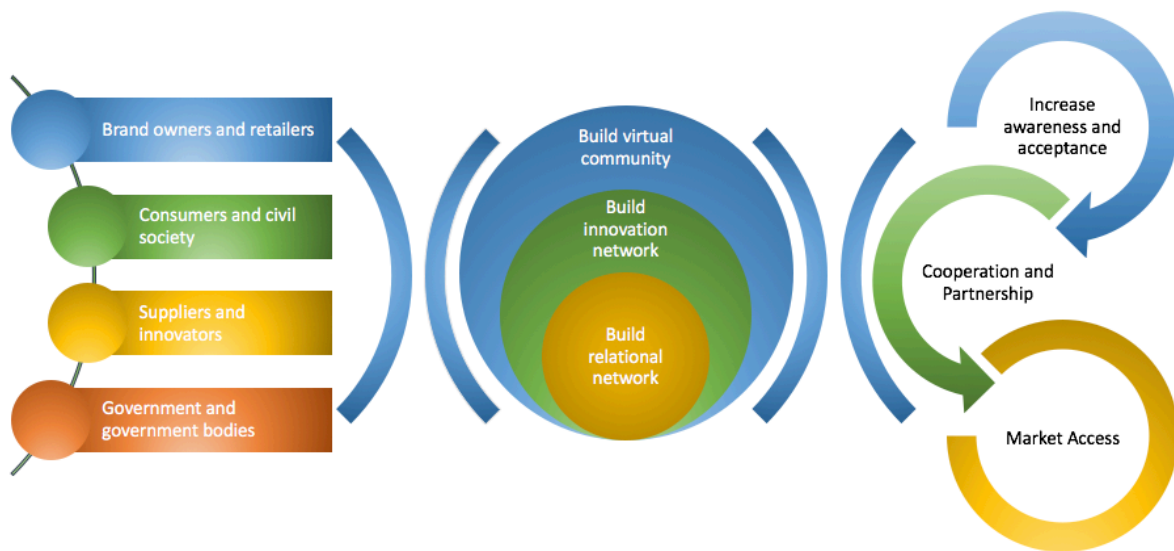


National Policy Statement on the Bioeconomy Submission by UCD Centre for Business and Society (CeBaS)



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EXECUTIVE SUMMARY

A national policy on the bioeconomy would have a significant impact and we advise government to:

Develop an ambitious national policy framework for the Irish bioeconomy that follows the European lead on the bioeconomy and highlights and encourages sources of Irish competitive advantage.

Government will be key in providing clear and effective policy, infrastructure support, incentives to key stakeholders to adopt bio-based alternatives, and investment to create collaborative platforms encouraging the use of bio-based materials and products.

We advise actions in the policy focused on collaboration between key stakeholders and bioeconomy value chain actors. Collaboration will be key to Ireland's success in building a competitive, successful bioeconomy harnessing Ireland's strengths. These actions include:

- Investigating the current decisions and actions of key stakeholders in the bioeconomy:
 - government, government bodies and local authorities
 - suppliers, innovators and processors
 - and especially brand owners, retailers, Irish consumers, civil society organisations.

Consumers, civil society groups, retailers and brand owners are key to the acceptance of materials and products and these groups must be targeted and motivated to become aware of bio-based materials and products and their benefits and for them to demand these materials and products.

- Helping to establish and support multiple collaborative platforms in order to provide a foundation for bioeconomy knowledge and innovation exchange. These should include:
 - Relational networks (workshops and conferences) where key stakeholders (brand owners, retailers, consumer groups and other civil society groups) are incentivised and encouraged to attend to give their insights and advice to established bioeconomy actors. Additionally, relational platforms where innovators can showcase innovations and benefits of their innovations to key stakeholders will encourage market access of these products.
 - Creating and managing the interaction of a virtual community to allow the momentum generated from workshops and conferences to build and to encourage cross-value chain interaction for solutions, innovations and market access.
 - Provide a risk mitigation platform in order for key stakeholders to spread the risk of innovating across multiple organisations, again incentivising the involvement of key stakeholders including government to understand the needs and challenges of the sector.
 - If possible, provide marketplaces for both bio-based innovations and to match 'waste' and side stream resources with feedstock and resource input needs.

NATIONAL POLICY IMPACT ON IDENTIFIED VALUE CHAINS

It is clear that policy is a direct pressure and motivation for multiple societal stakeholders especially when the area is new and emerging. It is imperative that the Irish government take the lead in establishing the key priorities and regulating to incentivise stakeholders while also providing investment and infrastructure to motivate stakeholders.

