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Incumbent entry modes and entry timing in sustainable niches: The plant-based protein transition in the United States, Netherlands, and United Kingdom

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ABSTRACT

While literature on sustainability transitions has generally portrayed incumbent firms as reluctant to engage in sustainable niches and primarily employing strategies that aim to limit niche growth, practice offers many examples that contradict this. In this paper, we mobilize insights from organizational literature, and particularly the concept of *entry modes* and *entry timing* from the international business and strategy literature, to investigate incumbent firms' engagement in sustainable niches through the introduction of new products, collaborative efforts with new entrants, the introduction of new brands, mergers & acquisitions, and investments. We focus on entry modes of incumbent firms, including food firms, meat processors, retailers, and food service firms, in meat substitute markets in the United States (US), the Netherlands (NL), and the United Kingdom (UK). We identify distinct entry mode patterns for the four firm types and that the entry modes of different types of incumbent firms vary in their timing and commitment towards the plant-based meat substitute niche. Contrary to the general consensus stemming from previous literature on incumbent engagement in transitions, our case shows that incumbents proactively engaged with niche products incentivized by economic opportunities stemming from changing consumption patterns, which preceded any regulatory action.

1. Introduction

Addressing contemporary environmental problems, such as climate change, food security, and biodiversity loss, requires radical shifts in socio-technical systems, including shifts in the electricity, heat, mobility, and agro-food sector. Sustainability transitions literature has provided valuable insights into such systemic transformations (Köhler et al., 2019; Savin and van den Bergh, 2021). According to this literature, change processes start in niches (i.e., protected spaces which support novel technologies) in which pioneering actors work largely independent from established incumbent firms to introduce radical technologies and products (Penna and Geels, 2012). These new technologies and products remain in niches for a relatively long-time while experimentation and learning takes place (Bento and Wilson, 2016; Smith and Raven, 2012). Incumbent firms initially resist radical niche innovations (Geels, 2014; Penna and Geels, 2012; Roberts et al., 2018). The reorientation of incumbents only occurs after a mixture of exogenous pressures

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which include the introduction of regulations, such as industry standards, and changing consumer preferences (Geels and Penna, 2015).

Nevertheless, sustainability transition scholars have recently criticized the prevailing conceptualization of incumbent actors as resisting change and delaying sustainability transitions (Ampe et al., 2021; Sovacool et al., 2020; Turnheim and Sovacool, 2020). For instance, Turnheim and Sovacool (2020) stress that incumbents can employ a wide range of positioning strategies when starting to engage with niche technologies and products, such as diversification activities, and call for more attention to the potentially enabling role of incumbents in transitions. Other studies illustrate that incumbents can contribute to accelerating scaling-up and diffusion processes of new technologies and products (Berggren et al., 2015; Wadin et al., 2017). Yet, the various modes that incumbents can use to engage in transitions are not well understood.

Regarding the question when engagement happens, transitions literature to date has mainly focused on the transformative potential of pioneering actors and their efforts to introduce radical innovations in the ‘formative phase’ of a transition (Geels, 2021; Markard et al., 2020). However, scholars have highlighted the increasing importance of further investigating the ‘diffusion phase’ of transitions, which then often also includes the strategic reorientation of incumbent firms (Geels, 2021; Markard et al., 2020). The diffusion phase of transitions is critical as innovations exhibit far more traction with regards to consumer demand and societal needs, and change processes can transpire (Markard et al., 2020). Incumbent behavior can change as a response to such accelerated innovation processes, which give way to new economic opportunities and thus, strategic reorientation can occur (Turnheim and Sovacool, 2020).

Finally, studies on incumbent behavior in sustainability transitions have been to a large degree limited to producing and manufacturing industries (Geels and Penna, 2015). Sustainability transition scholars now recognize that it is important to study the multiple incumbent actor types which make up industry regimes in transitions (Sovacool et al., 2020; Turnheim and Sovacool, 2020; Mori, 2021). In terms of firm types, it is useful to recognize the multiplicity of actors across supply chains. Producers, retailers, and other supply chain actors are diverse types of organizations involved in achieving the upscaling conditions of innovations and the engagement of firms across supply chains is crucial for promoting the adoption of new technologies and products, and for ultimately achieving the embedding of innovations in societies (Lambin et al., 2020; Mylan et al., 2019).

To advance knowledge on questions related to entry timing and entry modes, the micro-dynamics of incumbent behavior in transitions, authors have recently suggested to strengthen links between transition research and organizational literature (e.g., Geels, 2021). Although different streams can be distinguished (e.g., van Mossel et al., 2018), this literature generally confirms that incumbents are often reluctant to engage early with new products and markets (Christensen, 1997; Dosi, 1982; Nelson and Winter, 1982). The strategy literature, however, recognizes that incumbents may ‘move first’ when incentives, such as opportunities to pre-empt market space and gain control over an emerging industry are given (Lieberman and Montgomery, 1988; Suarez and Lanzolla, 2007). Further, studies on business model innovation find that incumbent firms are important for the transformation of markets towards sustainability because they often engage with new entrants by employing different strategies ranging from participating in alliances with new entrants, mimicking innovative business models or availing in friendly or hostile take-overs (Pereira et al., 2022; Schaltegger et al., 2016). Such strategies can contribute to the mainstreaming of innovation processes, including diffusion in mass markets (Hockerts and Wüstenhagen, 2010; Pereira et al., 2022; Schaltegger et al., 2016). Therefore, exploring these strategies is important for building insights into an alternative and potentially more enabling role of incumbents in sustainability transitions.

In this paper, we mobilize insights from the organizational literature and specifically, the concepts of *entry timing* and *entry modes* to investigate strategies through which incumbent firms engage in sustainable niches (see e.g., Ahsan & Musteen, 2011; Dong et al., 2008). We define incumbents as those organizations with ‘vested’ interests in the meat regime and whose routines, capabilities, and procedures are deeply entrenched in meat production and consumption practices. We examine the plant-based protein niche and study four different types of incumbent firms from the meat-based regime (retailers, meat processors, food firms, and food service) in order to contribute to a more nuanced view of the transient nature of the reorientation depth of different incumbent actors. We conduct a qualitative event-history analysis based on 627 events from the Nexis Uni database. Empirically, we focus on engagement strategies in meat substitute markets in the United States (US), the Netherlands, and the United Kingdom (UK) as countries in which the niche is already developed and incumbents visibly engage.

As a response to environmental concerns and the potential health implications of the production and consumption of livestock products, a wide variety of plant-based meat substitute products have recently been introduced to these markets. This growing trend towards meat substitutes is such that these products are at the point of breaking into mainstream food consumption. Therefore, scholars increasingly recognize the diffusion of plant-based meat substitutes as contributing to a transition to plant-based diets (Herrero et al., 2020; Mylan et al., 2019; Bulah et al., 2023). In contrast to other sustainability transitions, such as transitions in the electricity and mobility sector, incumbents have not shown significant resistance, but have been important in transforming the meat substitute sector into an established market segment (Lonkila and Kaljonen, 2022; Tziva et al., 2020). In addition, recently the diversification towards plant-based protein products has become a key component of strategies of large food firms and meat processors, as well as incumbents across the supply chain, such as retailers and food service firms (FAIRR, 2020). Therefore, the protein transition is a suitable case for exploring incumbent entry modes which promises to offer alternative explanations to dominant models of incumbent behavior in sustainability transitions. The research questions of this paper are as follows:

What are the different entry modes incumbent firms across the supply chain of plant-based meat substitutes employ to enter sustainable niches?

What are the entry timing dynamics of incumbent engagement in the protein transition?

The remainder of the article is structured as follows. Section 2 delineates the theoretical background underpinning our analysis. Section 3 discusses the methodology used to conduct our research. Section 4 describes the results and section 5 is the discussion and

conclusions.

2. Theoretical Background

2.1. Incumbent entry modes and entry timing in the transitions literature

Literature on sustainability transitions has provided insights into the behavior of established or incumbent firms as a response to radical innovation (Bergek et al., 2013; Penna and Geels, 2012; Steen and Weaver, 2017; Turnheim and Geels, 2019; Van Mossel et al., 2018). Within this literature, incumbents are predominantly seen as supporters of established technological trajectories and advocates of incremental innovation as means to address societal problems, while they remain reluctant to engage in radical innovation (Geels and Penna, 2015; Penna and Geels, 2012). This is because incumbents are “locked-in” to the existing industry regime which comprises existing technical capabilities and routines, industry beliefs, mind-sets, identity, and formal policies and regulations (Geels, 2014). Radical innovation involves risk and significant costs, while at the same time threatening sunk investments (Klitkou et al., 2015). Moreover, incumbent firms have limited internal incentives to address societal problems because these are related to common goods. Thus, authors have often argued that coercive external pressures, for instance the introduction of new industry standards, and/or changing consumer preferences which comprise economic opportunities are required for radical innovations to break through (Bento and Wilson, 2016; Elzen et al., 2011; Geels and Penna, 2015).

Nonetheless, the literature on sustainability transitions sees incumbents as critical to accelerating transitions. Incumbents have the power to steer change in socio-technical transitions given aspects such as their massive market power, political leverage, and capabilities, which has also frequently been named as argument for the need to further understand incumbent engagement (Geels, 2021; Kattirtzi et al., 2021; Magnusson and Werner, 2022; Ramanauskaitė, 2020; Van Mossel et al., 2018).

Transitions literature has examined how and why incumbents reorient towards radical innovation (Geels and Penna, 2015; Penna and Geels, 2012; Smink et al., 2015; Wesseling et al., 2015). Holistically, studies have shown that incumbent engagement (e.g., investments in a niche, R&D efforts, or the launch of a novel niche product) is largely influenced by civil society, policies and consumers where exogenous pressures coevolve to ultimately motivate incumbent engagement in new industries.

Most generally, in the literature on transitions incumbent *entry timing* is linked to a phase model in which incumbent engagement follows a stepwise procedure. In these models, during niche emergence, incumbents lobby against novel technologies and work to denounce their market readiness. In later phases, incumbent engagement is largely provoked by government coercion. Several studies have found that it is not until governments impose strict regulations which aid the development of new technologies and industries that incumbents move-into niches (Geels and Penna, 2015; Wesseling et al., 2015; Smink et al., 2015; Kungl, 2015). For example, drawing on institutional isomorphism, Bohnsack et al. (2020) make the argument that coercive pressures such as regulation triggers first-movers within a group of incumbents to invest in sustainable product innovation which then gives rise to mimetic and normative pressures for followers. The authors highlight the importance of these ‘first-movers’ in exerting divergent behavior which legitimizes the new niche and creates competitive pressures within the industry to ‘jump on the bandwagon’ (Bohnsack et al., 2020).

In a similar light, Wesseling et al. (2015) reinforce the importance of government coercion for triggering incumbent engagement in sustainability transitions. The authors find that in the automobile industry, incumbent car manufacturers were hesitant to manufacture and invest in novel sustainable vehicles i.e., Zero Emission Vehicles (ZEV) until California policymakers introduced a strict ZEV mandate. Moreover, only after the appearance of the mandate, incumbent car manufacturers were seen converting a small fraction of their fleet to ZEVs. The study further highlights an interesting point that Turnheim and Sovacool (2020) have labeled ‘continuity in spite of change’, even though the car manufacturers in this case experimented with the new technology shortly after its appearance on the market, they also continued to lobby against it and eventually deserted their attempts to engage due to reputational reasons and market unattractiveness (Wesseling et al. 2015).

Also, studies on transitions in the energy sector have reinforced these points. For example, Smink et al. (2015) show that incumbents did not conduct research and produce biofuels until after the appearance of the 2003 EU (European Union) Biofuel Directive which made the blending of biofuels obligatory in the fossil fuel and international commodity industry. Even thereafter, the authors highlight incumbents’ use of institutional strategies to keep the biofuel market as small as possible (Smink et al., 2015). For the transition towards renewable energy in the German energy sector, Kungl (2015) show that incumbents were strongly influenced by the appearance of government interventions such as the 1998 revision of the Energy Act and the Renewable Energy Sources Act. The authors highlight that it took over a decade for large incumbent energy companies to stop opposing renewables and to engage (e.g., through investments) with novel energy technologies (Kungl, 2015).

