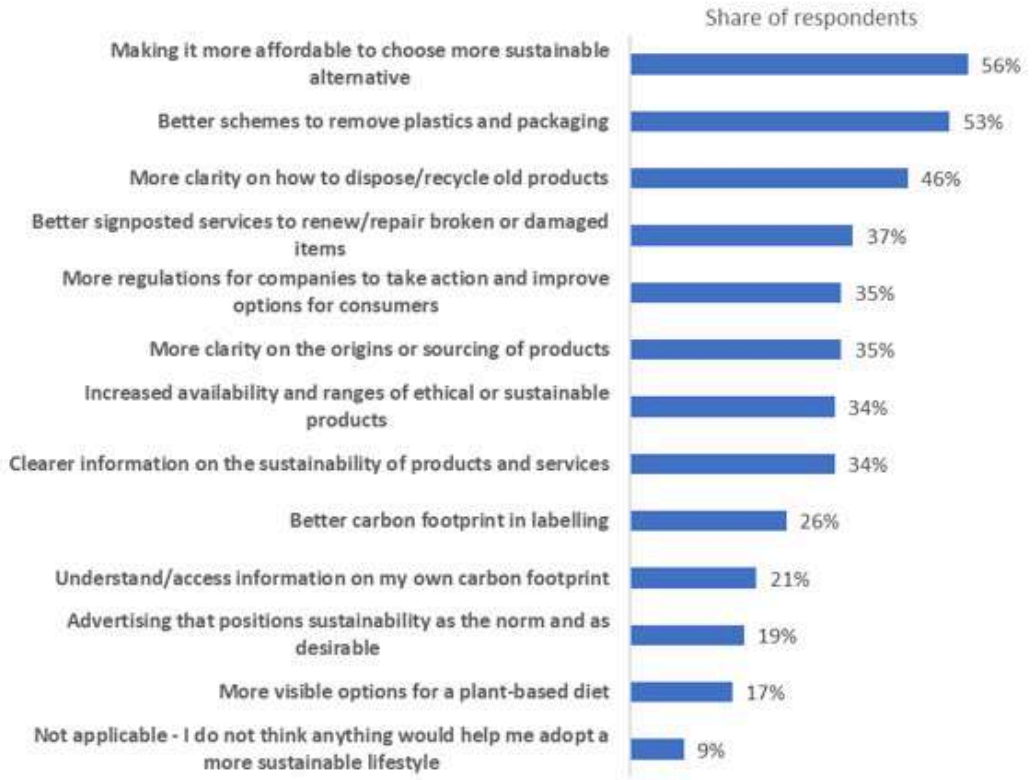
There are likely to be innovation drivers and barriers specific to different industries. For example, Cambridge Industrial Innovation Policy (CIIP, based at Cambridge University's Institute for Manufacturing) has noted that 'product innovation is a key focus of the UK food and beverages sector', although automation and digitalisation are also perceived as important to increasing productivity in that area [11]. Creating a more nutritious and resilient food supply is a particular driver in the sector, while regulations such as the sugar tax, sustainability and net-zero targets, the plastic packaging tax and related initiatives and food-waste targets have all shaped the direction of innovation. CIIP's UK Innovation Report reports that the industry's stakeholders anticipate future R&D will focus on low-emission production systems, food safety, packaging, recycling and light weighting, and CO2 traceability.

Consumer demand is a significant innovation driver for retailers and brand owners. One of the first Retail Institute annual reports, published in 2017, discussed the multiple roles that consumers have in the innovation process[12]. These include insight provider, such as through market research; ideator, a more active role of creating product ideas; co-creator, through open innovation processes; and user, by helping to test a new product. Perhaps the biggest current need for consumer input in consumer goods and packaging innovation relates to sustainability. This includes consumer awareness, attitudes, behaviours and the use and interaction of products throughout the lifecycle.

A survey by YouGov for Deloitte (figure 3) indicates how businesses can innovation to meet customer needs. When asked what would help them to adopt more sustainable habits and shopping behaviour, the highest concern, among 56% of consumers, was making it more affordable to choose a sustainable alternative.

Although this statement brings into question what consumers would consider to be a 'viable alternative', it does provide some focus for businesses. Other leading responses suggest that consumers require a stronger understanding of sustainability, with 46% calling for more clarity on how to dispose or recycle old products and on the origins and sourcing of products. Such issues suggest a need for more effective communication activities, while other responses are more about greater availability. For example, 34% of consumers wanted more availability of ethical or sustainable products and 17% wanted more visible options for a plant-based diet. Furthermore, there is still a strong packaging focus with 53% saying that they wanted 'better schemes to remove plastics and packaging'. In a separate survey from Ipsos Mori, 69% of consumers said that they wanted supermarkets to reduce plastic usage, although interestingly the most popular demand was for them to implement food waste management practices (72% of respondents).

Figure 3: Leading factors that would help consumers adopt more sustainable habits and shopping behaviour in the UK in 2023 (selected responses) (Source: Statista, 2023) [13]



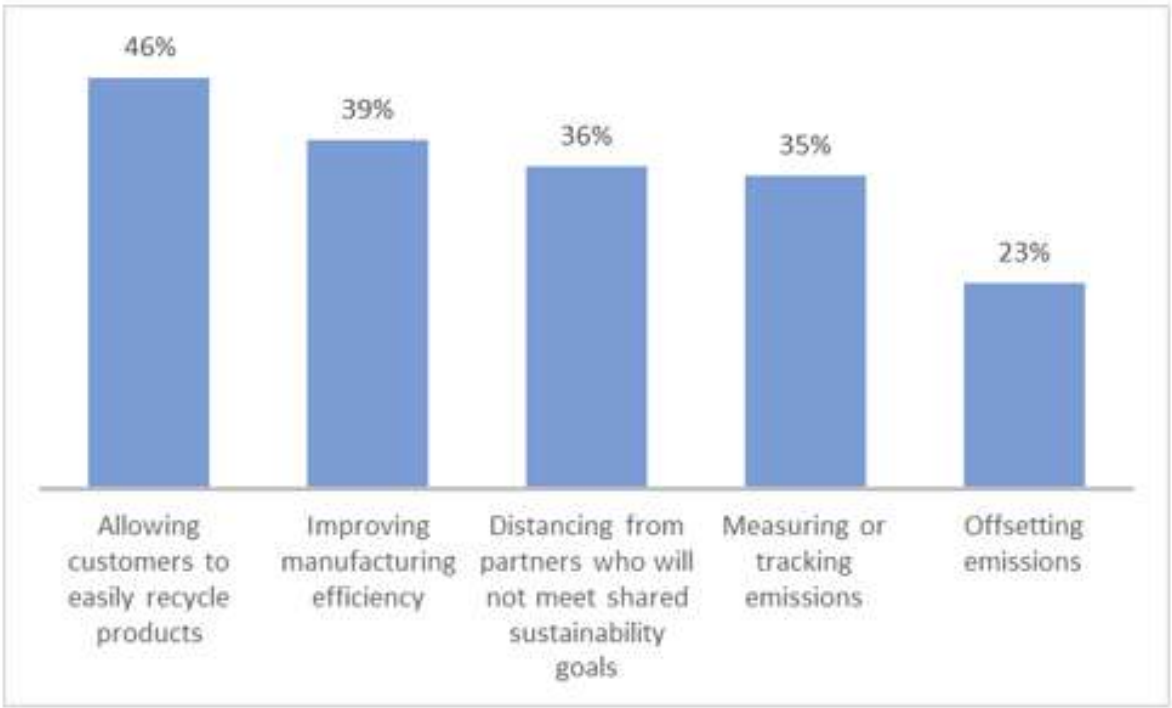
Many businesses are likely to be working on the issues highlighted in the consumer surveys, although carbon footprint is also a major area of activity. A study on sustainability initiatives by brands worldwide suggests that 'allowing consumers to easily recycle products' is the most common area of investment, with 46% of surveyed brands saying they were involved in that activity (figure 4). The other leading investment activities were 'improving manufacturing efficiency' (39%) and 'distancing from partners who will not meet shared sustainability goals' (36%).

