

Can disruptive business models effectuate change in business ecosystems?

The struggle to improve sustainability and productivity in UK housebuilding

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Abstract

Complementarities between business models in an ecosystem is key to viability but can also result in resistance to change. In research on disruptive firms in housing construction, it was found that they did not synchronise with the ecosystem at critical junctures, which prevented their adoption and resulted in firm failures.

Keywords

Ecosystems, business models, disruption, sustainability, productivity

Introduction and conceptual approach

In many industries, value creation and appropriation involves multiple, interconnected actors who work together to co-create value (Teece, 2007; Zott and Amit, 2010). While cooperation typically takes place vertically within supply chains, there is an increased recognition that value creation involves horizontal cooperation, too (Autio and Thomas, 2014). With the rise of (digital) platforms, it has become easier for firms to work simultaneously in the same stage of the supply chain and involve a wide range of stakeholders. This networked view of value creation and appropriation has been captured with the ecosystem concept (Adner, 2017; Autio and Thomas, 2014; Iansiti and Levien, 2004). While there are many different interpretations of business ecosystems, we take a broad view of firms working and innovating together within a network of “complementors, suppliers, regulatory authorities, standard-setting bodies, the judiciary, and educational and research institutions” (Teece, 2007, p. 1325). While firms work together within the ecosystem, they each operate their own business model (Boons and Bocken, 2018). For all actors to benefit from the ecosystem, there needs to be a considerable complementarity between their own individual business model and that of others within the ecosystem (Jacobides et al., 2006).

What makes ecosystems competitive is their strength to combine multiple value creation drivers as the involvement of a broad set of actors facilitates developing new value propositions and transactions, creating positive network externalities, bundling activities, and reducing transaction costs (Zott and Amit, 2010). Notwithstanding an ecosystem’s unique attribute of providing strength through numbers, the high degree of interdependency between actors also raises questions about the possibility for firms to introduce disruptive innovation within an existing ecosystem. Firms that feel disadvantaged by an ecosystem’s existing structure have an incentive to disrupt it by changing their own role in the value creation and appropriation through technological and/or business model innovation.

While existing studies show how disruptors employ various strategies to outmanoeuvre incumbents and other competitors in an ecosystem (Ansari et al., 2016; Cozzolino et al., 2021; Hannah and Eisenhardt, 2018; Snihur et al., 2018), they leave open how disruptors deal with other ecosystem actors, such as suppliers, regulatory authorities, and standard-setting bodies (Teece, 2007), with whom they do not directly compete but do depend on. This is an important omission because resistance to change does not come from direct competitors only, but also from other ecosystem actors who have a stake in sustaining the status quo. A better understanding of the way in which a disruptor manages its relations with ecosystem actors such as regulatory authorities, standard-setting bodies, users, and suppliers is of particular importance to highly regulated and place-based industries. While a disruptor might not be in competition with all ecosystem actors, they cannot circumvent

them either because they act as gatekeepers to the ecosystem and are the ones who can provide firms with a scalable market niche and a license to operate.

Moreover, existing studies mainly deal with cases where disruptors have successfully managed to disrupt an existing ecosystem (Ansari et al., 2016) or to create a new ecosystem (Dattée et al., 2018; Hannah and Eisenhardt, 2018; Snihur et al., 2018). However, it is far more common for firms aiming to disrupt an ecosystem to struggle in doing so or to fail altogether and, as a result, for the status quo to remain (Jacobides et al., 2016). Looking at successful cases only leaves unanswered why it is that potential disruptors might struggle or even fail to effectuate change with their technological or business model innovation at the level of the ecosystem. In this paper, therefore, we address the following question: *How do firms aiming to disrupt an existing ecosystem manage the disruption process and convince other ecosystem actors to support them in their effort?*

We seek to answer this question by considering both the business model and the ecosystem as a structure of interdependent activities (Siggelkow, 2002; Stonig et al., 2022; Zott and Amit, 2010) and highlighting the importance of boundary-spanning activities between a focal firm and the ecosystem (Zott and Amit, 2010). When a disruptor innovates their own business model with the aim to change the ecosystem, their attempt will have an impact on the ecosystem and thus cause frictions with the business models of other ecosystem actors. For the disruption process to progress, a disruptor thus needs to engage in synchronisation of its own activities with that of other ecosystem actors to create a dynamic fit throughout the disruption process (Kumaraswamy et al., 2018; Petzold et al., 2019).