Overall, the literature on incumbent entry and entry timing in transitions literature describes incumbents as followers as opposed to first movers in sustainable niches (Penna and Geels, 2012; Smink et al., 2015; Wesseling et al., 2015; Geels and Penna, 2015). Moreover, current literature posits that incumbents only engage when exogenous pressures persuade them to follow into niches. Entry timing and engagement is thus regulated by the introduction of external mechanisms which coerce incumbents to engage in novel technologies (Penna and Geels, 2012; Geels and Penna, 2015; Smink et al., 2015; Wesseling et al., 2015).

Yet, there are also a few recent studies on entry timing and incumbent engagement that have shown incumbents can ‘go first’ and move-in to niches without coercion. For example, Turnheim and Geels (2019) make the argument that incumbents can act as first-movers and accelerators of transitions when they do not operate in the threatened regime and instead are a part of ‘neighboring regimes’. Therefore, because these incumbents are not “locked-in” to the dominant regime and do not enter into direct competition with niche technologies, they can more easily diversify and pursue them. Furthermore, the scholars highlight that, as opposed to most studies in the transport and energy sector, in the emergence of common trams in France incumbents have been driving the

development of the industry (Turnheim and Geels, 2019). To summarize, the current state of the literature still leaves many questions about incumbent engagement in sustainability transitions unaddressed:

Firstly, the dominant ‘phase-model’ views of incumbent engagement with niche technologies cannot explain why some incumbents move-in to sustainable niches more quickly than others and why some act as enablers of change while others do not. Existing models have focused largely on the ‘formative’ phase of sustainability transitions where novel technologies require monetary, technological, and institutional mechanisms for protection (Geels, 2021; Markard et al., 2020). In the diffusion phase, however, technologies are increasingly intertwined with common practices, routines, and wider society which may result in incumbents no longer resisting but trying to reorient (Geels, 2021; Markard et al., 2020). Thus, scholars highlight the importance of a deeper understanding of incumbent entry timing in this phase as novel sustainable technologies exhibit far more traction with regards to consumer demand, institutional readiness, and regime engagement (Geels, 2021; Markard et al., 2020).

Secondly, with regards to the group of incumbent firms, dominant models and explanations do not distinguish sufficiently between different types of incumbents. Thus, it remains open whether a firm’s position in the value chain influences its decision to engage in a niche (Steen and Weaver, 2017). Existing models treat incumbents as a ‘monolithic block’ in which incumbents are holistically seen as defensive regime actors. Thus, the literature on incumbents in sustainability transitions has called for more insight into ‘pluralizing’ incumbencies (Turnheim and Sovacool, 2020) and the heterogeneity of incumbent actors (Berggren et al., 2015; Magnusson and Werner, 2022; Steen and Weaver, 2017; Van Mossel et al., 2018).

Thirdly, these existing studies of incumbents in transitions do not examine in-depth the formats incumbents use to enter sustainable niches. The manner in which incumbents engage e.g., through investments or new products, however, seems crucial to understand reorientation depth and the potential of incumbent engagement for accelerating transitions overall.

With this study, we thus aim to strengthen the literature on incumbent engagement in transitions by examining incumbent entry timing dynamics, entry modes, and type of incumbent organization. We link to concepts in the organizational literature, which has been increasingly recognized as fruitful tool for understanding why incumbent firms may exert heterogenous behavior when engaging in transitions. Scholars have already started to introduce explanations from organizational and strategy literature to transition studies in order to examine micro-level explanations of incumbent behavior (e.g., Planko et al., 2016, Van Mossel et al., 2018; Werner et al., 2022). These scholars have highlighted the importance of these literatures to explain which factors (exogenous and firm-specific e.g., capabilities, competitive advantage) may cause heterogenous behavior by incumbents in transitions (Van Mossel et al., 2018; Mori, 2021).

2.2. Incumbent entry modes and entry timing in the organizational literature

Organizational literature has long recognized that organizations tend to resist change, and especially the strategy literature has established that incumbent firms have little incentive to engage early on with new products and markets. This is not only due to sunk costs and existing resource and capability configurations, but also because incumbents meet behavioral barriers (routines, procedures) and cultural-cognitive barriers (industry mindset, core beliefs) that keep them from sensing and seizing radical innovation (Teece et al., 1997; Christensen, 1997; Dosi, 1982; Nelson and Winter, 1982). However, this literature also portrays a mixed picture, as it recognizes why some incumbent firms may deviate from this pattern and engage early in new markets.

A key factor in explaining early incumbent response is the possibility to reap first-mover and follower advantages (Lieberman and Montgomery, 1988; Suarez and Lanzolla, 2007). For example, the literature on first mover and follower advantages holds that pioneering firms can achieve first-mover advantages in terms of economic profit. In a growing market, incumbents may move into niches before new entry becomes profitable, to establish their position in the market space (Lieberman and Montgomery, 1988). Also, firms may choose to quickly follow in order to reap additional benefits as first-movers have often already made large investments in the new technology, which reduces uncertainty. In such conditions, fast followers can benefit from a rapid growth phase, in which they use their capabilities e.g., distribution channels and marketing tactics, to gain a foothold in the market (Lieberman and Montgomery, 1988).

Apart from the classic work on the strategic timing of responses, there is also more recent work that has considered such dynamics in the specific context of sustainable innovation. Such studies have, for instance, shown that both newcomers and incumbents are important for the sustainable transformation of markets (e.g., Hockerts and Wüstenhagen, 2010; Schaltegger et al., 2016) and that incumbents often copy business models of newcomers when they enter sustainable niches.

On the other hand, studies also make the claim that incumbents and newcomers are so fundamentally different that incumbents cannot simply copy new business models that emerge in sustainable niches. Scholars have used different terminology to describe the formats incumbents can use to become active. For instance, in their work on the co-evolution of business models of sustainable start-ups and incumbents, Schaltegger et al. (2016) posit that incumbents can use a repertoire of four basic strategies to engage in sustainable markets: growth, replication, mimicry and/or mergence. They conceptualize *growth* as entry modes which aim to scale sustainable business models that are self-developed. Instead, *replication* refers to the adoption of pioneering business models and technologies, individually or through collaboration and partnerships. *Mimicry* refers to the copying of sustainability pioneers and to the modification of their business model in order to fit existing business models. Finally, *mergence* refers to the integration of sustainable niche players into organizations through e.g., acquisitions, friendly or hostile take-overs. Similar to the conceptualization offered by Schaltegger et al. (2016), Pereira et al. (2021) suggests incumbents can either add novel activities to their business model, link activities in novel ways, or change the actors involved in performing activities. They conceptualize the modes by which incumbents can enter into sustainable niches as *mergers and acquisitions* (M&As), *joint ventures* (JVs), and *strategic alliances* (SAs).

This directs attention to the entry modes that incumbents chose to engage in sustainable niches. In the international business

literature, *entry modes* is a common concept used to refer to the international expansion of firms. Entry modes are defined as e.g., exports, contractual modes, joint ventures, and wholly owned operations (Werner, 2002). Generally, the international business literature conceptualizes firms' engagement in foreign markets as a step-wise process, whereby entry modes can differ in terms of 'commitment' (Ferreira and Serra, 2008; Mori, 2021; Dong et al., 2008; Petersen and Pedersen, 1999). In order to reduce uncertainty, firms may begin their engagement with low-commitment modes, such as exporting goods, and eventually move to higher-commitment entry modes, such as wholly owned subsidiaries (Ferreira and Serra, 2008; Ahsan and Musteen, 2011). Herein, decisions are typically seen as a trade-off between the two dimensions 'control' and 'risk'.

On the one hand, firms may refrain from higher modes of commitment as they typically entail higher risks. For instance, wholly owned subsidiaries require investments and entail higher brand exposure. On the other hand, firms' quest for control is a factor motivating entry mode choice. Because firms seek to control new markets and without control cannot, for example, coordinate their activities internationally, they may engage in high-commitment entry modes despite the presence of risks (Dong et al., 2008). Apart from these basic decision parameters, the literature on entry mode choice has suggested that firms may diverge from a step-wise manner of engagement by deploying 'mode additions' and 'within-mode changes'. Within-mode changes refer to expanding the current activities, but not changing the overarching entry mode. Mode additions refer to engaging in a new entry mode yet also continuing to deploy the current mode of entry (Petersen and Pedersen (1999)). In short, this literature makes the point that entry mode choice is not static and can also be conceived as a portfolio of activities that evolve over time. In the following, we use the concept of *entry mode* not to refer to activities of firms entering foreign markets, but to investigate entry modes of incumbents in plant-based meat substitute markets.

2.3. Linking the firm-level to system-level perspective

Our theoretical framework is anchored in the combination of firm- and system- level perspectives. We posit that the engagement of incumbents in niches, reflected by their *entry timing* and *entry mode*, constitutes a strong signal of regime change. Transitions literature suggests several signals that indicate niche expansion and regime destabilization e.g., the support of key actors and increased market share of an innovation. For instance, Geels and Schot (2007) suggest that the stabilization in a dominant design, the fact that powerful actors join the support network, improvements in an innovation's performance, price reductions, and the use in market niches that account for ca. 5% of market share can serve as indicators. However, the authors also note that it is not entirely objective if a niche is 'fully developed' (Geels and Schot, 2007, p. 405).

In line with this, Karltorp and Sandén (2012) propose that a key indication of regime change is when incumbent firms diverge their activities from established sectors and diversify into new industries. Generally, there is consensus amongst transition scholars that a key indicator of regime change is when key actors support the development of a new industry and use their economic means, organizational capabilities, and political capital to further contribute to industry development and help overcome resistance from other actor groups (Steen and Weaver, 2017; Geels and Schot, 2007; Karltorp and Sandén, 2012). This is basically a process of mainstreaming in which an innovation becomes fully able to compete in the mainstream market and directly challenges the established dominant regime (Geels and Schot, 2007).

Within the group of incumbents, entry of one firm into a new industry can trigger bandwagon effects among firms-in-an-industry (Bohnsack et al., 2020). Bandwagon effects entail that firms in an industry converge in their strategic actions and sustainability practices due to isomorphic pressures, and especially mimetic and normative pressures to 'follow-the-leader' and not miss the bandwagon (Bohnsack et al., 2020). In other words, competitive pressures and the desire to catch up with competitors. Importantly, this can even occur if the motives for rivals' strategic moves, or future potential of an innovation are unclear to a company. Firms may just invest as they might aspire to prevent competitors from gaining undue advantage (Chen & MacMillan, 1992). With these dynamics, a critical mass builds up. It is worthwhile to note that the empirical studies on sustainability transitions such as the work of Geels and Schot (2007) include the change of the regime in transitions by "accumulation" in niches. We therefore posit that herd behavior and bandwagon dynamics among incumbents signal accumulation.

Finally, revisiting the point that is not fully objective when a niche is developed, we posit that incumbents' discursive power already has a significant effect on the growth of a niche and therefore needs to be considered. While the actual investments and market shares of an innovation might only account for a limited share of incumbents' overall product portfolio, first flagship projects and even strategic investments in newcomers already have a strong signaling function on the market. In the literature on transitions, actors' voicing their expectations and visions regarding the potential of a niche serves as a signaling mechanism for other actors to join in and contribute to its development (Hekkert et al., 2007; Markard and Truffer; 2008). How incumbent actors communicate about the prospects of an emerging field and their own role in this field is important because it guides meaning-making and action by other actors (Bidmon & Bohnsack, 2019). Already the discourse surrounding an innovation and announcements of plans to engage in it, has a performative effect on other actors; for instance, as strong signals for suppliers and competitors, but also users and regulators.

In summary, we propose that incumbent action (symbolic, substantial) sets in motion bandwagon effects among the firms-in-an-industry and has a strong legitimizing function for other regime actors to engage. Bandwagon effects may, in turn, be seen as an indicator for "niche accumulation". In line with this reasoning, and the literature on entry modes (e.g., Schaltegger et al., 2016; Pereira et al., 2022) introduced in 2.2.; in this study we examine incumbent entry in the form of new products and brands, but also first collaborations, acquisitions, and strategic investments of incumbent actors in new entrants.

Table 1
Code definitions for incumbent entry modes in sustainable markets and examples.