NATIONAL POLICY SUPPORTING DEVELOPMENT

The national policy statement should include specific actions for regulation, infrastructure, investment and incentivisation. Due to the cross-sectoral nature of the bioeconomy, we are at the beginning of an innovation cycle with inherent risk. To ensure that innovation occurs this must be managed carefully. Research shows that open innovation through collaboration, not just within value chains but across value chains and their stakeholders, is key to achieving successful outcomes. Innovations can be heightened with focus, management and investment. This has to happen both at a relationship level, with opportunity for face-to-face meetings and workshop and through a virtual presence.

Government Impact on Value Chains

Government and local authorities provide the foundation and support for successful value chains. The support, or lack of support, from government has a unique impact. From the power governments have in purchasing, to the mechanisms available to government for incentivising, coercing or punishing, governments wield enormous power in the value chain. Government is, therefore, a key stakeholder in sustainable bio-based product value chains and can impact these chains in a number of ways.

Government policy and legislation around environmental products and waste plays an important role in modifying behaviours in value chains. For instance, the California Transparency in Supply Chain Act 2010 and the UK Modern Slavery Act 2015, both relating to forced and slave labour in the supply chain, and the Dodd Frank Act 2010 section 1502 relating to conflict minerals supply, have changed decisions and actions across value chains¹. Additionally, The UN sustainable development goals assert the responsibility of companies towards human and environmental rights in their own operations and in their business relationships.

Governments, government bodies and local authorities are big customers for goods and services, spending between 16-25% of GDP in OECD countries, and as such, have the power to influence supply markets². Governments in different countries have used their purchasing power to implement sustainable public procurement policy buying sustainable products and services and influencing emerging markets^{3 4}.

In addition to choosing to buy sustainably, government can also support suppliers that innovate in developing sustainable bio-based products. SMEs tend to be the locus of innovation and governments often have SME and 'Procuring Innovation' agendas to incentivise and advocate buying from SMEs, supporting product innovation and the local economy. They can hold 'meet the buyer' events, and look at ways contracts are 'bundled', dividing them into smaller lots so that SMEs can bid. They can extend the buying criteria and specification of products and services to encourage the purchase of sustainable bio-based products. They also have a valuable communication role, making it clear across local authorities and their suppliers

that they are supportive of sustainable products, services and new product development⁴. Governments and local authorities can therefore introduce policy and legislation and provide infrastructure and procurement processes that support sustainable bio-based products. Reports state governments adopt a range behaviours to influence the development of the bioeconomy from public procurement and legislation to incentive systems and infrastructure⁵.

STIMULATING MARKET DEMAND FOR BIOECONOMY PRODUCTS

Key to achieving a thriving bioeconomy and stimulating market demand is connecting the different value chain actors and stakeholders across bio-based networks⁶, for example those who are creating new sustainable bio-based materials and/or products and those who will sell and use these products. Innovators need to understand the requirements of the market, especially the brand owners and retailers who will sell the products. It is also imperative to gain awareness and acceptance from consumers in order to drive demand for sustainable bio-based products⁷.

However, a gap in our knowledge, and in our practice, is effectively connecting stakeholders and value chain actors to enable the change from fossil-fuel reliance to bio-based alternatives. Retailers and brand owners, in particular, are driven to disclose the sustainability of their products, materials and supply chains⁸ and sustainable bio-based products can be part of that solution.

Due to its emerging status, the bioeconomy has many inherent risks and uncertainties. Consumers are unaware of sustainable bio-based products and retailers are not prepared to pay a premium for sustainable bio-based products and want a win-win of price, quality and performance⁹. While at the same time, governments and local authorities must grapple with the demands of their citizens and making their locations attractive by regulating, incentivising and providing adequate infrastructure for products and services that will impact their communities¹⁰. Additionally, current market logic does not factor externalities, such as greenhouse-gas emissions and lack of biodegradability, into prices. Understanding the motivations, behaviours and actions of stakeholders is, therefore, key to understanding and reducing risks and uncertainty and creating opportunities for bio-based value chains.

We need to understand the motivations of the different stakeholders in this emerging economy. Different stakeholders give a more nuanced and realistic picture of the dynamics of value chains¹¹ and stakeholder consultation and cooperation is imperative for developing sustainable solutions¹². Figure 1, of possible actions, is given below. Moving from understanding different stakeholders through to building networks and the outcomes of those networks.