CIIP's UK Innovation Report [15] states that net-zero emissions targets, passed into UK law in 2019, have led to many UK-based food and drinks companies establishing net-zero targets (some of which were reported in last year's Future of Packaging report). Key emissions sources addressed by these companies include food ingredients, packaging, manufacturing, and distribution and storage.

According to CIIP, net-zero innovation by manufacturers includes work on energy efficiency, electricity decarbonisation, process heat decarbonisation and sustainable refrigerants, plus methods for extending shelf life, cutting waste, and replacing single-use plastics. The stakeholders consulted for that report suggested that complying with net zero standards was important for maintaining competitiveness against foreign producers.

There is still a strong packaging focus with 53% saying that they wanted 'better schemes to remove plastics and packaging'

Figure 4: Leading sustainability initiatives brands are investing in worldwide, 2021 and 2022 (Statista, 2022) [14]



For packaging manufacturers, producing sustainable packaging, however that might be defined, is likely to be a significant focus for innovation in the coming years. This is discernible in some of the available forecasts for the production and market value of packaging materials. For example, the market value of sustainable packaging worldwide is forecast to grow from 292.71 billion US dollars in 2024 to 423.56 billion by 2029 [16]. In addition, the market value of sustainable plastic packaging is forecast to grow from 85.8 billion US dollars in 2021 to 143.7 billion by 2030[17] .

Finally, according to European Bioplastics, global bioplastics (of which packaging is the largest segment with 43% of the bioplastics market) production capacity is expected to 'increase significantly from around 2.18 million tonnes in 2023 to approximately 7.43 million tonnes in 2028' [18]. This breaks down as around 2.8 million tonnes of biobased/non-biodegradable materials and 4.61 million tonnes of biodegradable materials, a reflection of the growing importance of biodegradability to this industry in the coming years (increasing from 52.1% of bioplastics in 2023 to 62% by 2028).

These figures indicate where packaging innovators might focus their attentions in the next few years. However, there are complexities to the innovation process that make it harder to predict which ideas or inventions will reach industrial scale potential [19]. Unforeseen discoveries or technological developments could change the direction of business goals and investments, as could social and economic change. A factor that is crucial for sustainable innovation is whether it spreads to other businesses and industries, as sustainable goals usually require large scale environmental impact to be worth investing in. The role of organisational structures, and the people within those organisations is also vital to the success of such projects. This is discussed in the next chapter.

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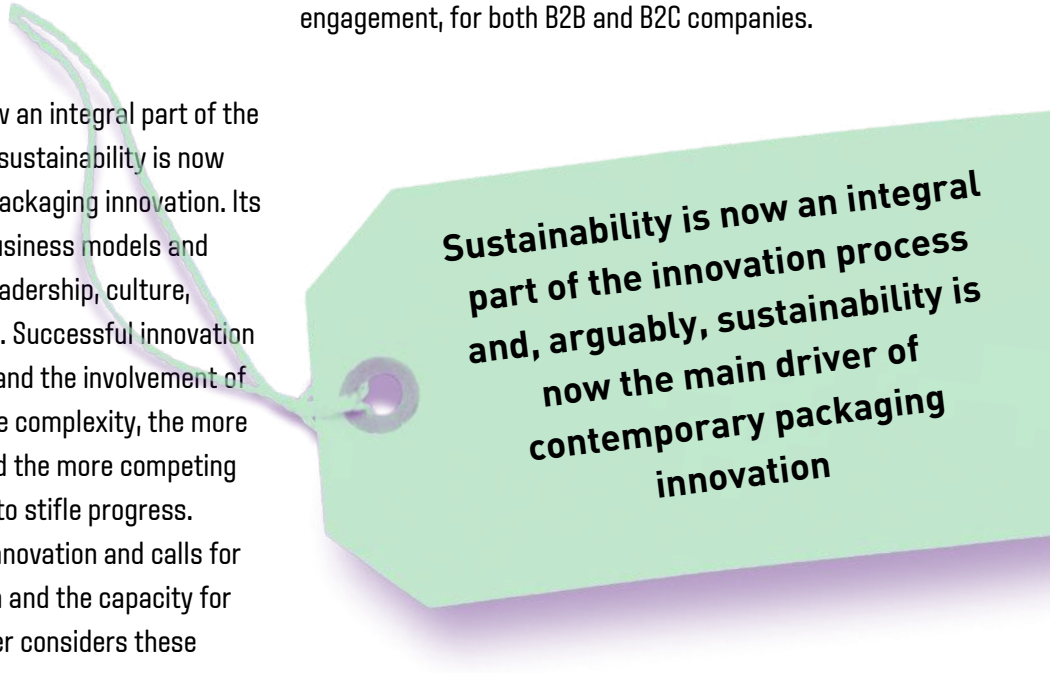
CHAPTER 2: THE ROLE OF ORGANISATIONS AND INDIVIDUALS IN SUSTAINABLE INNOVATION

The integration of sustainability into business models and activities has been a gradual process that reflects society's evolving understanding of its environmental impact. During the twentieth century, it became increasingly apparent that the World's natural resources are finite, and that the environment is something that needs active protection. There was growing recognition that many innovations that were perceived to represent 'progress' in making life easier and more efficient had harmful side effects for both human health and biodiversity. The classic example is the use of DDT – a pesticide designed for mosquitos but so effective that it killed insects on an unprecedented scale, thus threatening the ecosystem. The book that highlighted this, Rachel Carson's Silent Spring (1962), is often regarded as the beginning of the environment movement as it made the public aware of the human impact on nature and the need to control it [20]. Since then, businesses have learned to innovate according to both environmental regulations (e.g., DDT is now banned worldwide) and the anticipation of other potential side effects.

Consequently, sustainability is now an integral part of the innovation process and, arguably, sustainability is now the main driver of contemporary packaging innovation. Its relative importance depends on business models and organisational factors including leadership, culture, workforce and other stakeholders. Successful innovation often requires multiple iterations and the involvement of many contributors. The greater the complexity, the more barriers there are to overcome and the more competing ideas and interests that threaten to stifle progress. Managing these issues is part of innovation and calls for effective strategy, communication and the capacity for organisations to learn. This chapter considers these issues, drawing on insights from research on organisations and their stakeholders.

ORGANISATIONAL STRATEGIES

Although the environment is often the focus of sustainability in a packaging context, sustainable innovation may also concern the social and economic aspects of 'people, planet, profit'. This is shown in the way that businesses choose to communicate with the public about sustainability. A recent study of the use of Twitter (now X) by food companies found a mismatch between the topic of their messages and the preferences of their audience [21]. The analysis found that business to business (B2B) companies favoured messaging that emphasised the people side of sustainability, in terms of its employee engagement and workers' rights. Business-to-consumer companies (B2C) were found to have a more balanced approach to sustainability messaging, although the economic (profit) dimension tended to be the priority. However, the number of 'likes' noted for each messaging type suggests that messages about the environment generated stronger engagement, for both B2B and B2C companies.