Entry mode code	Definition	Example of events coded
New product	The introduction of new product or the expanding of existing operations e.g., scaling, within an incumbent actor	Retailer Sainsbury's has trademarked a meat substitute product
Collaboration/Co-promotion	Collaborative efforts between incumbent actors and new entrants e.g., joint R&D, joint promotion of products	Retailer Jumbo introduces new entrant's Vegetarian Butcher products
New brand or product line	The introduction of new brands by incumbent actors	Meat processor Tyson establishes meat substitute brand Raised and Rooted
Merger & Acquisition (M&A)	The integration of new entrants through e.g., acquisitions, joint ventures in incumbent actors	Food firm Nestlé USA acquires new entrant Sweet Earth
Investment	Investments of incumbent actors in new entrants	Meat processor Tyson invests in new entrant Beyond Meat

3. Method

3.1. Research design and case selection

We chose to study entry modes in the plant-based meat substitute markets for two reasons. First, because meat substitutes aim to disrupt meat markets and often depict the negative impacts associated with animal products, resistance could be expected from incumbents, particularly meat processors. However, in the case of meat substitutes, incumbents have been pivotal in transforming the niche into an established segment in food markets (Tziva et al., 2020; Lonkila and Kaljonen, 2022). As this contrasts with what current theory would predict, the protein transition case could offer interesting insights into alternative explanations of incumbent behavior in transitions. Second, diversification towards plant-based protein products has become a key component of strategies of giant food firms and meat processors, such as Nestlé, Unilever and Tyson Foods (FAIRR, 2020). Other incumbents across the supply chain of meat substitutes, such as retailers and food service firms, also increasingly introduce meat substitute products in their stores and on their menus. Therefore, the protein transition case allows us to examine several instances of entry modes deployed by diverse types of incumbent firms.

We focus on incumbents embedded in multiple markets (the US, the Netherlands, and the UK). Studying multiple cases is useful for analyzing the data both within each situation and across situations (Yin, 2003) and results offer a higher potential for generalizability (Gustafsson, 2017). By exploring incumbent strategies in three of the fastest growing markets for meat substitutes globally, we focused on settings that offered a high probability of observing the phenomenon of interest. On top of this, pioneering new entrants, such as Beyond Meat, Impossible Foods, and the Vegetarian Butcher, operate in these three countries. Therefore, these markets also offer insights into the co-evolution of new entrant and incumbent entry modes.

3.2. Data collection and analysis

To identify incumbent entry modes, we conducted a qualitative event-history analysis of highly visible incumbent entries in the plant-based protein niche in the US, the Netherlands, and the UK between 1990–2020. These comprised the entry modes of incumbents amongst the largest across the supply chain (e.g., Unilever, Tesco, McDonalds), often as a response to the occurrence of new entrants (e.g., the Vegetarian Butcher, Beyond Meat, Impossible Foods). We characterized these events as 'highly visible' when they were reproduced multiple times in popular media outlets.

Empirical data for the event analysis was collected through the Nexis Uni Database. Nexis Uni is a database which collects news, legal and business information from thousands of prints and online international and national news sources (Negro et al., 2008; Negro and Hekkert, 2008). The database mainly includes events from mainstream media and therefore some less visible events may not have been included. However, it is reasonable to expect that the events in our database provide an accurate overview of highly visible, i.e., the most important, incumbent entry modes in the protein transition.

For the US and the Netherlands, we used a set of predefined keywords to search Nexis Uni. This included the terms: *meat substitutes*, *plant-based protein*, *protein transition* and *protein innovation*, to identify events across all sources in the database. For the UK case, we again used a set of predefined keywords. However, we focused primarily on three sources including the online archives of the print version of the Guardian (London) and the Times (London) and the online version of the Telegraph (telegraph.co.uk) in order to narrow down the results of the search. Generally, we used the Boolean operator "OR" to compile all available data relating to the protein transition and then removed duplicates. Moreover, specific terms were included for each country. For example, the term "plant-based meat" was used in the United States case and the term "protein transition" was used in the Netherlands case as they are common terms used to describe the shift from animal-based proteins to plant-proteins in these countries. A database was compiled which included 627 events relevant to incumbent entry modes in the three countries. The events related to 148 incumbent firms across the supply chain of meat substitutes (see Appendix 2). Firms spanned from multi-billion organizations, such as Tyson Foods, to food service firms operating in national markets, such as Febo.

To analyze the results, we employed an abductive coding method. First, concrete events reporting entry modes, such as M&As and

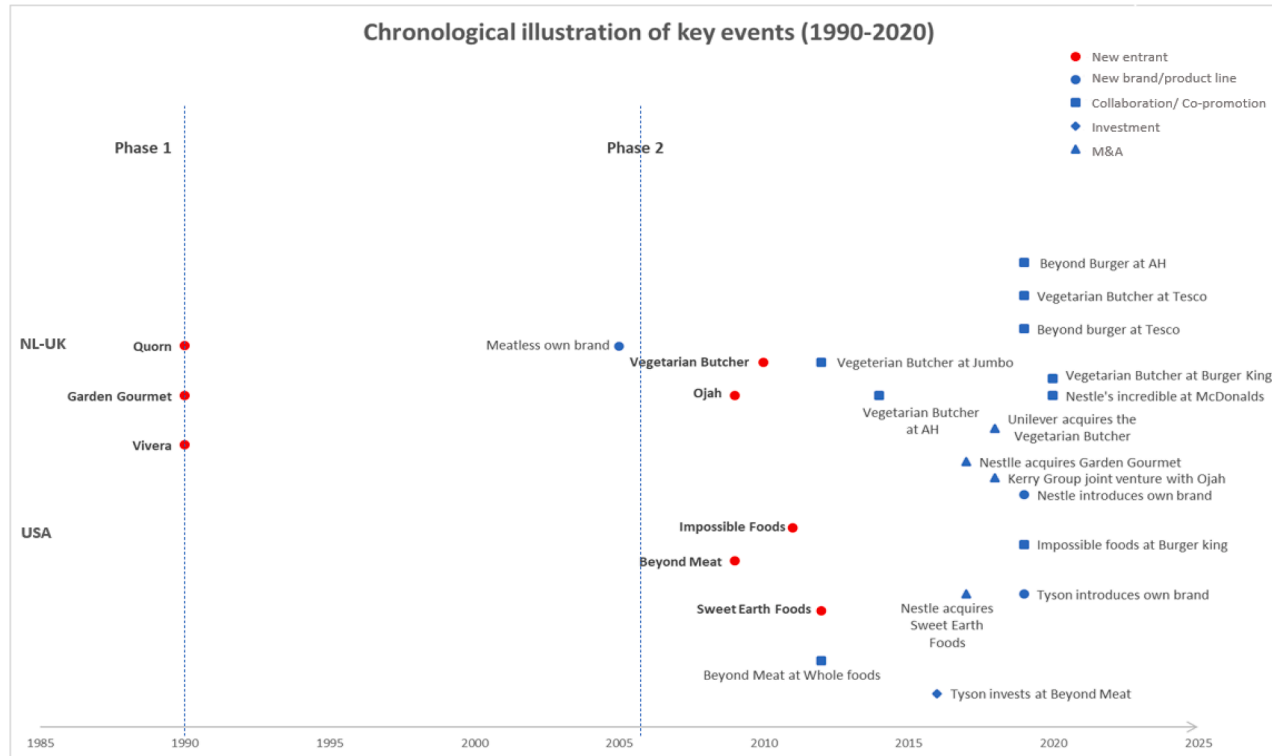


Fig. 1. Chronological illustration of key new entrant occurrences and incumbent entry modes in USA, NL and UK markets (1990-2020).

investments, were identified. Next, incumbent activities, such as the announcement of new corporate strategies, were extracted in order to provide contextual information for the cases. Events were then coded, and the different events aggregated under entry mode labels, borrowing from the terminology existing literature (see prior section) offers to describe entry modes. A set of 5 entry mode codes, exemplified in [Table 1](#), were used to code the data. Once all the events in the database were re-coded along these 5 categories a sample of the events was sent to an independent researcher to perform an intercoder-reliability check. Codes that were contested were then discussed with the researcher team, and code definitions were refined until agreement was reached.

In addition, to develop an overall understanding of the cases and explore how contextual developments affected incumbent entry modes, we also included secondary data on the appearance of new entrants on the market, important technological developments, and other trigger events for incumbent entry modes. Particularly, we drew information from [Tziva et al. \(2020\)](#) and [Bulah et al. \(2023\)](#) who already provide detailed timelines regarding the development of the protein transition, mainly in the Netherlands and the United States.

To analyze the results, we employed a process-tracing approach, which is an approach suitable for the analysis of event data that are of a temporal sequence ([Langley, 1999](#); [Brady and Collier, 2010](#)). First, to reduce the complex mass of information we analyzed the data according to the selected entry mode codes and types of incumbent actors. We chronologically ordered and counted codes, which allowed us to recognize initial patterns in the data. Concretely, we observed two distinct temporal phases of low and higher engagement of incumbents (1990-2006, 2006-2020). Therefore, we decomposed the information into two successive “temporal phases” in order to break down patterns and connections between entry modes.

After the initial analysis we chose to include four types of incumbent actors in our results: 1. food firms, 2. meat processors, 3. retailers, 4. food service. Firstly, food firms, defined as food businesses dedicated to the production, processing and distribution of food products were chosen because they represent a collective of diverse firms which is central in determining the multiple food choices in the current food regime. Thus, entry modes of incumbent food firms are key to understanding the reorientation of industry in the protein transition. Second, we chose to separately analyze meat processors because they represent food industry actors with “more to lose,” e.g., in terms of sunk investments in the meat industry. Finally, we also chose to analyze retailers and food service firms. The entry modes of these intermediary actors, which sit between the industry and consumers, are important in understanding selection pressures on the industry and how novel products are introduced to the market. Finally, we zoomed-in on case examples of specific incumbent actors to verify the broad patterns we observed and understand them in context. While it is beyond the scope of this paper to present these descriptions in full, based on this analysis, we provide several examples to illustrate important variances between and within entry modes. An overview of entry modes per country can be found in [Appendix 3](#) and [Appendix 4](#).

4. Results

4.1. Entry timing dynamics in context

Plant-based meat substitutes have existed in European and US markets for decades. To conceptualize technological development in the meat substitutes sector we distinguish between first-generation and second-generation products. During the early 1990's, the meat substitutes industry was mainly comprised by a few firms which offered first generation products, a narrow assortment of plant-based meat substitutes based on available processes and ingredients e.g., textured vegetable protein. Second generation meat substitutes started reaching markets in the early 2000s due to advancements in extrusion technology, such as the introduction of high-moisture extrusion, and the deployment of processes from other sectors, such as the utilization of hydrocolloids. Second generation products more closely resembled the taste, texture, and appearance of animal meat. In recent years, a few pioneering processing firms which processed and marketed second generation products, as well as innovation across the supply chain of plant-based proteins, have contributed to the availability of a large assortment of higher quality meat substitutes which aim to mimic animal meat.

The popularity of meat substitutes has risen exceptionally over the years and has grown hand in hand with increasing interest in vegetarian, flexitarian, and vegan diets. These changes in consumer preferences have been sparked by increasing awareness of animal welfare, health, and environmental sustainability. Retail sales of meat substitutes in Europe have risen by almost 10% per year between 2010 and 2020 ([ING, 2020](#)). According to sales data from the US, dollar sales of plant-based meat grew 19% in 2018 and 45% in 2019 ([GFI, 2020](#)). Additionally, in 2020 plant-based meat substitutes grew 152% over the prior year for the week ending March 15, while animal-based meat grew only 80 percent over 2019 for the same period ([GFI, 2020](#)).

In terms of incumbent entry modes, two temporal phases can be distinguished. [Fig. 1](#) illustrates the chronological development of incumbent entry modes in reference to the initial occurrence of new entrants and important contextual and technological events.

Phase 1: In the first phase, (1990-2006), crises related to livestock supply chains, most notably the BSE (Bovine spongiform encephalopathy) crisis, had led to periods of increased public concerns over health and safety aspects of livestock products and jolts in the small markets for meat substitutes. This incentivized individual incumbents to introduce new plant-based brands to pre-empt market space and/or address potential issues in the resilience of livestock supply chains. One important example is Meatless which was established by a firm originating from the meat processing sector. Nevertheless, the sector remained very small, with other incumbent entry modes very limited and short-lived. For example, food firm Unilever had participated in a joint research project which aimed to deliver knowledge on meat substitutes based on peas. However, no notable commercially oriented projects followed.