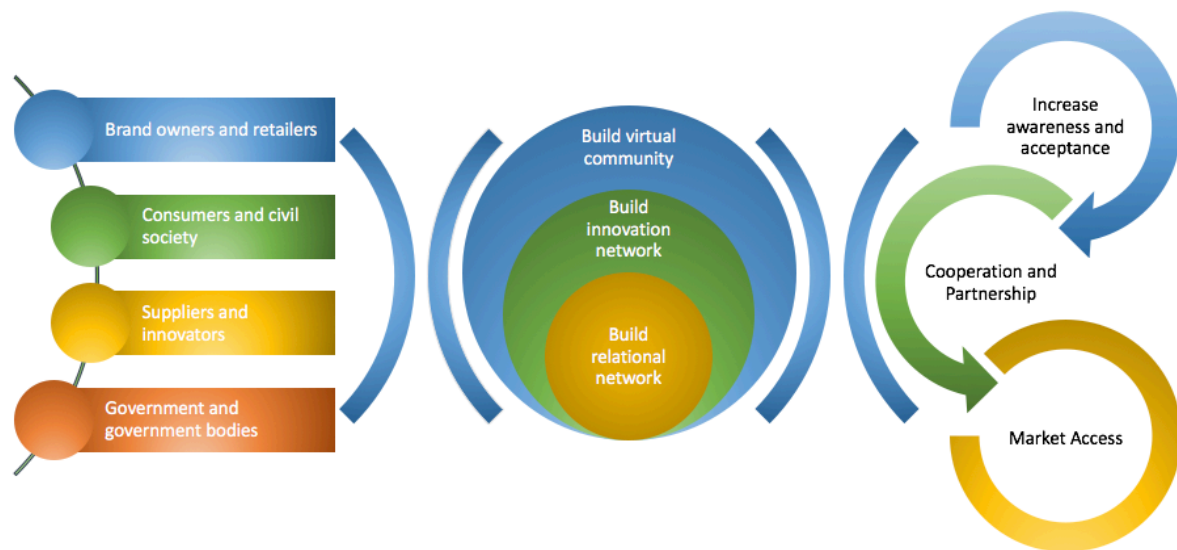


Figure 1 Possible Actions from the National Policy Framework

UNDERSTANDING THE DECISIONS AND ACTIONS OF KEY STAKEHOLDERS

Understanding Consumers

Consumer preferences are changing as the discourse on environmental impact changes to focus on health, inclusion, societal issues, the impact now and on future generations. This is especially so of the millennial generation, who's consumer habits will be markedly different to their predecessors.

Current research shows that the power of mass consumer demands is central to changing behaviours in value chains. When coupled with passionate and dedicated civil society organisations and media coverage, consumers can become an unstoppable force for change¹³. To understand motivations and pressures in bio-based value chains, it is imperative to examine consumer and civil society awareness and acceptance of bio-based products. There has been considerable research conducted to date on consumer acceptance of products deemed to be beneficial to the natural environment. These have varied, from research that focuses on products, which make small incremental changes, to more complete sustainable alternatives. There are three main groups to consider:

- Radical environmental consumers: those who change their lifestyle completely (e.g. voluntary simplifiers, anti-consumers, zero wasters)^{14,15}
- Incremental environmental consumers: those who engage in limited environmental purchases (e.g. recycled paper)¹⁶
- Mainstream consumers (who do not consider environmental issues when purchasing)

Currently, sustainable consumer products and lifestyles have been explored, and, in particular, the attitude-behaviour gap for sustainable consumption behaviour¹⁷ and communication strategies for sustainable products^{18, 19}. Here, the importance of long-term and learning-oriented communications, for instance through corporate transparency reports, eco-labelling and experiential learning, is recognised²⁰. A particular, and evolving, focus is the thorny issue of consuming less and consuming differently²¹ and identifying those who might be first-movers and finding ways to support them, leading to behavioural change in

other consumers²². Recently, researchers have begun to uncover how and why consumers are sustainable innovators in their use of consumer goods²³.

However, it is acknowledged that in understanding and changing consumerist consumption and lifestyles 'we have hardly scratched the surface'²⁴. We have limited understanding of what tools and techniques work in particular circumstances and how consumption innovation can drive change throughout the value chain.

Additionally, research on civil society organisations including consumer groups, non-governmental organisations (NGOs) and the media, reveals that these groups can create dramatic changes in behaviours in value chains. The accountability power of consumer groups and NGOs, who are regarded as bastions of legitimacy, and the media and social media, who have the reach and resource to investigate and disseminate information, leads to behavioural change in both consumers who modify consumption patterns and retailers who follow the demands of their customers¹. Again, this burgeoning area has examined the role of civil society in behavioural change, particularly, the push for transparency and disclosure in supply chains. However, there are calls for a much more nuanced picture of the action of civil society organisations and their impact on changes in value chain behaviour²⁵.