Social media activity is not a clear indicator of innovation activities. However, this shows the importance of demonstrating that a business is considering the environment in its product and service development. The most convincing way to achieve this is with genuine actions and a strategy that incorporates ethical values. Within multinational corporations, this can be difficult to implement. Henkel's 'Factor 3' strategy, launched in 2011 [22], was aimed at maintaining the company's reputation as a corporate leader in sustainability. It included goals of becoming three times more efficient and achieving reductions in waste and water and energy use. A series of interviews with managers at the company has revealed the challenges of achieving these targets. These include changing consumer attitudes and behaviours, difficulties measuring ecological footprint, and the ever decreasing 'low hanging fruit' opportunities, making objectives progressively harder to achieve.

While there was optimism among managers about meeting their targets, there was a feeling that some factors were outside Henkel's control and there were issues dealing with competing interests. Although participation in sustainability activities generated pride and enthusiasm, the programme also caused some stress because the objectives were seen as difficult to achieve. The consumer problem was also a continuing concern, which was associated with a tension between marketing practices and product sustainability.

The Henkel example seems typical of the problems that corporations are likely to face when developing products with sustainability in mind. The costs of switching to new methods, machinery or materials means that there are usually many problems to solve, requiring considerable expertise, collaboration and compromise. Thus, it is useful to consider the organisational capabilities that enable sustainable innovation.

SUSTAINABLE INNOVATION

The motivations behind sustainable innovation may be a mixture of compliance, proactive competitiveness and a certain amount of philanthropy. Archie B. Carroll's pyramid of CSR (corporate social responsibility) expresses this as four distinct types of responsibility (see figure 5), starting with economic (be profitable), legal (obey laws and regulations), ethical (do what is just and fair) and philanthropic (be a good corporate citizen) [23]. The first two are required by society and the last two expected or desired.

Sustainable innovation could be generated at each level of responsibility. From a packaging perspective, new taxes and regulations will create an economic and legal imperative to innovate, the expectation to reduce waste or pollution engenders an ethical responsibility and support for activities to clean up waste or promote behaviour change are examples of businesses fulfilling their philanthropic responsibilities.

Figure 5: Carroll's pyramid of CSR (Source: Carroll, 2016)

Businesses are perceived as progressing through three phases of the sustainability agenda – compliance, competition and market creation[24]. In the first phase, as understanding increases of the environmental impacts of a product or process, government legislates in response. In phase 2, organisations start to take on an initiating role as they appreciate both the impacts of their processes and the potential for cost savings. The final phase involves the generation of new market opportunities as corporations recognise that sustainability demands profound change[25].

Such phases reflect increasing levels of proactivity by businesses as they move from simply reacting to obligations to more creative positions in which they seek to lead and differentiate from competitors. This is expressed by a 'maturity model for sustainability in business', (see figure 6) by Van Oppen and Brugman[26}, in which they contend that sustainable innovation consists of the capabilities that organisations need to move from R&D aimed at pre-empting competitors to strategy and innovation for future positioning and differentiation.

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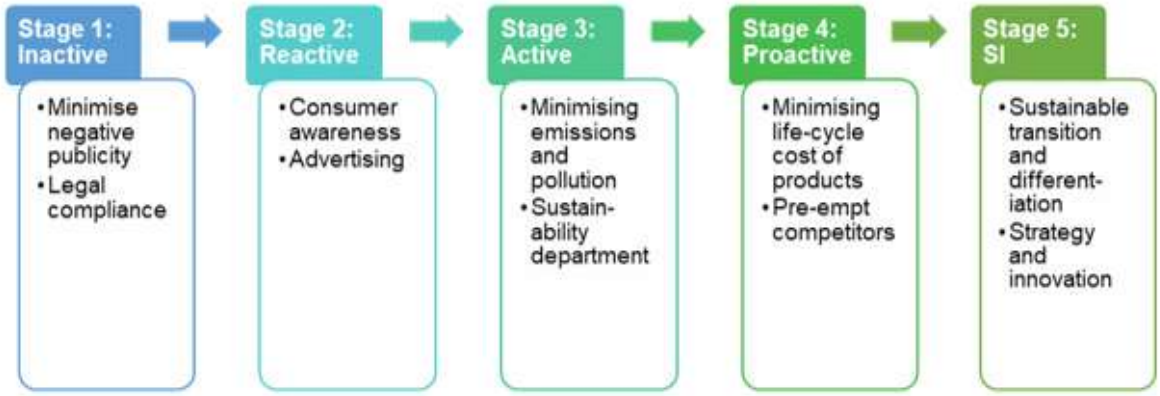
Such capabilities include a decentralised organisational structure, a diverse and appropriately trained workforce, internal cooperation and knowledge sharing mechanisms, long-term targets and methods for measuring progress against them. This also requires a culture that is open to change and innovation with time allocated for non-core activities.

Figure 6: Maturity model for sustainability in business (adapted from Van Oppen and Brugman, 2011)



The notion of innovation takes various forms, depending on its purpose, scale or radicalism. It might be significantly or just slightly disruptive, designed as a breakthrough solution or as a way of sustaining a previous breakthrough. Within organisations, people may have different perspectives on the application or value of innovations and who is responsible for its generation. It is especially important for manufacturing businesses, whose innovation projects are likely to involve major changes in production processes[27], requiring strong leadership and organizational capabilities.

A report by Philips outlining the company's approach to sustainable innovation states that success depends on managing the complexity not only of an organisation's interconnected system but also the external systems of nature and society, requiring a deep understanding of both [28]. Leadership, the ability to transform employees' knowledge and skills and a good understanding of market dynamics are identified by Phillips as prerequisites of innovation. The company outlines four strategies for a sustainable future:

- Build relationships towards a higher purpose: innovators need to share this higher purpose beyond personal and business interests, building trust to co-create new visions based on common values.
- Enable sustainable lifestyles: focus on fulfilling fundamental needs, so people can live well in a healthy environment and a healthy society.
- Create multi-stakeholder value: working with partners throughout society to create value that is distributed fairly and is transparent for all.
- Use resources responsibly: starting at a system level and envisaging potential impacts on users, society and environment.

A more recent study of service and manufacturing firms suggests that important mediators of innovation outcomes are supplier collaboration and employee involvement[29]. Another business survey found that sustainable innovation is especially driven by market-based sustainability and organisational learning capabilities [30]. Market-based sustainability is the strategic alignment of customer desires with the "social, economic, and environmental concerns of other stakeholders". The same research also confirmed that sustainable innovation contributes to the triple bottom line, i.e., improved social, environmental and economic performance. However, economic performance is only elevated through social and environmental achievements.

LEARNING ORGANISATIONS, STAKEHOLDERS AND INDIVIDUAL ATTITUDES

Organisational learning involves the development of knowledge that influences behaviours or improves performance to ultimately strengthen competitive advantage.

Accordingly, firms cannot stay content with 'business as usual' and should look to embrace new approaches and opportunities.

Peter Senge's concept of the 'learning organisation', a key component of manufacturing innovation, includes ideas relating to spirituality, mental models and systems thinking[31]. Spiritual growth guides a way to live and work, providing individuals with energy to achieve better productivity and performance. Mental models are assumptions and generalisations that influence how people view the world and the recognition of different stakeholders' mental models is important to effective management. Systems thinking involves seeing interrelationships and patterns of change. Senge also discussed a 'sustainability mentality' in which systems thinking enables an appreciation of the interdependency of commercial sustainability with social and environmental systems. In summary, learning was seen as essential to transforming mindsets through collaborative working for a shared earth.