Phase 2: In the second phase (2006-2020), the influential publication of “Livestock’s Long Shadow” from the Food and Agricultural Organization (FAO) of the UN ([Steinfeld et al., 2006](#)), which estimated the contribution of livestock agriculture to climate change, marks the start of growing awareness of the adverse environmental impacts of the livestock sector. Around the same time, a few pioneering new entrants explored new processes and ingredients for the development and commercialization of second-generation

Table 2
Incumbent first mover and follower (approximate) response times in reference to the occurrence of new entrants.

New entrant occurrence	Incumbent Response First mover	Time lag between first mover	Follower	Time lag between follower – first mover
<i>UK & NL</i>				
Ojah (2009) Vegetarian Butcher (commercializes Ojah products in 2010)	<i>Retailers</i> Retailer Jumbo introduces Vegetarian Butcher products (2012)	2 years	Retailer AH introduces Vegetarian Butcher products (2014)	2 years
	<i>Meat processors</i> Vion Food introduces Hackplus products with plant-based proteins (2012)	2 years	Meyn Food Processing joins collaborative effort to develop meat alternatives with the Vegetarian Butcher (2017)	5 years
	<i>Food service</i> Smullers offers a vegetarian burger (2018)	8 years	Febo offers a vegetarian burger (2018)	<1 month
	<i>Food firm</i> Bobeldijk Food Group produces its first vegetarian burger (2010)	1 year	Unilever collaborates with Vegetarian Butcher to introduce first vegetarian balls (2015)	5 years
<i>USA</i>				
Beyond Meat (2009) First Beyond Meat commercial product (2012)	<i>Retailers</i> Retailer Whole Foods introduces Beyond Meat product (2012)	<6 months	Retailer Walmart introduces Beyond Meat products (2015)	3 years
	<i>Meat processors</i> Tyson Foods launches plant-based protein bowls under new brand Green Street (2018)	6 years	Perdue Farms launches Chicken Plus products with plant-based proteins (2019)	1 year
	<i>Food service</i> BurgerFi tests Beyond Meat at several locations (2017)	5 years	TGI Fridays adds Beyond Meat to the menu at several locations (2017)	<3 months
Sweet Earth (2011)	<i>Food firm</i> Kellogg's launches several new vegetarian products (2018)	7 years	Nestlé introduces meatless pizza and lasagna with Sweet Earth's Awesome Grounds (2019)	1 year

meat substitutes. From 2009 onwards, food firms including Ojah and the Vegetarian Butcher in the Netherlands and Beyond Meat, Impossible Foods, and Sweet Earth in the US, introduced novel second generation products. These new entrants were key to the beginnings of rapid growth of the meat substitutes market in the US, UK, and NL as they offered base ingredients for several incumbent firms. Almost immediately after their appearance, prominent incumbent retailers, such as Whole Foods, followed to launch these products in mass markets.

The second phase was also accompanied by rising concerns over the health impacts of meat and dairy (over)-consumption. For instance, an important contextual development was initiated by a study published by the World Health Organization (WHO) which identified a link between certain types of cancer and particular processed meat products (Bouvard et al., 2015). This resulted in increasing public awareness of the negative effects arising from meat consumption and also the popularity of vegetarian, flexitarian and vegan diets started rising in the second phase. In 2019, the covid-19 pandemic became a catalyst for driving innovation in the food industry with a focus on healthier, more sustainable diets and long-term food security (FAIR, 2019). In this context, giant food firms, such as Unilever and Nestlé as well as meat processors such as Tyson Foods, became engaged in the plant-based sector by making several investments in new entrants and high-profile acquisitions. Two of the most established incumbents, Nestlé and Tyson Foods introduced their own plant-based burgers and major fast-food chains, including Burger King and McDonalds started including popular meat substitute products in their menus. In Appendix 1, Table 1 lists the most visible events between 1990-2020 in a chronological order and Fig. 1 below illustrates the key new entrant occurrences and incumbent entry modes in the two phases.

Looking at Fig. 1, it becomes apparent that within fifteen years after the occurrence of first pioneers, incumbents moved into the niche and follower dynamics unfolded quickly in the second phase. Key events that seem to have shaken up the industry in the Netherlands were the introduction of Ojah in 2009, a firm producing intermediary meat substitute products, and the launch of the Vegetarian Butcher in 2010, a brand which commercialized Ojah's products. In the US, key events were the occurrence of meat substitute firms Beyond Meat, Impossible Foods, and Sweet Earth around the same time. Food retailers engaged with the industry most quickly in efforts to pick-up these newcomers' novel products. For example, we observe that in the Netherlands, it took only two years for the major retailer Jumbo to launch the Vegetarian Butcher's products. Shortly after, second mover Albert Heijn followed suit and introduced the Vegetarian Butcher products to its stores. In the US, the first mover was even more agile. Whilst founded in 2009, Beyond Meat only introduced its first commercial product in 2012 and within months the newcomer announced its partnership with Whole Foods. Second mover and major retailer Walmart announced the launch of Beyond Meat frozen products in 2015.

There are notable differences between firm types. Whilst retailers are observed as being 'frontrunners' in engaging with plant-based

Table 3
Most visible investments and M&As in NL-UK and US market (2016-2021).

Year	Entry mode	Description
2016	Investment	Meat processor Tyson invests in 2nd generation new entrant Beyond Meat
2017	M&A	Food firm Nestlé USA acquires 2nd generation new entrant Sweet Earth
2018	M&A	Food firm Kerry group takes majority share in 2nd generation new entrant Ojah
2018	M&A	Food firm Nestlé acquires meat substitute firm Garden Gourmet
2018	M&A	Food firm Unilever acquires 2nd generation new entrant the Vegetarian Butcher
2021	M&A	Meat processor JBS acquires meat substitutes firm Vivera

meat substitutes, we also find that food firms and meat processors were rather quick to engage (see [Table 2](#)). Notably, in 2010, less than one year after the appearance of the Vegetarian Butcher, Bobeljik Food Group produced its first vegetarian burger. In the US, however, we see that food firms take relatively longer to engage. However, when they do engage, this is directly with the introduction of multiple new products or product lines. For example, in 2018 Kellogg's visibly launched two new meat-free burgers, a vegetarian chorizo, and meatless chicken nuggets. Less than a year thereafter, Nestlé announced the launch of meat-free pizzas and lasagnas using Sweet Earth's Awesome Grounds.

For meat processors, even more strikingly, it took only two years for the first firms to engage with meat alternatives. Given sunk costs and a heavy asset base in the meat processing industry, this seems exceptionally fast and at odds with what theory predicts for firm types heavily invested in the current dominant product (meat). In the Netherlands, for example, we observe that already in 2012, less than two years after the appearance of the Vegetarian Butcher in the Dutch market, Vion, a prominent Dutch meat processor with nearly 30 meat producing factories spanning across the Netherlands, Belgium, and Germany, introduced minced meat products made with plant-based proteins. In the US, only six years after the emergence of Beyond Meat's first product, Tyson Foods also introduced its own line of plant-based bowls under its new brand Green Street. These first movers were also quickly followed by other meat processors. Notably, these forms of entry modes were largely influenced by the introduction of semi-finished products that these incumbents could build on. However, their quick activity is still remarkable given the heavy investment of this firm type in meat products.

In all countries, results indicate that food service incumbents are the most hesitant to move into the market. However, once the first food service incumbent moves in, others follow within months. For instance, in the US, BurgerFi, a fast-casual burger restaurant, introduced the Beyond Burger five years after Beyond Meat's first product. Only three months after, in 2017, TGI Fridays, a popular American rib and burger house, announced the addition of Beyond Meat products to its menu at several of its US locations. Similarly, in the Netherlands, fast-food chain Smullers launched its first vegetarian burger in 2018 and less than one month after a competitor, Febo, also introduced its first vegetarian burger.

To provide a broader picture, [Table 2](#) shows for selected, highly visible events, how long it took until the first incumbent responded to a new entrant. The table further indicates how long it took the second incumbent to 'jump on the bandwagon'.

Overall, the timeframe between launching the first commercial products and incumbents following is between six months and nine years. On the system level, these developments signal relatively fast regime change in which incumbents are quick to reorient towards a new market.

A few years after the mass introduction of second-generation products in major retail stores, food firms and meat processors already started engaging with new entrants. In fact, between 2016-2021 many meat substitute firms received investments from incumbents or were acquired by them. Food firms largely deployed M&A's as an entry mode in the timeframe between 2016 and 2021 ([Table 3](#)). For example, in 2017, only 6 years after the company was founded, Nestlé USA acquired new entrant Sweet Earth. Also, meat processors were active in M&A's. In 2016, the largest poultry processor in the United States acquired a 5% stake in new entrant Beyond Meat, which it rapidly increased to nearly 7% ([Tyson Foods Divests Interest, 2019](#)). Finally, in 2021 the worlds' largest meat processor JBS acquired Vivera for over 300 million euros ([Ellis, 2021](#)). These high stake investments also underline the agility of incumbents in responding to the newcomers.

Yet, there are also clear differences between firm types with regards to the entry modes deployed. For instance, food service firms took longer than the other firm types to introduce plant-based alternatives and meat processors predominantly engaged through high stake entry modes such as immediately taking over a newcomer or investing large amounts. The following section further unpacks these differences between types of incumbents: food firms, meat processors, retailers, and food service firms.

4.2. Entry modes of food firms, meat processors, retailers, and food service firms

For each firm type, we plotted the total number of entry modes we coded (launching a new product, launching a new brand or product line, collaboration and co-promotion, investments, M&A) over the years (see [Fig. 2](#)). The focus of the charts is on the period from 2010 to 2020, because most activity can be seen in this phase. These mere counts already reveal visible differences between firm

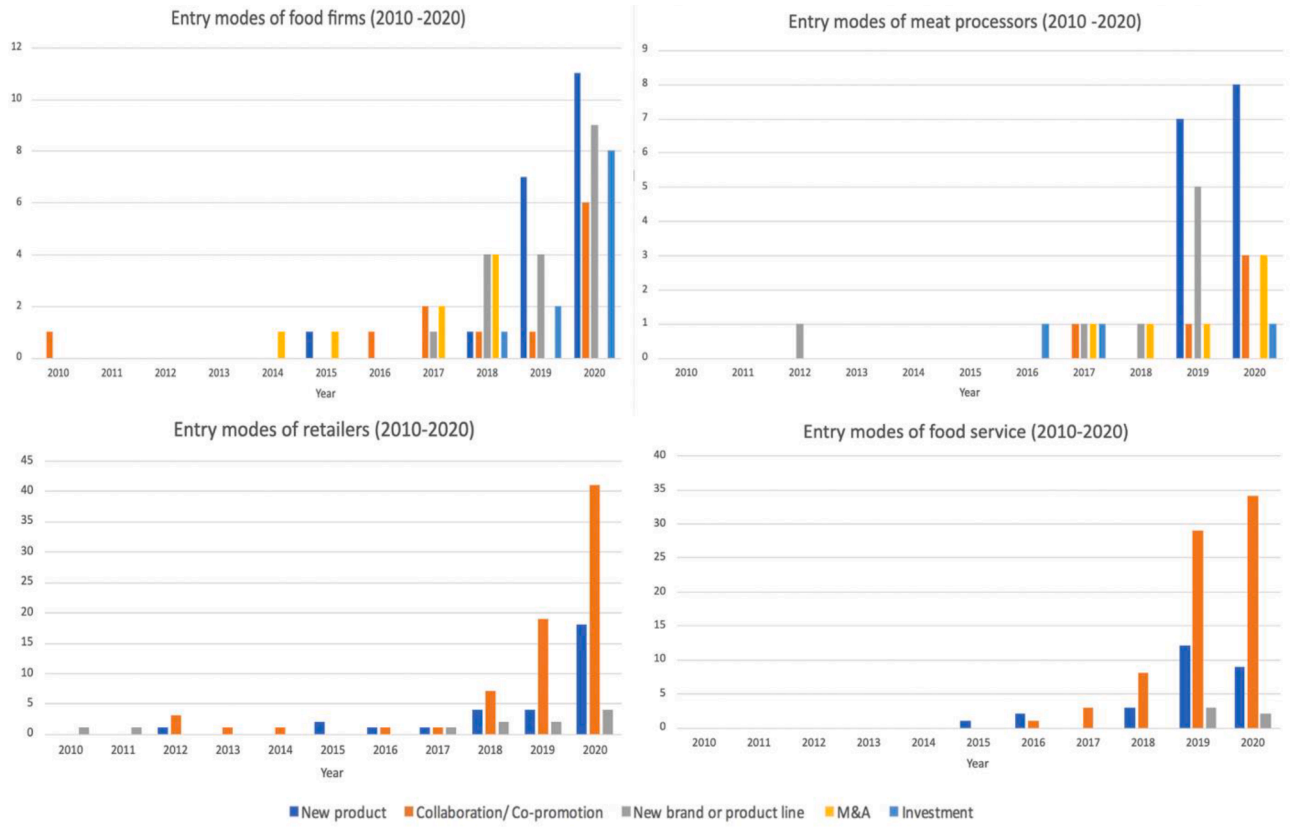


Fig. 2. Entry modes of food firms, meat processors, retailers, and food service in US, NL, and UK markets (2010-2020).

types. In the following section, we explain notable differences for each firm type. Furthermore, we comment on the differences in commitment to the sustainable niche that entry mode choices may indicate (e.g., co-promoting a product vs. making an acquisition). We illustrate our explanations with selected, short examples from the data pool.