Bord Bia, food suppliers and food retailers of Ireland have a key role to play. Food is one of Ireland's greatest industrial strengths and we could lead the way on environmental packaging, the use of agricultural 'waste', the use of food 'waste.' Appealing to consumers through education programmes in schools, colleges and in appropriate regulation and incentive systems is key.

Understanding Retailers and Brand Owners

In many value chains, the resources and influence of retailers and brand owners are so great that their decisions and actions impact entire industries²⁶. In order to create successful value chains, persuading retailers and brand owners of the merits of materials and products and understanding their constraints, limitations and doubts is one of the most important ways to enable awareness and ensure acceptance.

Research shows that retailers and brand owners are shifting from a transactional focus to emphasising the integration of upstream and downstream activities and, increasingly, to understanding consumer behaviour²⁷ and are affecting product innovation in value chains²⁸. Additionally, retailers and brand owners are growing through organic growth and acquisition²⁹. Consolidation has resulted in lower transactions costs with resulting cost-saving potentials, synergies and greater buying power³⁰. These retailers are also 'gate-keepers' deciding what products to buy and are vital for the success or failure of new products. Thus, in order for a new product acceptance by a retailer³¹, the gatekeeper must be persuaded to stock them.

Retailers and brand owners are also at the forefront of sustainability initiatives and, in particular, corporate sustainability reporting, even influencing consumers' sustainability behaviours³². However, a growing problem for retailers and brand owners is the perception of pushing sustainability costs onto suppliers³³ and greenwashing³⁴. Anticipating the demands of stakeholders is now a major component in retailers' and brand owners' sustainability strategies³⁵. Retailers and brand owners will release sustainability information to increase

positive sentiments of customers³⁶ because they understand that positive behaviour towards stakeholders helps to create competitive advantage.³⁷ Indeed, disclosing sustainability information leads to multiple positive outcomes for companies including competitive and reputational advantage and supply chain control visibility as well as gaining customer trust³⁸. It also leads to new talent, supplier and activist-investor loyalty. Companies now highlight their environmental achievements as badges of honour.³⁹

It is essential to understand which products are accepted or ignored by retailers and brand owners and how manufacturers can persuade them of the merits of their products⁴⁰. The changing role of the retailer in sustainable supply chains warrants investigation including how they wrestle with the dilemma of reducing consumption while relying on consumption for profit and growth. Retailers and brand owners have to be incentivised to be part of the bioeconomy and be persuaded of its benefits before bio-based materials and products will become mainstream.

Government behaviour towards retailers and brand owners is key. In terms of driving the adoption of bio-based alternatives through the use of regulation and motivating changes in behaviour through infrastructure and financial incentives. The first step in this process is realising the importance of the retailers and brand owners in the innovation process and ensuring their support at workshops and conferences, so they become part of the bioeconomy discourse.

Understanding Suppliers, Innovators and Processors

Capabilities of suppliers, and the resources they possess, are key determinants of the structure of global value chains⁴¹. To understand their behaviours in the value chain, and particularly how they are able to influence retailers and brand owners⁴² is essential in understanding how to increase awareness and acceptance. In higher centrality value chains, usually with a dominant brand owner or retailer influencing the value chain, suppliers are usually small and dispersed and have to be creative in their use of influence⁴³. For suppliers to be regarded as innovative they have to be: specialised, technical competent with an unblemished reputation, provide value-added services, and embed themselves in high-trust relationships⁴⁴. In lower centrality value chains, where influence is dispersed over retailers, brand owners and high-technology, high-knowledge or unique-capability suppliers, suppliers do not have the same barriers and are usually part of a mutually-dependent relationship⁴⁵. Between these two there is a spectrum of structures where behaviours adapt to the demands of the network.

Bio-based suppliers are very different from one another, and range from very large multinational process industries, to small family-owned farms with very limited resources. Whereas, for instance, large paper and pulp companies can greatly influence value chains, SMEs can have little or no power. A number of networks, such as strategic alliances and clusters of SMEs, have been formed to help SMEs overcome these difficulties⁶. We know that SMEs, in particular, find it difficult to overcome barriers to entry in bio-based markets, citing the lack of understanding on consumer perceptions of value, collaboration in research and development and visibility of the value chain^{46 47}. It is essential to understand why and how this is happening as well as finding ways to create opportunities for SMEs and other suppliers. Government policy will be key to creating the opportunities suppliers, innovators and processors need to showcase their products and the benefits of their products.