Systems thinking involves seeing interrelationships and patterns of change. Learning was seen as essential to transforming mindsets through collaborative working for a shared earth.

The involvement of stakeholders is critical to an organisation's ability to implement sustainability strategies and vice versa. Sustainability activities often take place to meet and balance the various demands of groups including owners, employees, customers and others affected by a company's activities. Case studies conducted in Spain have highlighted that both dialogue with stakeholders and integration of their knowledge help to develop innovative ideas[32]. The success of this depends on transparent, two-way communication and non-hierarchical organizational structures that allow flexibility and openness to change. Manufacturing and packaging innovation also requires collaboration with customers and suppliers. Such relationships inevitably generate learning from each other. A recent case study of a meat producer and wholesaler has helped to clarify the distinct value of learning from a partner and learning about a partner during a sustainability innovation process[33]. Together, these enhance innovation, build trust and improve coordination between partners.

Perhaps the most important group of stakeholders is employees. Multi-industry research published in the Journal of Business Ethics identified a clear relation between proactive environmental strategies, employee integration and environmental performance[34]. Specifically, high levels of shared vision helped to advance the corporate greening agenda. Furthermore, employee influences were greater than those of other types of stakeholders. This could be for the simple reason that employees naturally work more closely with an organisation's managers than other stakeholders. The authors note the need for fluid, cross-departmental communication, which is more likely if there is a strong shared vision. This is facilitated by training and development and the cultivation of a learning culture. In addition, the recognition of employees' actions (e.g., rewards for star performers and promotion through internal newsletters) as environmental stakeholders can further increase their motivation and attract high quality new recruits[35].

The success of any programme or intervention that involves people depends on the attitudes and styles of working. Therefore, the implementation of an organisation's sustainability goals depends on its ability to shape the attitudes and behaviour of employees{36}. This not only means creating an organisational 'culture', in which the values of the company determine employee attitudes and Interactions with clients, but also maintaining an organisational 'climate' in which employees hold positive feelings about the business, leadership and recognition of their work [37].

The involvement of stakeholders is critical to an organisation's ability to implement sustainability strategies. The success of this depends on transparent, two-way communication and non-hierarchical organizational structures that allow flexibility and openness to change.

These findings have been supported by research from the field of environmental psychology in which perceived organisational support towards the environment led to pro-environmental behaviours [38]. It also improved job satisfaction and the extent that employees identified with their own organisation. Furthermore, support for the environment reduced intentions of leaving the business (see figure 7). An important mediator of these relationships is 'psychological empowerment', a situation in which employees believe that they have control over their own work[39]. Thus, greater awareness among the workforce about the environmental impacts of their activities will make them feel more satisfied and empowered. Some employees might have limited awareness of the benefits of sustainability initiatives and could have concerns about personal, organisational or societal costs, it is important for businesses to address these through internal marketing campaigns [40]. This could be taken further using organisational systems, procedures or codes of conduct to promote desired attitudes and behaviours relating to sustainability projects[41].

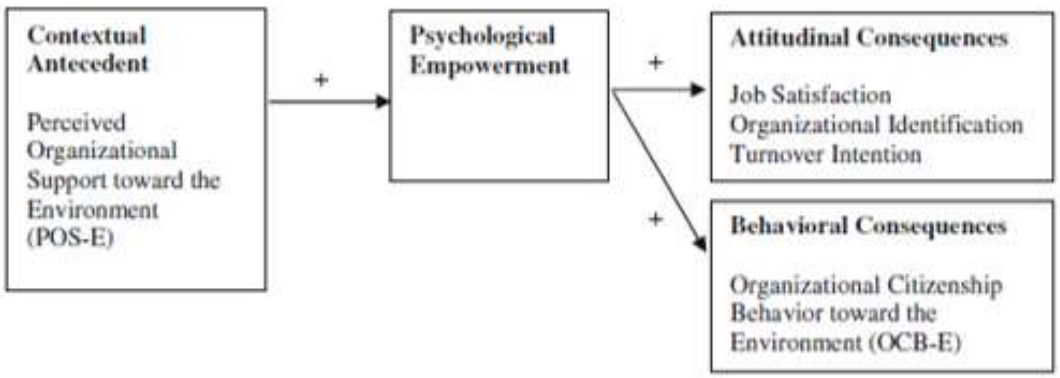
The ideas, motivations and perspectives of individuals is a critical determinant of the outcome of an innovation process. If a business is to achieve its sustainability goals through innovation, it will need to be effective in managing the interactions between those involved. A further determinant of successful innovation outcomes is the responses of another stakeholder group – customers.

CONSUMER BEHAVIOUR/ADOPTION

The consumer problem is well known to packaging designers and manufacturers. Demand for more sustainable packaging comes from consumer perceptions of excessive waste and plastic pollution, which has been supported by government legislation in taxes and extended producer responsibility. Businesses innovate in response to this and in anticipation of further developing needs and preferences. The end user is always part of the thinking, although consumers do not always behave in a way that ensures an innovation achieves its sustainable goals. They dispose of packaging incorrectly or reject the new format in favour of more familiar or convenient but less sustainable alternatives. Manufacturers are then left with a choice of whether to revert to the previous format, try something different or put effort into persuading people to accept the new format. All these options require the need to understand behaviour as well as possible.

The end user is always part of the thinking, although consumers do not always behave in a way that ensures an innovation achieves its sustainable goals.

Figure 7: Consequences of perceived organisational support towards the environment (Source: Lamm et al., 2015)



Jonatan Pinsk and René Bohnsack have conceptualised these issues in a 'sustainable affordance framework' [42] . Their purpose was to address the trade-offs "between a product's environmental features and consumer expectations regarding desired functionalities and user experience", with the contention that "sustainable products are more likely to be adopted if they address multiple environmental outcomes that do not conflict and offer either similar functionality to products currently in use" [43]. Pinske and Bohnsack state that,

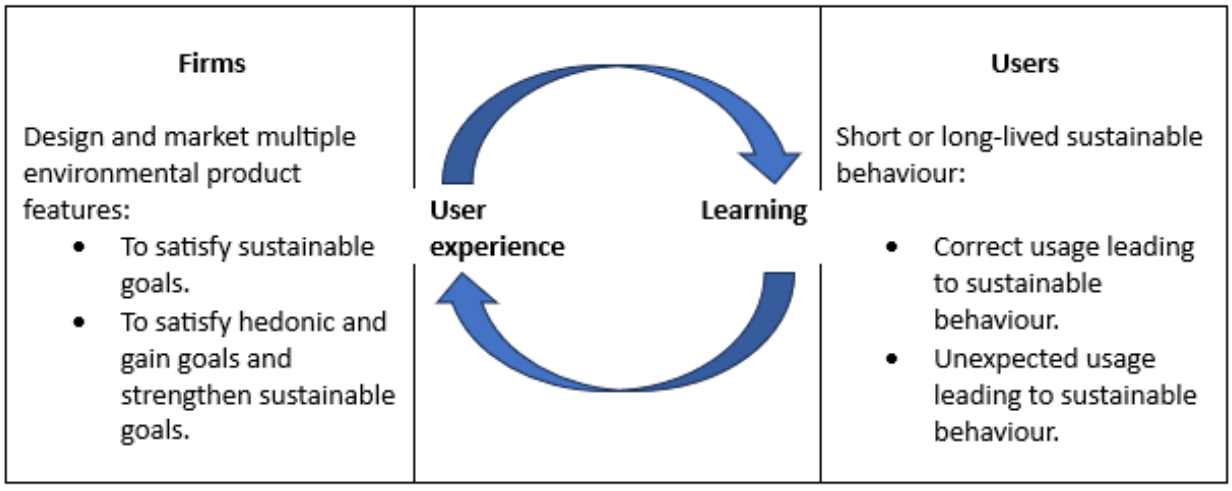
> *"New product features can provide a range of sustainability affordances—for example, circularity, longevity, eco-efficiency, decarbonization, biodegradability, compostability, organic production, resource substitutability, or traceability, for example, which invite consumers to behave more sustainably and help achieve outcomes such as lower carbon emissions or less water pollution."*