- *Retailers*

Retail firms engaged relatively early with meat substitutes compared to the other firm types. But despite their early engagement, retailers almost exclusively employed entry modes that involved relatively little risk. Between 2010-2020, they mainly engaged in co-promotions with newcomers, launched new meat substitute products and also expanded private labels for vegetarian/vegan versions of animal products. The period also saw some retailers already introducing their own brand of meat substitutes, which speaks for higher commitment, yet often through private labeling of products produced by third parties that can be added or removed rather flexibly from the product range. For example, Albert Heijn, one of the largest retail chains operating in the Netherlands and Belgium, has offered a limited range of meat substitute products for decades. After the emergence of new entrants in the second phase, the retailer quickly enlarged its range of offered meat substitute products. Around the same time, Albert Heijn launched and expanded its own dedicated meat substitute lines, such as the brand AH Vandaag Vegetarish (AH Today Vegetarian). However, because Albert Heijn's entry modes were mainly comprised by collaborations with producers of meat substitutes, the firm could also easily discontinue brands and products that did not perform as expected.

- *Food firms*

Contrary to retailers, food firms employed a more diverse set of entry modes. Fig. 2 indicates that food firms started to substantially engage with meat substitutes around 2017. Particularly, in 2017 and 2018 incumbent food firms were involved in several high-profile M&As (discussed in the previous section) and started launching their own meat substitute brands. Other entry modes, in the form of adding plant-based meat substitutes to existing product ranges or introducing brands and products to new markets, followed the M&As.

For example, Nestlé, the largest food firm in the world, started to visibly engage with meat substitutes in 2017 with the acquisition of plant-based meat substitute producers Garden Gourmet² and Sweet Earth. Following these acquisitions, the company expanded these brands, as well as the product portfolios of its other existing brands to include new plant-based products. As the market and competition in the meat substitute industry grew, Nestlé also started to directly compete with and mimic new entrants. For instance, the company was accused of trademark infringement by Impossible Foods, after launching the “Incredible” plant-based burger, because the two firms reportedly had meetings in the context of a potential partnership. As another example, in 2018, the Dutch food firm Unilever acquired new entrant the Vegetarian Butcher. This was followed by several new product launches under the Vegetarian Butcher brand. Not long after, however, the food giant also began to experiment with meat substitute products under its own brand Unox. After almost a century of producing solely meat-based sausages, in 2019, Unilever announced that it launched a new vegetarian sausage under the Unox brand, a move which underscores the promise it seemed to ascribe to the growth of the market for meat substitutes.

- *Meat processors*

Similar to food firms, meat processors also engaged in entry modes characterized mostly by high equity stakes. Fig. 2 indicates that meat processors engaged in highly visible M&As around the same period as food firms. However, meat processors' brand and product portfolios were less diverse than those of large food firms. Therefore, relative to food firms, whose entry modes indicate the addition and diversification of operations, the coupling of meat processors' operations with the production of meat substitutes might ultimately symbolize their preparation for an eventual cannibalization of their traditional product.

For example, Tyson one of the largest American food companies and a multinational meat processor, entered the plant-based meat substitute market with an investment in new entrant Beyond Meat. Between 2016 and 2017, Tyson invested over 20 million dollars in Beyond Meat acquiring a 6.5% stake in the company (Tyson Foods Divests Interest, 2019). For the subsequent two years, Tyson did not visibly pursue any other efforts to become active in the niche except for holding this strategic investment. However, by the end of 2018 (and similar to Nestlé), as meat substitute markets and competition grew, the meat giant also entered into direct competition with new entrants. In 2019, the company established Raised & Rooted its own meat substitute brand and almost simultaneously sold its stake in Beyond Meat.

- *Food service*

The food service industry substantially engaged with meat substitutes relatively later than the other types of incumbents. Like retailers, food service firms also almost exclusively employ entry modes symbolizing lower commitment such as collaborations or co-promotions. Food service firms either expand their menus to offer plant-based meat substitutes or collaborated with manufacturing

² Garden Gourmet was formerly known as Tivall

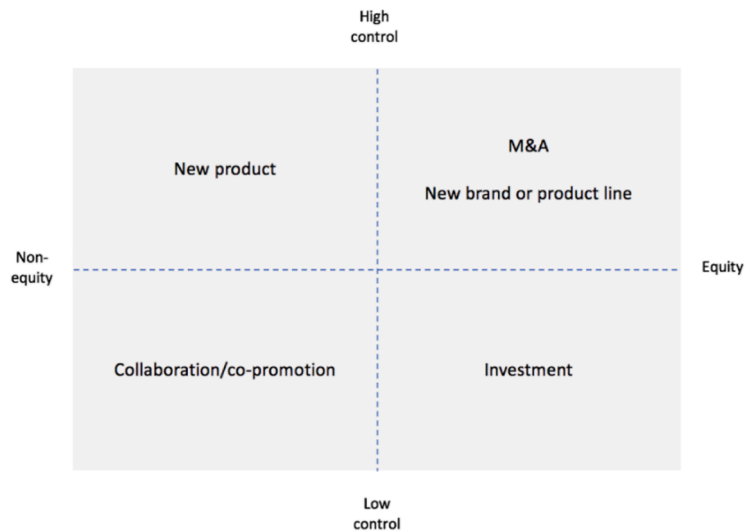


Fig. 3. High- and low-commitment entry modes of incumbents.

firms to introduce products in their restaurants. Introductions of meat substitute products at popular global fast-food chains, such as the introduction of the Impossible burger in Burger King, start around 2018. Such fast-food chains initially conducted time-limited tests in specific locations before committing to introducing a meat substitute in a national market.

For example, McDonalds has made attempts with vegan and vegetarian products over the years but has strayed away from incorporating plant-based meat substitutes in multiple markets until very recently. Around 2019, the company participated in several collaborations, including a collaboration with Nestlé's Garden Gourmet in Europe. However, these attempts were swiftly discontinued for different reasons, including lack of expected demand and the legal battle between Nestlé and Impossible Foods. Nevertheless, as the market of meat substitutes continued to grow, McDonalds announced more collaborations. In 2020, McDonalds announced the introduction of the first McPlant and it was later revealed that it would be produced in collaboration with Beyond Meat.

4.3. The co-evolution of high and low commitment entry modes across the supply chain

While all types of incumbents increasingly engaged in the plant-based sector over the time studied, the evolution of their entry modes also exhibits distinct patterns. The most notable difference seems the 'level' of commitment their activities indicate, for instance whether their brand name becomes visibly associated with a meat substitute product, or whether they merely make a strategic, temporary investment in a newcomer. Drawing on the literature on entry modes in international business, entry modes can be characterized as high and low commitment modes according to the level of control an entry mode offers and whether it is equity or non-equity based (e.g., Ahsan and Musteen, 2011). We import these dimensions to classify the entry modes we observed in the case of incumbent responses' to the plant-based protein transition in NL, UK, and the US. For instance, a full acquisition can be seen as a 'high commitment' entry mode, as it allows for a high level of strategic control of operations and comes with significant resource commitment. On the opposite side of the spectrum, entry modes such as collaboration or co-promotion can be characterized as 'low commitment' as they are concerned with less resource investment but also offer a lower level of strategic control over the operations. The following Fig. 3 illustrates the level of commitment of the five entry modes we identified.

When matching this classification with the firm types and the evolution of entry modes over time, two patterns can be distinguished (see Fig. 4). Food firms and meat processors predominately employ high-commitment entry modes first and follow-up with lower commitment modes, such as adding new products to existing product lines. On the contrary, retailers and food service incumbents almost exclusively pursue low commitment entry modes throughout the entire time period studied in this paper.

To some extent, these patterns can be explained by the business models of the firm types. For instance, retailers and food service firms are not producers and generally commit by giving shelf space to third parties rather than pursuing M&As. However, because particularly retailers are the first type of incumbent firms to engage with meat substitutes and introduce products of new entrants in mass markets, these low-commitment, collaborative entry modes, may serve as markers for initial tests that play an important function in preparing the market. For instance, without the deployment of these low-commitment entry modes and their successful introductions the meat substitute industry might not have seen the entrance of food firms and meat processors which then employ high-commitment entry modes and deploy substantial resources. A remarkable point is the hesitant commitment of food service firms, and particularly fast-food chains. Like retailers, these firms mainly engaged in co-promotion or collaborations regarding single new products but did so quite late. Yet, there is a difference between the visibility and cultural meaning of entry modes between fast-food chains and retail firms that might explain these patterns. Retailers have diverse brand and product portfolios, and the introduction of a new supplier can be seen as a move with limited implications (cf. meat processors refurbishing entire machineries or buying new equipment). For food service firms, however, the brand is directly coupled to the products they offer, and the product range is more

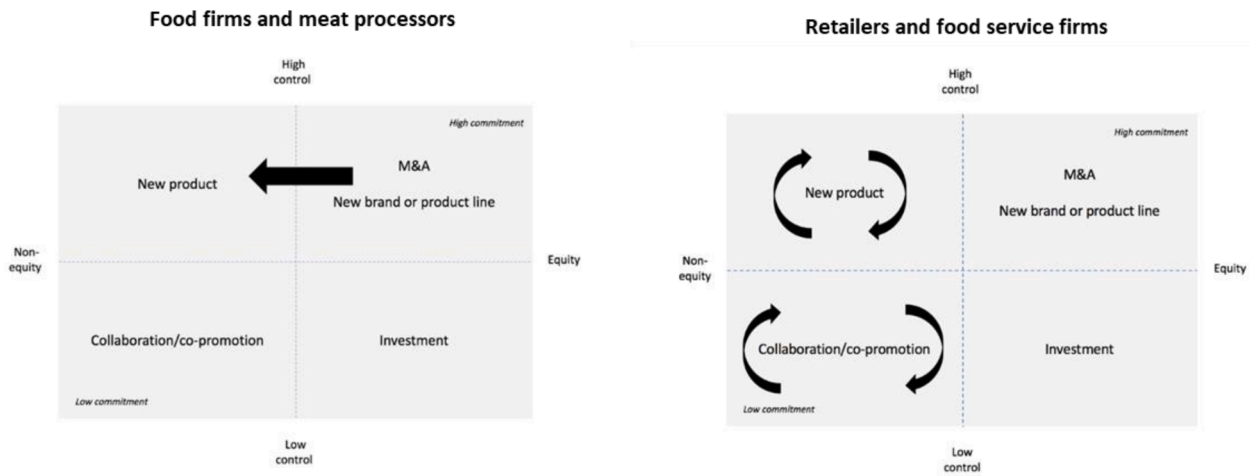


Fig. 4. Entry mode evolution food firms and meat processors vs. retailers and food service firms.

limited. For instance, the brand of major fast-food burger chains is closely associated with a meat product, the burger. Such differences in visibility might explain the relatively late engagement of fast-food chains with meat substitutes, for example the introduction of the “Impossible Whopper,” which carries both the names of the Impossible Foods and Burger King. Because such firms are front-stage actors with an identity to the customer, namely a brand coupled with meat consumption, they might be more hesitant to associate themselves with disruptive products.