STIMULATING DEMAND

Operating in open innovation networks reduces uncertainty for suppliers, brand owners and retailers. It allows participants to outsource parts of the innovation process to external players⁴⁸. The benefits accrued by companies engaging in open innovation include: cost efficiency compared to traditional research and development; decreased time to market or commercialisation, reduced risk and uncertainty ultimately resulting in more innovative products⁴⁹. Success factors for open innovation include network knowledge of market, law and legislation, inter-functional collaboration and innovation-oriented learning⁵⁰.

Open innovation is relevant for both high and low-technology firms with both SMEs and large companies benefitting from open innovation. However, open innovation cannot be based on the initiative of single firms. Networks of actors have to work in alliances, incorporating large and small firms across the value chain as well as universities⁵¹. Open innovation literature states that even large, established firms are unable to take on sole responsibility for the development of new products and solutions⁵². Instead it is important to form alliances and find alternative organisational forms such as crowdfunding, new business models and public-private-partnerships, in order to create and exploit successful innovations.

Cooperation between organisations is an important pre-requisite for successful innovation⁵³, it is fundamental for resource acquisition and development⁵⁴. However, there is an essential difference between general networks for task completion that are the result of resource dependence, and deliberate networks or alliances formed to further the interests of individual organisation, a network for the common good⁵⁵. Cooperation and partnership in these networks goes well beyond commercial interests⁵⁶ and is seen as imperative to realising strategic innovations⁵⁷.

Trust between the members in these networks is the basis for successful cooperation and partnerships^{58 59}. It is evident from open innovation theory that even established, multinational firms with large resources cannot innovate on their own and must cooperate with other innovative firms and academia for successful innovation⁶⁰. This means networks are growing in importance, and trust, cooperation and partnership are central to the innovation development process⁶¹.

Relational cooperation, through workshops and face-to-face meetings, is key to developing trust and innovation^{7 8}. Relational Networks take the form of workshops, meetings and conferences. It is particularly important that civil society, government, retailer and brand owner representatives discuss and give advice on the challenges, trends and developments in the bioeconomy and related markets in order for suppliers to understand the needs of these different stakeholders in order to change, edit or target innovations appropriately. It is also important that innovative suppliers can showcase their products.

Technology plays an important and growing role in promoting cooperation and the development of innovation, by allowing instant access to information and encouraging communication⁶². Using technology platforms for collaboration can become a virtuous cycle allowing more collaboration and the ability to shift resources to the most effective tasks⁶³. However, it is clear, that technologies, and platforms, have to be complementary with a single,

easy to use interface to avoid frustration and wasted resources. If there are multiple platforms and interfaces this can be a barrier to collaboration leading to frustration and wasted resources⁶².

Cooperation should be understood as a system where the structure and strategy of the partnership is vital, where issues such as the alignment of organisational policies, processes and systems, become important. Using a more structured approach for managing partnerships is important, especially when collaborating with SMEs and also non-traditional chain members such as government bodies and non-governmental organisations⁶⁴.

Establishing a community and cooperation between stakeholders will allow greater market access for sustainable bio-based products. From a bio-based products perspective, there are different aspects to market access. First, how do SMEs gain access to markets⁶⁵: as suppliers to producers, brand owners, retailers or directly to consumers. Second, is the acceptance and awareness of bio-based products, services and solutions regardless of who the innovator is or if the innovation is a collaborative network effort⁶⁶. Products must have proven 'green' credentials, established proof of concept and be scalable⁶⁷. Then they receive attention and promotion to gain market access and share⁶⁸.

Virtual markets to match waste or side streams with buyers of feedstock materials could also have a number of significant impacts: providing a platform for companies using circular economy principles and allowing the valorisation of under-utilised or under-valued resources⁶⁹
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KEY ISSUES FOR NATIONAL POLICY STATEMENT

The key issue for increasing demand and therefore essential for the national policy framework is collaboration and providing the appropriate foundation for this collaboration to occur. The key to this is providing opportunities for stakeholders to meet, to discuss and to innovate together.

The workshop that the Department of the Taoiseach and Teagasc ran was an excellent introduction to the type of multi-stakeholder collaborative platform that is pivotal to innovating for the bioeconomy. These should have a particular focus. Brand owners and retailers, along with consumers, community group and civil society, will be key to the awareness and acceptance of bio-based materials and products and should be prominent within these workshops. Incentivising their participation is key.

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