In their framework (see figure for a simplified version), Pinske and Bohnsack contend that sustainable product innovation is more likely to work when firms acknowledge and put emphasis on consumers' hedonic or gain goals. These are the pleasure and personal gain that they expect to achieve when buying the product.

They argue that focusing on helping the environment will only be successful in mature green segments of the market. Recognising the experiential compromises that consumers must make will help users to gradually get used to a sustainable product. This will also help gradual behaviour change as user experience generates learning, which feeds back into later experiences. In this cycle (see figure 8) hedonic and gain goals can help to strengthen the goal of behaving sustainably.

Another popular idea relating to behaviour change is the idea that consumers can be nudged into performing the desired actions. This can be used in the packaging context using images and information that activate reflection on the environment. However, research has found that the effectiveness of different kinds of green nudges depends on the way that people think, i.e., their cognitive style.[44] The study, which involved over 1000 German consumers, found consumers were generally willing to pay more for bio-based packaging. However, it was important that the environmental attributes were clear to consumers. For consumers with a cognitive style that bases decisions on emotions and intuition, this was most effectively communicated using nature pictures on the packaging.

Figure 8: sustainable adoption framework (adapted from Pinske and Bohnsack, 2021)



However, some consumers are likely to favour more deliberate slower thinking and, in that case, providing normative information and asking reflective questions about the environment were more effective for increasing willingness to pay.

These findings help to explain consumer acceptance of eco-friendly packaging. The importance of cognitive style in acceptance of nudges means that designs and marketing strategies need to allow for this. A further consideration is the level of self-control. Research has found a positive association between self-control and individuals' pro-environmental behaviour [45]. This contrasts with their 'perceived behavioural control' (PBC), in which people assess their ability to make a difference according to perceptions of the impact of their actions. PBC was not found to have a significant association with pro-environmental behaviour. In other words, self-control is better at explaining this behaviour because it gives people the capability of breaking unsustainable habits.

It follows that those will low levels of self-control need more help in achieving sustainable outcomes.

Sustainable packaging innovation is most likely to occur within an organisational setting that has multiple groups of stakeholders, with differing goals. These groups influence the motivation and strategy of sustainability. The implementation of projects and development of new products depends very much on the organisation's capacity for learning and the individual volitions of employees. This is where innovation is drawn into the realms of management, employee engagement and more ambiguous concepts like organisational culture and climate. Firms can do much to foster pro-environmental behaviour in both the workforce and among consumers. The final chapter will discuss how this is achieved in practice, from the perspective of retailers, brand owners and packaging manufacturers.

CHAPTER 3: SUSTAINABLE PACKAGING INNOVATION

Innovation in the packaging sector is reflective of retail and manufacturing generally but maintains some distinct features. To gain some detailed insights into innovation processes and the role of sustainability, the Retail Institute interviewed three senior packaging and sustainability experts. Firstly, a former head of packaging for a multinational brand owner gave us his perspective from his long career. We also spoke to an R&D director from a global packaging manufacturer and a senior sustainability manager at a UK supermarket. For reasons of brevity, they will be cited as 'brand owner', 'packaging manufacturer' and 'retailer'. We also have some useful insights from a survey of businesses and interviews we conducted for the Flexographic Industry Association (FIA), and we are grateful to FIA for their permission to share these insights.

Actions relating to sustainability included developing strategies to cut different kinds of waste and training the workforce to raise awareness of relevant issues.

Figure 9 below shows that many businesses are engaged in a range of different sustainable activities. In this case, the survey findings are from flexographic print businesses, many of which are engaged in packaging manufacture. As with many other manufacturing businesses, most (around two thirds) agreed that they have been working on reducing carbon footprint and energy usage and improving efficiency. In addition, the majority are looking to improve the recyclability of products (68%) and/or switch to other materials (54%).

Almost three quarters of these businesses said that they were engaged in innovative activities that involved either moving into new markets or identifying new clients. The motivation behind this was a combination of technological development (such as moving into digital print or new product coatings) and responses to market sluggishness. To achieve this diversification, the businesses had to invest in new machinery and enhancing their internal technical capabilities. Actions relating to sustainability included developing strategies to cut different kinds of waste and training the workforce to raise its awareness of relevant issues.

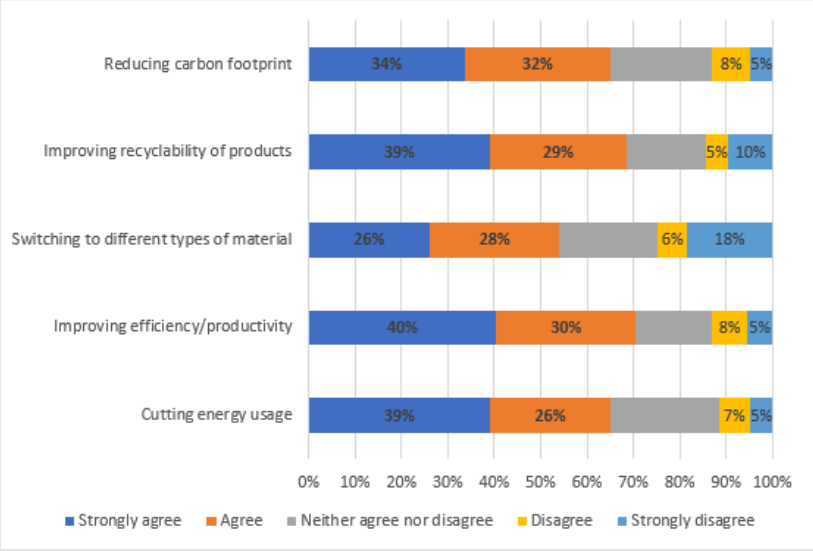


Figure 9 : Activities to manage change and remain sustainable and competitive among flexographic print companies (Source: FIA, 2023)

Each of these areas of activity and investment require businesses to form clear goals and priorities, and then implement them with consideration of all operational, regulatory and market factors that could determine whether those goals are achieved. The approaches to innovation described by our three experts reflected the type of business they represent and the relationships they have with other organisations.

The brand owner's approach consisted of using established innovation models and set procedures through which multiple departments work together in the creative process. The business distinguishes between three innovation types – front end, applied and problem solving. Front end innovation is a creative stage in which commercial and technical teams come together to work through the six steps of the Osborn-Parnes methodology - Objective, Fact, Problem, Idea, Solution, and Acceptance finding. Our expert remarked that this is important because "there are always things you don't know that you don't know. And those things generate problems". Therefore, bringing together different teams helps to manage risk. This leads to the more applied stage of innovation, which focuses more on problem solving. The final stage also involves problem solving but at a more technical engineering level and the business uses the TRIZ method (translated from Russian as 'The Theory of Inventive Problem Solving'[46]).