5. Discussion and conclusions

This study explored incumbent engagement strategies and incumbent entry timing in the sustainable niche emerging around plant-based meat alternatives. This is an important topic because current literature on sustainability transitions makes contradictory claims about incumbent behavior in transitions. While some studies see incumbents as opponents of change that remain inert until forced to change, others credit this actor groups willingness to support sustainable product innovation and accelerate transitions. Penna and Geels (2015) recognize that also changing consumer preferences may constitute exogeneous pressures that can steer incumbents towards engaging in niches, but empirical cases supporting this are still scarce. Beyond that, authors have recently called for work that explores what happens when incumbents eventually attempt to strategically reorient, i.e., the ‘diffusion’ phase of transitions (Geels, 2021; Sovacool et al., 2020; Turnheim and Sovacool, 2020). With the Netherlands, the UK, and the US we studied markets where the plant-based protein niche is already in an advanced stage and incumbents have visibly started to engage with plant-based meat alternatives. While our results confirm that incumbents are not the first to enter or develop sustainable niches, they do support a view of incumbents as proactive participants in transitions that do not wait-and-see or remain myopic. Specifically, our findings support the current state of research in three ways:

First, our findings clearly show that incumbent entry timing is not solely influenced by coercive pressures. In all three markets studied, regulation in the form of strict quotas was still absent at the time incumbents became active. Much rather, our findings indicate that entry timing is influenced by projections of a promising market, and a ‘bandwagon’ effect which the engagement of a first mover among the group of incumbents in a market triggers. This contrasts with earlier findings of incumbent engagement in transitions where coercive, regulatory pressures are discussed as a predecessor for creating normative and competitive pressures (Bohnsack et al., 2020; Geels and Penna, 2015; Wesseling et al., 2015; Smink et al., 2015).

For instance, Bohnsack et al. (2020) suggest based on the case of the car industry’s engagement in electric vehicles that exogeneous, coercive pressures were critical for setting the bandwagon in motion and creating mimetic and normative pressures within the group of incumbents. In our case, incumbents may have anticipated increasing regulatory pressures as first markets have introduced labels for organic food and animal welfare, or reduced taxes for plant-based foods, but generally our findings direct attention to of the importance of anticipated market growth, the power of changing lifestyles (e.g., vegetarianism or flexitarianism), and competitors’ actions, which were all critical to incumbent engagement in the niche.

Instead of suppressing the niche, in the case of plant-based meat substitutes, incumbents worked to increase their share in the market. Whilst the actual share of the plant-based protein market remains marginal (e.g., in 2019 the US plant-based meat alternative market was valued at over 900 million dollars, but this only accounted for 1% of all meat sales) we argue that this still implies a high strategic importance of these activities for incumbents (GFI, 2020). The fact that incumbents move into the niche despite the rather negligible absolute size of the market suggests the importance of foreseen market demand and discourse regarding the future of the meat substitute niche. Furthermore, the fact that a company with a strong ‘meat-legacy’ such as Burger King introduced a plant-based product has a strong signaling effect.

For policymakers, this implies that measures to instigate consumer demand and create markets for sustainable innovation may be a promising avenue to support the reorientation of incumbents. In industries, such as the energy, water, and transport sector, measures to create markets have usually been targeted towards creating subsidies for novel technologies, feed-in tariffs, or taxing regime technologies (Geels and Penna, 2015; Wesseling et al., 2015; Smink et al., 2015; Wells and Nieuwenhuis, 2012). But contrary to measures that coerce the formation of new markets, which may lead to intense negotiations and lobbying battles, our findings suggest that in consumer-based markets measures aimed at instigating demand and stirring the public debate about sustainable lifestyles could also lead incumbents to engage more proactively in sustainable niches (Geels and Penna, 2015).

Second, because we find significant differences between actor types, our findings corroborate earlier claims in the transition literature that incumbents cannot be simplified to a ‘monolithic block’ (Turnheim and Sovacool, 2020; Mori, 2021). For studying transitions, this implies that scholars must be wary of the heterogeneity of incumbents and how this heterogeneity affects the analysis and interpretation of their engagement strategies. We find that incumbent firms across the supply chain differ in their strategic responses in terms of commitment. Some firm types, such as retailers, may engage earlier with substantive actions, but these actions remain of limited risk and can be seen as ‘test beds’ and experiments. Differentiating between high and low commitment entry modes, as we suggest in this paper, can help to better understand the degree of incumbent commitment and, thereby, also the development stage of the transition. Yet, our case also clearly highlights that incumbent commitment to sustainable niches requires a qualitative discussion: low commitment entry modes may still have an important signaling function for other firms across the supply chain.

In the case of the plant-based protein transition, for instance, first product introductions by retailers preceded higher forms of commitment in other firm types, such as high investments and acquisitions by meat processors. A limitation of our study is that the mere comparison of entry modes is not sufficient to make claims about the ‘impact’ that the actions of different firm types have on developing the niche. For instance, it could be argued that incumbents engage largely for symbolic action and motives of strategic control over the niche. Whether the acquisition of newcomers, for instance, helps or hampers the radicality of niche innovation can be critically discussed (Wells and Nieuwenhuis, 2012) and deserves attention in future research. While our study did not set out to assess

the impact of incumbent engagement on the development of the niche, it stimulates further debate regarding incumbents' attempt to gain strategic control and the 'net effect' of their engagement on transitions. For instance, we found that in some cases, while incumbents engaged with new entrants to promote niche innovations almost immediately after they had appeared on the market (e.g., through investments), they were quick to drop newcomers once they established their own product lines.

Third, not only the differentiation between firm types but also the interaction between the entry modes and entry timing of firm types is important to understand the dynamics in the 'diffusion' phase of a transition. In connection to the previous point, both low and high commitment strategies are critical in this phase. Retailers are first seen adopting newcomer's product lines and do not produce products themselves. Nonetheless, these low-commitment entry modes incentivize other incumbents to join the industry a few years later. Followers then use higher-commitment strategies. For example, whilst meat processors would be expected to be the last to 'move-in' because of the high sunk costs in machinery and slaughterhouses characterizing this firm type, these incumbents followed into the niche fairly quickly (between 2–6 years). Literature on incumbent engagement in transitions highlights that those with 'the most to lose' will be more likely to continue developing and investing in existing regime technologies given aspects such as their technological know-how and set customer base (Geels and Penna, 2015; Geels, 2014). In other words, investing in novel technologies is associated with risk, uncertainty, and high switching costs. In our case, however, we see that once retailers enter the plant-based industry, prominent meat processors – who have high sunk investments in meat-processing technology and machinery - quickly followed. This also triggers interesting future research avenues around the question which industry- or sector-specifics can explain differences between incumbents' responses. For instance, future studies could compare incumbent entry modes and entry timing across different transitions (e.g., energy or mobility).

Lastly, our study provides valuable insights into incumbent engagement strategies and incumbent entry timing in sustainability transitions. However, because this research focused on firms which engaged with the meat substitute niche, it inevitably entails front-runner bias. Future research deliberating on the impact of incumbent strategies in transitions should also explore the population size of incumbent firms which employ entry modes in relation to other regime firms, and longitudinally follow how first, symbolic actions translate into substantive investments and relative market shares. In other words, there is ample potential for future research that critically assesses incumbent engagement in the diffusion phase of transitions, and when incumbents start 'to walk their talk' (Bidmon & Bohnsack, 2019).

Appendix 1

Most visible events in US, NL and UK markets for plant-based meat alternatives (1990-2020).

Year	Country	Type	Event label
1990	NL-UK	New entrant occurrence	Quorn already in European markets
1990	NL-UK	New entrant occurrence	Garden Gourmet already in European markets
1990	NL-UK	New entrant occurrence	Vivera was established
2005	NL-UK	Incumbent entry mode: New brand	Meatless was established by a former meat industry actor
2009	NL-UK	New entrant occurrence	Ojah
2009	US	New entrant occurrence	Beyond Meat
2010	NL-UK	New entrant occurrence	Vegetarian Butcher
2011	US	New entrant occurrence	Impossible Foods
2012	US	Incumbent entry mode: Collaboration/ copromotion	Whole foods introduces Beyond Meat
2012	US	New entrant occurrence	Sweet Earth
2012	UK-NL	Incumbent entry mode: Collaboration/ copromotion	Vegetarian Butcher at Jumbo
2014	UK-NL	Incumbent entry mode: Collaboration/ copromotion	Vegetarian Butcher at AH
2016	US	Incumbent entry mode: Investment	Tyson invests in Beyond Meat
2017	US	Incumbent entry mode: Acquisition	Nestlé acquires Sweet Earth
2017	NL-UK	Incumbent entry mode: Acquisition	Nestlé acquires Garden Gourmet
2018	NL-UK	Incumbent entry mode: Acquisition	Unilever acquires the Vegetarian Butcher
2018	NL-UK	Incumbent entry mode: Acquisition	Kerry Group enters joint venture with Ojah
2019	US	Incumbent entry mode: New brand	Tyson foods introduces own meat substitute brand
2019	UK-NL	Incumbent entry mode: New brand	Nestlé introduces own plant-based "Incredible" burger
2019	UK-NL	Incumbent entry mode: Collaboration/ copromotion	McDonalds introduces Vales for chicken burger
2019	UK-NL	Incumbent entry mode: Collaboration/ copromotion	AH introduces Beyond burger
2019	UK-NL	Incumbent entry mode: Collaboration/ copromotion	Vegetarian Butcher at Tesco
2019	UK-NL	Incumbent entry mode: Collaboration/ copromotion	Tesco launches Beyond burger
2019	US	Incumbent entry mode: Collaboration/ copromotion	Burger King introduces plant-based Impossible burger
2020	UK-NL	Incumbent entry mode: Collaboration/ copromotion	McDonalds introduces first plant burger based on Nestlé's Incredible burger
2020	UK-NL	Incumbent entry mode: Collaboration/ copromotion	Burger King introduces the Rebel Whopper in Europe, a vegetarian burger created by the Vegetarian Butcher

Appendix 2

List of 148 incumbent firms per type.

Company Name	Type of incumbent firm
Monde Nissin	Food firm
Pinnacle Foods	Food firm
Premier Foods	Food firm
Beckers	Food firm
Bobeldijk	Food firm
Bumble Bee Foods	Food firm
Cargill	Food firm
ConAgra	Food firm
General Mills	Food firm
Finnebrogue Artisan	Food firm
Five Star Gourmet Foods	Food firm
General Mills	Food firm
HAK	Food firm
Iceland	Food firm
Kellogg's	Food firm
Kraft Heinz	Food firm
Louis Dreyfus Company (LDC)	Food firm
Green Leaf Foods (owned by Maple Leaf)	Food firm
Hormel Foods	Food firm
McCain	Food firm
Nestlé	Food firm
Nomad Foods	Food firm
Oxo	Food firm
Quorn	Food firm
Unilever	Food firm
Yum! Brands	Food firm
Mama Mancini	Food firm
Suiker Unie	Food firm
Kerry Group	Food firm
Don Lee Farms	Food firm
Mora	Food firm
Royal Cosun	Food firm
Avebe	Food firm
Arbys	Food service
Bowlero	Food service
Burger King	Food service
BurgerFI	Food service
Capriotti's	Food service
Carl's Jr.	Food service
Chipotle	Food service
Costa	Food service
Dave & Busters	Food service
Del Taco	Food service
Denny's	Food service
Dippin' Dots	Food service
Disney	Food service
Dunkin' Donuts	Food service
El Pollo Loco	Food service
Fatburger	Food service
Febo	Food service
Golden Krust	Food service
Gourmet burger kitchen	Food service
Greggs	Food service
Habit Burger Grill	Food service
Hardees	Food service
Hema	Food service
Honest Burger	Food service
Hooters	Food service
Ikea	Food service
KFC	Food service
Leon	Food service
Little Caesars	Food service
McDonald's	Food service
On the Border	Food service
Papa John's	Food service
Pizza Hut	Food service
PizzaRev	Food service
Popeyes	Food service
Pret	Food service
Qudoba	Food service

(continued on next page)

Appendix 2 (continued)

Company Name	Type of incumbent firm
Red Robin	Food service
Ruby's	Food service
Smullers	Food service
Sonic	Food service
Starbucks	Food service
Subway	Food service
Taco Bell	Food service
TGI Fridays®	Food service
Wendy's	Food service
Wawa	Food service
White Castle	Food service
Vion	Meat processor
Maple Leaf Foods	Meat processor
Boekos	Meat processor
Bolscher	Meat processor
Encko Food Group	Meat processor
Jan Zandbergen	Meat processor
JBS	Meat processor
Perdue Farms	Meat processor
Meyn Food Processing	Meat processor
Tönnies	Meat processor
Tyson Foods	Meat processor
Smithfield Foods	Meat processor
Jensen Meat Co.	Meat processor
Zwanenberg	Meat processor
Acme	Retailer
Alberstons	Retailer
Albert Heijn	Retailer
Aldi	Retailer
BJs	Retailer
Bristol Farms	Retailer
C1000	Retailer
Club stores	Retailer
Co-op	Retailer
Costco	Retailer
CVS	Retailer
De Markt	Retailer
EkoPlaza	Retailer
Giant Foods	Retailer
Haggen: Food & Pharmacy	Retailer
Harris Teeter	Retailer
HelloFresh	Retailer
Hema	Retailer
Jewel-Osco	Retailer
Jumbo	Retailer
Key Foods	Retailer
Kings	Retailer
Kroger	Retailer
Meijer	Retailer
Albertsons	Retailer
Lidl	Retailer
Lucky's Market	Retailer
Marks & Spencer	Retailer
Marqt	Retailer
Pavilions	Retailer
Planet Organic	Retailer
Plus	Retailer
Publix	Retailer
Raley's	Retailer
Dot Foods*	Retailer
Ralphs	Retailer
Safeway	Retailer
Sainsbury's	Retailer
Sam's Club	Retailer
Shoprite	Retailer
Sprouts	Retailer
Stop & Shop	Retailer
Sysco *	Retailer
Target	Retailer
Tesco	Retailer
Tops Friendly Market	Retailer
Trader Joes	Retailer

Appendix 2 (continued)

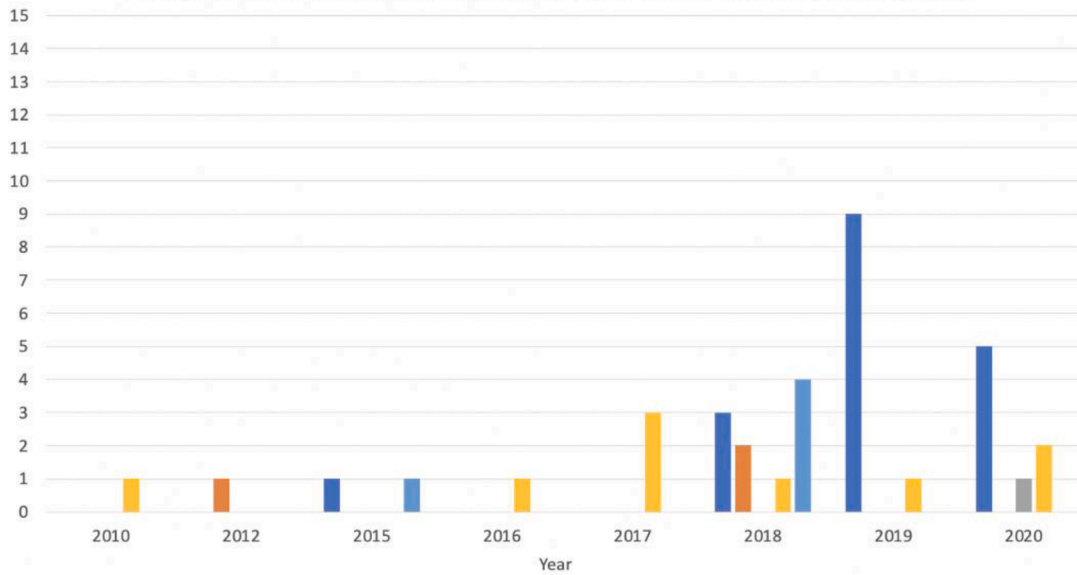
Company Name	Type of incumbent firm
US Foods*	Retailer
Vons	Retailer
Waitrose	Retailer
Walmart	Retailer
Wegmans	Retailer
Whole Foods Market	Retailer

*Categorized as a retailer based on the nature of entry mode i.e., Sysco launches Beyond Meat products exclusively for its customers

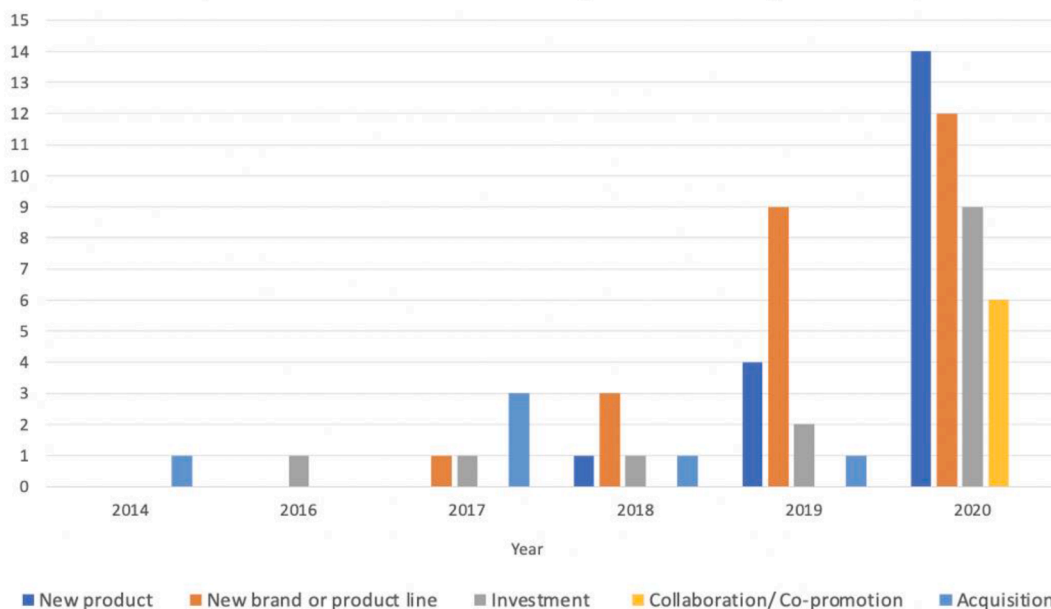
Appendix 3

Entry modes UK-NL and US: Food firms and meat processors (2010-2020).

Entry modes food firms and meat processors UK-NL (2010-2020)



Entry modes food firms and meat processors US (2010-2020)

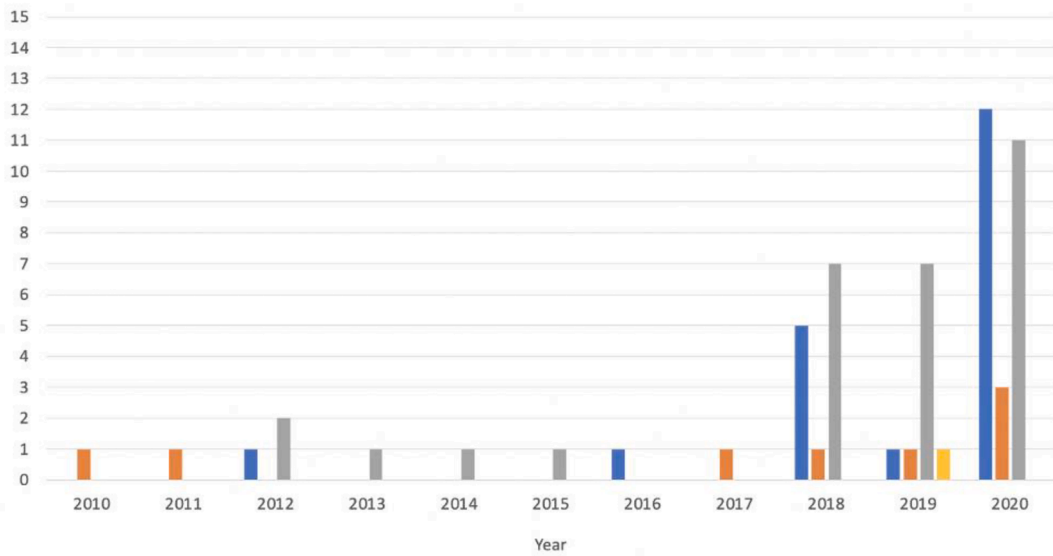


■ New product ■ New brand or product line ■ Investment ■ Collaboration/Co-promotion ■ Acquisition

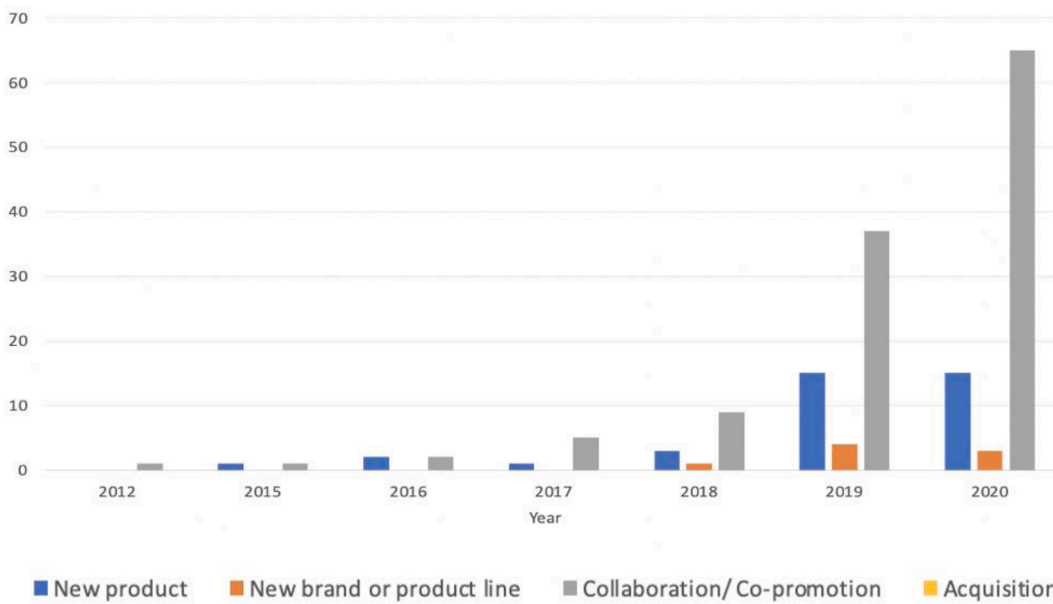
Appendix 4

Entry modes UK-NL and US: Food service and retailers (2010-2020).

Entry modes food service and retailers UK-NL (2010-2020)



Entry modes food service and retailers US (2010-2020)



■ New product ■ New brand or product line ■ Collaboration/Co-promotion ■ Acquisition

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests.

Data availability

Data will be made available on request.