The packaging manufacturer suggested that the execution of an innovation strategy is likely to be similar across the industry. However, approaches to strategy are likely to differ. He described how they use several different sources of intelligence. External consultants meet specific needs, such as identifying trends in a particular material, from which the manufacturer can then investigate further to determine what action is needed. Investors also have an influence, meaning that market conditions are always part of the calculation.

For the brand owner, defining goals was very important. These usually come from the top of the corporation and filter through various departments, with regular goal alignment exercises to keep them on track. He made a distinction between the voice of the business (the branches of the corporation focusing on specific products and categories) and the voice of organisation as a whole. The reality was that each department has different goals and any change proposed by R&D had to make a case to each section of the business based on its specific objectives. He described the likely process of switching to a different packaging material (e.g., plastic to paper):

"So manufacturing, … obviously they're obsessed with manufacturing cost [and] operational costs. If I say … to achieve that goal, we actually need to make your process more expensive or more complex … I'm going to have a hell of a job getting them on board. So that's where we use the operational master plan. [We say] no, this is a corporate goal. [For a change of packaging material] You can imagine the size of the scale of that kind of problem [and] the investment needed to do so. I would need to get sponsorship for that; I would need to sell the idea [to] get commitment across the business, probably firstly with marketing and then get manufacturing on board to make that change. So those kinds of things tied it all together."

(former Head of Packaging, Multinational Brand Owner).

Like the brand owner, the retailer had manufacturers within the business with which the packaging team had to work closely to appreciate the effort required to introduce a new format. He said:

"We're different to the supermarkets without any of their own manufacturing. So, we have to be very collaboratively working with our internal manufacturing business … We see the disruption that it causes much closer than others. So, to move from a plastic backed steak to a cardboard backed steak, we really see the difference that it makes in a factory."

(Senior Manager for Sustainability, Supermarket)

He contrasted this situation with the suppliers that the retailer uses for other product areas:

"What we get with other suppliers is that they've done it for somebody else, so they'll just come to us and go. 'We could do it in cardboard and plastic'. You don't really see the pain that they've gone through, the disruption that they've gone through. So, unless you're the one that's driving it with that supplier, you just get kind of the byproduct of the pain and disruption".

(Senior Manager for Sustainability, Supermarket)

This point is a reminder that innovation processes can work very differently, with one distinction being the level of collaboration needed to implement a project. The brand owner suggested that sustainable innovation must be more collaborative than other kinds of innovation. This could be both in a sense of working with other organisations and in terms of people within the business working together on a common goal.

"I'd say it's more collaborative. I think it's because naturally [for] most people it's a key motive for the majority of people. To do the right thing. Most people particularly. I felt in R&D, people were very aware … I always found it enormously rewarding to work in such an environment because it was full of so many clever people … You work with those kinds of people. It rubs off on you and you grow and learn as well. But I would say so, yes, definitely more collaborative."

(former Head of Packaging, Multinational Brand Owner).

DRIVERS OF SUSTAINABLE INNOVATION

Retailers, brand owners and suppliers have all been influenced heavily in recent years by demands to make packaging more sustainable. In that sense, the motivations behind sustainable innovation are likely to be similar, although with some differences in interpretation and prioritisation. For the packaging manufacturer, innovation is inherently about sustainability. He estimated that 90% of the company's innovations are to redesign for sustainability, with a focus on the end of life. He also noted that even before this became the main focus, there were many years of work on lightweighting, reducing materials and reducing carbon intensity.

The brand owner described how sustainability had evolved from being merely a concept to something to which the organisation was committed. He noted how the Blue Planet effect contributed to that change:

"Nobody really cared until Blue Planet 2 … then all of a sudden because … Greenpeace are showing [our] products all over the beaches, worst polluters and all this kind of stuff. So there was much more visibility. So, it was the first time the business really came to us in R&D. So, all the heads in the different categories and said, what should we do? So, we put together a … strategy, because [the business] itself had a kind of a strategy, but it wasn't a strategy for change. It was a strategy just for managing the status."

(former Head of Packaging, Multinational Brand Owner).

The retailer also observed that there is a "rather different mood now than I think you would have seen several years ago", noting that in the past the sustainability team would have been told to "make it go away and deal with it". The difference now is that "it has to be all the way through the business, and we have to know what the future's going to hold for us".

The main motivation behind this appears to be the customers. The retailer confirmed that this was certainly the case for packaging and plastics. The targets are strongly influenced by regular customer surveys relating to sustainability. Consistent priorities for consumers are prices, food safety and buying British. Issues relating to plastic, food waste are also important. These priorities change according to customer segments, with those on higher incomes tending to prioritise packaging and climate over buying British, for example. This creates a dilemma for the retailer between those customers it is fighting to keep and those it is fighting to attract.

The retailer noted that competitors had taken differing approaches in response to the pressure from customers and environmental campaign groups. This included the demand to cut the use of plastic in packaging by 50%, with some focusing on own brand and others on all products sold. However, some competitors removed this target by switching to an absolute number of items removed. This in turn has an impact on the retailer's own targets as they were perceived to be falling behind their competitors.

Despite the increased priority for sustainability across the sector, innovators must still solve the cost problem to create a viable alternative. The brand owner described how challenging this can be:

"If you want to drive change, especially in areas of sustainability, it's not cost neutral. There was always a cost of change. Because by default, if it's an established brand, you're going to be operating at the lowest possible cost. [It] makes no sense overpacking … in that context … Why would you spend more money than you have? … So, you're already cost optimised, and you've been optimising that over years and years."

(former Head of Packaging, Multinational Brand Owner).

Therefore, managing the cost of change is the 'major roadblock to innovation'. In addition, the brand owner commented that the commercial team often has the strongest voice because their goal is to ensure that profit margins are maintained. He contended that there was "no point bringing [a] sustainable product to market if it won't sell because you won't get the sustainable impact". For the packaging manufacturer, the need to be profitable also governed the innovation process. However, in this case the need to lead the market in the process of change was an important driver. Nonetheless, he appreciated that:

"From a brand owner's perspective, it's about selling a number of units and you absolutely need to be doing that. The longer term, if you're not on sustainability, it's innovate or die. [Every one of the] brand owners will have a strategy to do that, and they will be evolving even if it's not [in a] particularly sexy way, you know that they will be doing stuff by default. Would they be allowed to bring all the products into the market that's going to have a higher carbon footprint? No, they wouldn't. If would you replace a recyclable product with a non-recyclable product? No, you wouldn't."

R&D Director, Global Packaging Manufacturer

In addition, the retailer noted the benefits of sustainability initiatives that help to ease any concerns of the business's owners. These include achieving what the customer expects, savings from cutting food waste and carbon use, adding new products to the portfolio and the boost to the value of the business that comes from ESG (environmental, social and governance) activities.

The challenges of sustainable innovation around cost mean that the job of initiating change often consists of finding opportunities where there could be a viable business case. In one example, the brand owner found that the business was able to justify a switch from plastic to cartons, even though it meant a multi-million-pound investment in new equipment. In this case, the business felt that the product could be used "to influence the next generation of consumers … to get them to think about sustainability early. You're helping to build better consumers for the future. So, I think that was quite noble for the brand and it fitted with the brand ethos."

ORGANISATIONAL CHARACTERISTICS AND COLLABORATION

As well as capital investments, managing different perspectives within the organisation is a big challenge for implementing change. For our three businesses, the starting point appears to vary significantly. For the packaging manufacturer, sustainability has become built-in as a standard. While the brand owner has made significant efforts to embed an ethos of sustainable thinking within the organisation, buy-in within the retailer is much more mixed. In each case, the organisation's sustainability goals drive decision-making. The former packaging manager at the brand owner described how training and interventions from corporate leaders were key mechanisms in driving the organisation's ethos. He told us:

Training was used to disperse thinking in the organisation. For example, technology and management training helped to lead innovation. [At the training], there were always presentations from senior members of the organisation - a way of distributing the ethos and values of the organisation. Get people on board and it [becomes] part of our own ethos".

(former Head of Packaging, multinational brand owner).

In addition, a research and development strategy conference was held every 18 months, in which leaders would share the strategy and the conference would rubber stamp it, thus enhancing the overall buy-in.

The packaging manufacturer indicated that the use of metrics was part of a process of sustainability becoming standard within the business. Targets were set for everything to be recyclable, compostable or reusable by 2025 and the business now measures itself against those targets. This followed a process of looking at the carbon intensity at Scope 3 level emissions of all products. Sustainability indicators are now part of the company's annual report (rather than a separate report). The R&D Director described how sustainability is understood throughout the organisation:

"Sustainability metrics [are] regularly reported and regularly challenged by shareholders and investors and analysts, so right the way from the top down … it is absolutely front [and] centre of what they're looking at and what they'll talk about. Certainly, if I speak to a general manager of a plant, they know that if they're going to be filling their plant with innovations, they're going to be sustainable innovations. They're going to be [switching] to mono-material, recycle-ready materials [or] paper. Maybe they're going to … compostables or whatever … They know that that's where the growth is, and the added value is going to come."

(R&D director, global packaging manufacturer)

The senior sustainability manager at a retailer indicated that there was natural variation within the organisation regarding the amount of commitment to environmental concerns. He cited the example of a commercial director with responsibility for buying much of what goes into the stores. While this director was not especially focused on sustainability, he took a leading role in in ensuring that all category directors had a plan for reaching the company's packaging reduction target. In contrast, the director responsible for sustainable sourcing was "much more of an advocate for it in general". The retailer also described some colleagues as 'passionistas', who love sustainability and often send him suggestions. There are also those "who think it's absolutely nothing but PR. So, the whole range exists".

Increased buy-in within the organisation is likely to happen naturally as younger people joining the organisation start with more understanding and environmental issues. The retailer said that "It's more built into their psyche … there's an intergenerational change".

Overall, the approach to sustainable innovation needed within the retail business was to appreciate the needs and objectives of various departments. The retailer explained:

"You need to work out who you're talking to. So, if you're going to try and convince an accountant that you need to do something different, you need to talk money … around the investments. If you're talking to somebody who's super passionate about sustainability, you've got to talk to them about the sustainability. If you're trying to reduce carbon in a process … you need to talk about the energy use … There's no point in talking to some of our shop floor guys about COP [UN climate conferences]. They don't care. But you can talk to them about the energy or you can talk to them about the food waste … You can make it really relative to their jobs … Most of what we have to do is find a way to make what we're trying to do relative to those people and put it in their language. That makes them interested in the change and then able to drive it through … sometimes we're going back two or three times for conversations until we realise what the thing is that makes that person [accept that change]. People are people. Unfortunately, they're not all the same."

(Senior Manager for Sustainability, Supermarket)

Another difference from the set-up of the brand owners is that retailers are unlikely to have a full set of sustainable innovation capabilities within the organisation. Because of the large range of categories and products to manage, it is more likely that the supermarkets rely on partnerships with suppliers to facilitate innovation. By developing longer-term deals of two or three years, suppliers can have more confidence to invest and innovate. The retailer also noted how differences between branded suppliers and home brand suppliers means there are significant disparities in the innovative relationship with the retailer. Brand owners tend to be very advanced and active in sustainable innovation, meaning that their communication with retailers consists of sharing updates and trying to understand the retailer's perspective. In this case, the brand owners bring the innovation.

Own brand suppliers are in very different position. Relatively short-term deals (the retailer used the commoditised example of rice) means that little can be achieved from a sustainability perspective in that time. In such cases, the retailer is more likely to be trying to help the supplier with innovation. This is more important to the supermarkets because own brand is seen as the greater risk area than products provided by brand owners. The retailer commented that "that means that branded suppliers haven't had the same pressure from us but are actually doing it because they have the same pressure from investors and consumers that we get".

As well as capital investments, managing different perspectives within the organisation is a big challenge for implementing change.

Sharing ideas between organisations is a delicate process because of the ethical issues related to using the work of others or pressuring organisations to innovate a particular way. The retailer described this as an 'artificial barrier' in that he could not pass on knowledge shared by suppliers to the supermarket's own manufacturers.

However, the packaging manufacturer contended that it is important for sustainable innovations to spread across the industry so that change can happen on the necessary scale. He described the response of competitors to them developing a new mono-material product (see example initiative – packaging manufacturer on page 29):

"We know after we launched that product, our major competitor, there was a frantic amount of activity with them in the people making the barrier materials. They didn't believe we could do it. They were in the same position that I was a few years before saying, well, this is never going to work, is it?

How are you going to make a recycle ready polypropylene retort (steam sterilisable) pouch? We drove them on to innovate and they came up with different ways of solving the problem. We can't transform the whole market - you actually need credible competition to make it sustainable. So, you know, bring on the competition because we learn from other people's innovation and what they're doing and then you can adapt from that ... we respect others' IP and hopefully people respect ours. We patent where we can."

(R&D Director, Global Packaging Manufacturer)

Therefore, competition is healthy in the sense that innovation by one business moves the whole industry forward. The packaging manufacturer also remarked that "when you prove the possible, then it's rather difficult as well for the market to say, well, we can't do it ... and once you've done that then ... I think that breaks down some barriers."

It is important for sustainable innovations to spread across the industry so that change can happen on the necessary scale.

CONCLUSION – LEARNING FROM SUSTAINABLE PACKAGING INITIATIVES

This report has investigated the nature of sustainable packaging innovation. There are two meanings to that 'nature'. One reflects our relationship with the natural environment, which is traceable to pre-history. The other meaning refers to the typical problems within sustainable innovation initiatives that businesses experience. This final concluding section summarises these points with reference to the three examples provided by our packaging and sustainability experts (see pages 28 to 30). They demonstrate the difficulty of innovation in this area as they have three contrasting outcomes. One demonstrates the successful development (that took several years) of a new packaging format. Another is also successful in terms of project outcomes, even if the innovation was not rolled out beyond the pilot stage. The third is an example of a project that had to be abandoned because of negative consumer responses.

The first chapter of the report noted that there is plenty of innovation activity happening in the UK economy. It also established that it is typically a complex process, with iterations of trial and error and many people, often dispersed, building on each other's ideas. In the retail packaging supply chain, consumers are a major driver of change. However, much of the focus of the innovation is how to achieve that change without creating an additional cost that consumers are not willing to pay. The brand owner's project to switch to a paper packaging format (page 28) had to overcome some significant cost barriers to prove its viability. This was done with shared commitment and investment to drive costs down. In each example initiative, a business case had to be made. However, sustainability and the business case are increasingly merging.