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Appendix

References

- Ampe, K., Paredis, E., Asveld, L., Osseweijer, P., Block, T., 2021. Incumbents' enabling role in niche-innovation: Power dynamics in a wastewater project. *Environ. Innov. Soc. Transit.* 39, 73–85.
- Ahsan, M., Musteen, M., 2011. Multinational enterprises' entry mode strategies and uncertainty: a review and extension. *Int. J. Mana. Rev.* 13, 376–392.
- Bento, N., Wilson, C., 2016. Measuring the duration of formative phases for energy technologies. *Environ. Innov. Soc. Transit.* 21, 95–112.
- Bergek, A., Berggren, C., Magnusson, T., Hobday, M., 2013. Technological discontinuities and the challenge for incumbent firms: destruction, disruption or creative accumulation? *Res. Policy* 42 (6-7), 1210–1224.
- Berggren, C., Magnusson, T., Sushandoyo, D., 2015. Transition pathways revisited: established firms as multi-level actors in the heavy vehicle industry. *Res. Policy* 44 (5), 1017–1028.
- Bidmon, C., Bohnsack, R., 2019. When incumbents change their mind: framing strategic reorientation in emerging fields. In: *Academy of Management Proceedings*, 2019. Academy of Management, Briarcliff Manor, NY 10510, p. 15724.
- Bohnsack, R., Kolk, A., Pinkse, J., Bidmon, C.M., 2020. Driving the electric bandwagon: The dynamics of incumbents' sustainable innovation. *Bus. Strategy Environ.* 29 (2), 727–743.
- Brady, H.E., Collier, D., 2010. Rethinking social inquiry: diverse tools, shared standards. Rowman & Littlefield Publishers.
- Bouvard, V., Loomis, D., Guyton, K.Z., Grosse, Y., El Ghissassi, F., Benbrahim-Tallaa, L., Straif, K., 2015. Carcinogenicity of consumption of red and processed meat. *The Lancet Oncology* 16 (16), 1599–1600.
- Bulah, B.M., Negro, S.O., Beumer, K., Hekkert, M.P., 2023. Institutional work as a key ingredient of food innovation success: The case of plant-based proteins. *Environ. Innov. Soc. Transit.* 47, 100697.
- Chen, M.J., MacMillan, I.C., 1992. Nonresponse and delayed response to competitive moves: The roles of competitor dependence and action irreversibility. *Acad. Manag. J.* 35 (3), 539–570.
- Christensen, C., 1997. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business School Press, Boston.
- Dong, B., Zou, S., Taylor, C.R., 2008. Factors that influence multinational corporations' control of their operations in foreign markets: an empirical investigation. *J. Int. Mark.* 16 (1), 98–119.
- Dosi, G., 1982. Technological paradigms and technological trajectories. *Res. Policy* 11 (3), 147–162.
- Ellis, J., 2020. World's biggest meat firm pays \$409 million for plant-based protein maker. *AFN*. <https://agfundernews.com/vivera-acquired-by-jbs-for-plant-based-protein-409m>.
- Elzen, B., Geels, F.W., Leeuwis, C., Van Mierlo, B., 2011. Normative contestation in transitions 'in the making': Animal welfare concerns and system innovation in pig husbandry. *Res. Policy* 40 (2), 263–275.
- FAIRR (2020). *Appetite for disruption (II): a second serving*. FAIRR. Retrieved from: <https://www.fairr.org/article/appetite-for-disruption-a-second-serving/>.
- Ferreira, M.P., Serra, F.A.R., 2008. Foreign entry modes under institutional pressures: The impact of strategic resource seeking and market seeking strategies. *Rev. Ciênc. Adm.* 10 (22), 11–29.
- Geels, F.W., 2014. Reconceptualising the co-evolution of firms-in-industries and their environments: developing an inter-disciplinary triple embeddedness framework. *Res. Policy* 43 (2), 261–277.
- Geels, F.W., 2014. Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. *Theory Cult. Soc.* 31 (5), 21–40.
- Geels, F.W., 2021. From leadership to followership: A suggestion for interdisciplinary theorising of mainstream actor reorientation in sustainability transitions. *Environ. Innov. Soc. Transit.* 41, 45–48.
- Geels, F.W., Penna, C.R., 2015. Societal problems and industry reorientation: elaborating the dialectic issue life cycle (DILC) model and a case study of car safety in the USA (1900-1995). *Res. Policy* 44, 67–82.
- Geels, F.W., Schot, J., 2007. Typology of sociotechnical transition pathways. *Res. Policy* 36 (3), 399–417.
- Good Food Institute (GFI) (2020). *2020 State of the industry report: Plant-based meat, eggs and dairy*. Retrieved from: <https://gfi.org/wp-content/uploads/2021/05/COR-SOTIR-Plant-based-meat-eggs-and-dairy-2021-0504.pdf>.
- Gustafsson J. (2017). *Single case studies vs. multiple case studies: a comparative study*.
- Hekkert, M.P., Suurs, R.A., Negro, S.O., Kuhlmann, S., Smits, R.E., 2007. Functions of innovation systems: a new approach for analysing technological change. *Technol. Forecast. Soc. Change* 74 (4), 413–432.
- Herrero, M., Thornton, P.K., Mason-D'Croz, D., et al., 2020. Innovation can accelerate the transition towards a sustainable food system. *Nat. Food* 1, 266–272.
- Hockerts, K., Wüstenhagen, R., 2010. Greening Goliaths versus emerging Davids—Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *J. Bus. Ventur.* 25 (5), 481–492.
- ING (2020). *Growth of meat and dairy alternatives is stirring up the European food industry*. ING research. Retrieved from: https://think.ing.com/uploads/reports/ING_report_Growth_of_meat_and_dairy_alternatives_is_stirring_up_the_European_food_industry.pdf.
- Karlortop, K., Sandén, B.A., 2012. Explaining regime destabilisation in the pulp and paper industry. *Environ. Innov. Soc. Transit.* 2, 66–81.

- Kattirtzi, M., Ketsopoulou, I., Watson, J., 2021. Incumbents in transition? The role of the 'Big Six' energy companies in the UK. *Energy Policy* 148.
- Klitkou, A., Bolwig, S., Hansen, T., Wessberg, N., 2015. The role of lock-in mechanisms in transition processes: The case of energy for road transport. *Environ. Innov. Soc. Transit.* 16, 22–37.
- Köhler, J., Geels, F.W., Kern, F., Markard, J., Onsongo, E., Wiecek ... & A., Wells, P., 2019. An agenda for sustainability transitions research: State of the art and future directions. *Environ. Innov. Soc. Transit.* 31, 1–32.
- Kungl, G., 2015. Stewards or sticklers for change? Incumbent energy providers and the politics of the German energy transition. *Energy Res. Soc. Sci.* 8, 13–23.
- Lambin, E.F., Kim, H., Leape, J., Lee, K., 2020. Scaling up solutions for a sustainability transition. *One Earth* 3 (1), 89–96.
- Langley, A., 1999. Strategies for theorizing from process data. *Acad. Manag. Rev.* 24 (4), 691–710.
- Lieberman, M.B., Montgomery, D.B., 1988. First-mover advantages. *Strateg. Manag. J.* 9 (S1), 41–58.
- Lonkila, A., Kaljonen, M., 2022. Ontological struggle over new product category: Transition potential of meat alternatives. *Environ. Innov. Soc. Transit.* 42, 1–11.
- Markard, J., Geels, F., Raven, R., 2020. Challenges in the acceleration of sustainability transitions. *Environ. Res. Lett.* 15.
- Magnusson, T., Werner, V., 2022. Conceptualisations of incumbent firms in sustainability transitions: Insights from organisation theory and a systematic literature review. *Bus. Strategy Environ.* 1–17.
- Markard, J., Truffer, B., 2008. Technological innovation systems and the multi-level perspective: Towards an integrated framework. *Res. Policy* 37 (4), 596–615.
- Mori, A., 2021. How do incumbent companies' heterogeneous responses affect sustainability transitions? Insights from China's major incumbent power generators. *Environ. Innov. Soc. Transit.* 39, 55–72.
- Mylan, J., Morris, C., Beech, E., Geels, F.W., 2019. Rage against the regime: niche-regime interactions in the societal embedding of plant-based milk. *Environ. Innov. Soc. Transit.* 31, 233–247.
- Negro, S., Hekkert, M., 2008. Explaining the success of emerging technologies by innovation system functioning: the case of biomass digestion in Germany. *Technol. Anal. Strateg. Manag.* 20 (4), 465–482.
- Negro, S., Suurs, R., Hekkert, M., 2008. The bumpy road of biomass gasification in the Netherlands: Explaining the rise and fall of an emerging innovation system. *Technol. Forecast. Soc. Change* 75 (1).
- Nelson, R., Winter, S., 1982. *An Evolutionary Theory of Economic Change*. Harvard University Press, Cambridge, MA.
- Penna, C.C., Geels, F.W., 2012. Multi-dimensional struggles in the greening of industry: A dialectic issue lifecycle model and case study. *Technol. Forecast. Soc. Change* 79 (6), 999–1020.
- Pereira, G.I., Niesten, E., Pinkse, J., 2022. Sustainable energy systems in the making: A study on business model adaptation in incumbent utilities. *Technol. Forecast. Soc. Change* 174, 121207.
- Petersen, B., Pedersen, T., 1999. Fast and slow resource commitment to foreign markets: What causes the difference? *J. Int. Manag.* 5 (2), 73–91.
- Planko, J., Cramer, J.M., Chappin, M.M., Hekkert, M.P., 2016. Strategic collective system building to commercialize sustainability innovations. *J. Clean. Prod.* 112, 2328–2341.
- Roberts, C., Geels, F.W., Lockwood, M., Newell, P., Schmitz, H., Turnheim, B., Jordan, A., 2018. The politics of accelerating low-carbon transitions: Towards a new research agenda. *Energy Res. Soc. Sci.* 44, 304–311.
- Savin, I., van den Bergh, J., 2021. Main topics in EIST during its first decade: A computational-linguistic analysis. *Environ. Innov. Soc. Transit.* 41, 10–17.
- Schaltegger, S., Hansen, E., Lüdeke-Freund, F., 2016. Business models for sustainability: origins, present research, and future avenues. *Organ. Environ.* 29, 3–10.
- Smink, M.M., Hekkert, M.P., Negro, S.O., 2015. Keeping sustainable innovation on a leash? Exploring incumbents' institutional strategies. *Bus. Strategy Environ.* 24 (2), 86–101.
- Smith, A., Raven, R., 2012. What is protective space? reconsidering niches in transitions to sustainability. *Res. Policy* 41 (6), 1025–1036.
- Steinfeld, H., Gerber, P., Wassenaar, T.D., Castel, V., Rosales, M., Rosales, M., de Haan, C., 2006. *Livestock's Long Shadow: Environmental Issues and Options*. Food & Agriculture Org.
- Sovacool, B.K., Turnheim, B., Martiskainen, M., Brown, D., Kivimaa, P., 2020. Guides or gatekeepers? Incumbent-oriented transition intermediaries in a low-carbon era. *Energy Res. Soc. Sci.* 66, 101490.
- Steen, M., Weaver, T., 2017. Incumbents' diversification and cross-sectorial energy industry dynamics. *Research Policy* 46 (6), 1071–1086.
- Suarez, F.F., Lanzolla, G., 2007. The role of environmental dynamics in building a first mover advantage theory. *Acad. Manag. Rev.* 32 (2), 377–392.
- Teece, D.J., Pisano, G., Shuen, A., 1997. Dynamic capabilities and strategic management. *Strategic Manag. J.* 18 (7), 509–533.
- Turnheim, B., Geels, F.W., 2019. Incumbent actors, guided search paths, and landmark projects in infra-system transitions: Re-thinking strategic niche management with a case study of french tramway diffusion (1971–2016). *Res. Policy* 48 (6), 1412–1428.
- Turnheim, B., Sovacool, B.K., 2020. Forever stuck in old ways? Pluralising incumencies in sustainability transitions. *Environ. Innov. Soc. Transit.* 35, 180–184.
- Tyson Foods divests interest in alternative protein company Beyond Meats. *State Capital Newsfeed Talk Business Politics (Arkansas)*. 2019. Retrieved from <https://advance-lexis-com.proxy.library.uu.nl/api/document?collection=news&id=urn:contentItem:5VYS-6PY1-JB4V-8207-00000-00&Context=1516831>.
- Tziva, M., Negro, S.O., Kalfagianni, A., Hekkert, M.P., 2020. Understanding the protein transition: The rise of plant-based meat substitutes. *Environ. Innov. Soc. Transit.* 35, 217–231.
- Van Mossel, A., van Rijnsvoever, F., Hekkert, M.P., 2018. Navigators through the storm: a review of organization theories and the behavior of incumbent firms during transitions. *Environ. Innov. Soc. Transit.* 26.
- Wadin, J.L., Ahlgren, K., Bengtsson, L., 2017. Joint business model innovation for sustainable transformation of industries—A large multinational utility in alliance with a small solar energy company. *J. Clean. Prod.* 160, 139–150.
- Wells, P., Nieuwenhuis, P., 2012. Transition failure: understanding continuity in the automotive industry. *Technol. Forecast. Soc. Change* 79 (9), 1681–1692.
- Werner, S., 2002. Recent developments in international management research: a review of 20 top management journals. *J. Manag.* 28 (3), 277–305.
- Werner, V., Flaig, A., Magnusson, T., Ottosson, M., 2022. Using dynamic capabilities to shape markets for alternative technologies: a comparative case study of automotive incumbents. *Environ. Innov. Soc. Transit.* 42, 12–26.
- Wesseling, J.H., Farla, J.C.M., Hekkert, M.P., 2015. Exploring car manufacturers' responses to technology-forcing regulation: the case of California's ZEV mandate. *Environ. Innov. Soc. Transit.* 16, 87–105.
- Yin, R.K., 2003. Designing case studies. *Qual. Res. Methods* 5 (14), 359–386.