The second chapter focused on the organisational culture and capabilities needed for successful innovation. It discussed the need for organisational learning to ensure a 'sustainable mentality'. The brand owner's description of training and dissemination within the business indicates how that might be achieved.

As the example initiatives show, much of the innovation process consists of problem solving. This starts with learning what the problems are and working through them at an increasingly granular level. It is likely to require high skills levels within the business and strong communication between departments with each section having a good appreciation of the objectives and interests of others. Consequently, collaboration is a key theme of sustainable innovation. It must happen within businesses and becomes more complex the larger the organisation. It must also happen across businesses, not only because few organisations have all the necessary capabilities, but also because the required impact of sustainable innovation needs to happen on a very large scale to make a difference to the environment.

Finally, with the help of our three experts, this report has shown the importance of leadership in sustainable innovation. Each business, and presumably many others, have changed their attitude toward sustainability over a few decades, from being reactive to proactive and from an afterthought to the forefront of innovation. In addition, knowledge of coming trends is vital to guiding the process. Each expert spoke of their efforts to be aware of customer needs. For innovations to work, understanding those who implement them and use them is critical. The packaging manufacturer said that it was essential "to figure out what problem you're trying to solve". He also emphasised the importance of "beginning with the end in mind, starting with the consumer". In short, as he put it, "if you really want to do the right thing for the planet, you have to do the right thing for everybody".

SUSTAINABLE PACKAGING INNOVATION EXAMPLE INITIATIVES

THE BRAND OWNER

Goal:
To prove that a globally familiar food product could be wrapped in paper instead of plastic.

Problem:
"Initially, when we presented it, it was something like five times the cost of OPP and so that was not going to work. So, the barrier to change was high".

Innovation process:
"We continued with R&D funding because we believed that we could overcome a lot of those technical challenges and we learned a lot through other projects. So, we didn't actually start with [that product]. We started with [a couple of smaller brands]. So, we also enabled the organisation to believe that we could do this, and we also showed progression on costs and capability barrier and performance and so on."
"We did a limited launch [in a distant market], so it wasn't a full-scale launch, but a proper market test that produced a few 100,000 items. [It was a] proper launch enough to be in the marketplace for several months. While we got the consumer feedback … we put the reference, which is the plastic one, and the paper one; we asked consumers to feed back, they had two different QR codes and they gave us the feedback".

Barriers:
"There's a lot of resistance … We managed to convince the 'senior decision maker' that this would work, he was looking for a sustainability story. So, we had a willing customer who was far enough away from [home market] to be able to say yes, I'm happy to do that. But that they had a lot of pressure from his peers in the other markets saying why are you doing this? You're crazy. This this is going to put pressure on us [in home market] to do this."

Solutions:
"We got a decent R&D budget so I could actually say, 'look, we will pay for this, if it works, you pay us back. So, … you'll pay us for that investment that we've had to put onto your machine to make it run'."
"Having the customer pull is [also] a key thing".

Outcomes:
"I felt that was a huge achievement … the mindset change that we've managed to make was huge. [It is] now on record that is doable. It's accepted and acknowledged and [with a] scientific fact base behind it. Also, all the consumer understanding all the learnings in an Anglo-Saxon environment are there so it can be applied elsewhere."
"When you've already done one or two other paper innovations, suddenly suppliers wake up and they want to get on board with you".

THE PACKAGING MANUFACTURER

Goal:

To move multi-layer flexible packaging into mono-materials.

Problem:

"This was what we considered to be the hardest application to turn into a mono-material cycle ready, and in fact I didn't believe it was possible … We [thought about it] in about 2015 and we could see that the trend for going to mono-material was coming [to be recycle ready for all products]."

Innovation process:

"We looked at re-engineering [and] we knew it had to be fully polypropylene … So, then we set about just deconstructing the whole product … What barrier material you're going to use? Which is most stress resistant? So really going to base material science, how do you do that? How do you engineer your best carrier layer for your barrier material? Why doesn't it work right now? Fundamental material science.

"Piece by piece, layer by layer we then reconstructed it in a way that it did work … we had to redesign the polypropylene cement layer. We had the team who are the extrusion experts in that polymer doing that part. We had to redesign the lamination adhesives process because it had to then be something that you could reprocess in a recycling process and also had to be able to bond not just to polyester but also to polypropylene. We then had to redesign the print layers. The ink types you're using, so you're not using any substances of concern, and was not going to interfere with the barrier. So, layer by layer, we deconstructed it and then put it back together again piece by piece."

Barriers and solutions:

"A business like [ours has] the scale to do that. So, I had my barrier expert team, we have our own pilot equipment. [We could] do rapid prototyping, going from lab and design materials and scale that up. Then we have a coatings team who did the inks coatings and adhesive work. They specialised on that. We had the procurement team working on sourcing the right base films that we were buying in and then you had the conversion team that had to figure out how to laminate these materials together because polypropylene is more stretchy and you can damage an inorganic barrier much more. Right the way through from a from a base level, I think having our specialised teams was something that was absolutely essential to the success of that."

"The other key element is the connection with the customers … we knew with our big customers that they were looking for this. [We] locked in with a couple of them to help us to build the business case. If you don't have that pull to make it happen, we have to invest tens of millions to make it happen. And, actually, our customers have had to invest very heavily in redesigning their equipment."

Outcomes:

"It took us from 2015, launched the first product [around 2022] … and now we're investing in a completely new factory to make these products."

"It goes into polypropylene recycling stream. So, in the UK, you could now put it in front of store bin, around other parts of Europe that would be curb side recyclable".

THE RETAILER

Goal:
To reduce food waste by changing potato packaging.

Problem:
Potatoes have a seven-day shelf-life with existing packaging, which has partial (20%) coverage, meaning that lots of light gets onto the potatoes. This is what turns the potatoes green and starts the sprouting process. The project aimed to move to a totally covered bag.

Innovation process:
"We have to involve … the buyer, the manufacturing business, the merchandising people who put it on shelf … we have to work out the impact on manufacturing and show them that they can get value out of it. We still have to convince the buyer because they're the master of what goes on shelf really. So, they have to see the benefit of it. The merchandising people decide what shelves look like, that's what goes where."

"We went through a long process of putting it in. We showed [how other] supermarkets [had] done a very similar thing. We got 16-day shelf life. We took a huge amount of food waste out of it. We launched it."

Barriers:
"[In the first week] we got 15-20 customer complaints. They were saying … They were terrible. They were black on the inside. I wouldn't have bought them if I could have seen them properly. You're making me waste money. It ended up on the CEO, the manufacturing director, the commercial Chief commercial officer. And they said no, we can't upset customers like this. Go back to the old one. So, we went back to the old pack. Seven-day shelf life. More food waste, more complaints because they're greener. And actually, when my team dug into the complaints, [they] were about a thing called hot rot in the potato. So, it's right in the middle of the potato … you could not see that problem … the packaging had nothing to do with it. And we went the opposite way. So rather than riding it out and finding the proper answer, we just decided it was upsetting the customers too much and backed off it and went back to the old way and haven't been able to get it back through again."

Solutions:
It is possible that better communication could have improved consumer understanding. There are examples, such as vacuum-packed mince implemented by some supermarkets, where there was an initial drop in sales but the retailer continued with the format until sales returned to their previous level.

"I think there's an amount about being brave to take that decision and being brave to stand by that decision because it's the right one. So, maybe there's something about the process of how we manage the roll out of any innovation."

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