Methodology

Considering the implications of business models and the ecosystem, we conduct an in-depth study of the attempt of disruptors to change the UK housing construction sector by introducing modern methods of construction (MMC) with the aim to improve the sector's sustainability and productivity. While the construction sector is not usually seen as a business ecosystem, the highly networked nature of the sector lends it well to examine it through an ecosystem lens (Pulkka et al., 2016). Disruptors introducing MMC change their business model by moving from being project-oriented to product-oriented (Lessing and Brege, 2015), with the consequence that they change the ecosystem structure and governance in terms of how activities are linked and who performs them (Zott and Amit, 2010).

The value proposition of MMC providers is different from industry incumbents. Constructing homes in a factory environment has the potential to improve the sustainability of homes as they can be made more energy efficient and of the production process as homes are manufactured in a less wasteful manner. Besides, MMC holds the promise of improving productivity and bringing down prices when operating at scale and a faster delivery of the end-product. However, the MMC business model's promise to improve

sustainability and productivity relies on disruptors effectively fitting it into the existing ecosystem or transforming the ecosystem instead (Smith and Raven, 2012). In our empirical case, we examine how firms trying to disrupt UK housebuilding with MMC employ various approaches to synchronise (fit and/or transform) their activities with those of others in the ecosystem.

Four types of data were used to gain insights into the current market dynamics and the approaches of key firms and stakeholders: (1) archival documents including industry reports, government publications and academic papers that pertain to new homes construction in the UK and particularly with respect to MMC, (2) thirty-five semi-structured interviews and twelve direct engagements through discussion and site visits, (3) corporate archives including websites, press releases, marketing materials and financial filings, and (4) archives from the media discussing the firms, new homes construction in the UK and modular homes.

Findings

The firms studied were motivated to innovate housing delivery to combat long-standing issues, including chronically low productivity and stagnant productivity growth, poor sustainability performance, constraints of a limited supply of skilled labour, and long-standing unmet demand for housing. These firms aimed to simultaneously address productivity challenges and the triple crises of climate change and skilled labour and housing shortages. Our analysis however revealed multiple points of friction between the disruptive firms' business model and the existing ecosystem.

In principle, moving homes construction from a traditional site to a factory environment is expected to deliver productivity gains. The consistency and repeatability of a manufacturing approach paired with the shelter of a factory environment – unaffected by winds, rain, and other environmental factors – enables speed, efficiency and scalability that is incredibly difficult to achieve with traditional construction methods. With the high capital costs for the factory and equipment, and overheads related to maintaining a semi-skilled workforce for consistency and quality of assembly, it is critical that the factory operates at capacity and reaches the benefits of scaling their operation to cover expenses and lower costs. In practice, these firms did not have an opportunity to operate at capacity or reach scale, and thus failed to deliver on a vital aspect of their business model. For a host of reasons, important ecosystem actors stymied adoption of factory-manufactured homes. Disinclined to try something new and different, and wary of taking on any additional risk, land-use regulators and local development teams – as well insurance and warranty providers – were slow to extend support to the new firms and their products.

A major challenge for the construction industry is a severely limited and diminishing pool of skilled labour that is vital to traditional construction. In moving to a manufacturing approach, firms can work with highly repeatable tasks that require trained labour but not

the superior abilities of a skilled labourer such as a joiner, plumber, or electrician. In compartmentalising the assembly of a home into discrete tasks and precise standard operating procedures, and using more pre-manufactured components for complex tasks, the need for skilled labour is greatly reduced. This enables firms to tap into a much wider and deeper pool of available labour, and at a reduced cost. Skilled labour remains important, however, when factory-produced modules inevitably arrive on a construction site for installation. Extensive work – including foundations and utilities – are required to prepare a site for a modular home to be installed. If there are delays on the site, the storage of the modules can be hugely problematic in terms of space and protecting them from the elements before they can be made air- and water-tight. In addition, if the foundations are not set to the precise specifications of a factory-built home, there are major issues that have resulted in the demolition of developments due to millimetres of variance between specifications and actual execution.

Regarding the marketplace challenge of unmet demand, each of these firms entered the space seeing this as an opportunity and seeking to build their orderbook by addressing the severe shortages in the supply of new homes. Government targets had not been attained for decades, and there seemed to be significant unmet demand. The firms understandably would have anticipated high interest in their products, but their experience proved much less straightforward. This had a crippling effect on their viability. With the high and ongoing costs to maintain their factory and workforce, it was critical that the factories consistently operate at capacity. Further, to facilitate economies of scale that would enable them to price their product more competitively, they needed to consistently deliver volume. Existing actors challenged these efforts as they were not motivated or incentivized to support a more modern approach to delivering homes. There was a significant amount of inertia and entrenched practices that made it difficult for the firms to gain traction. The large incumbents did not adopt their products or practices and held much of the power in the market. For other developers, including municipal authorities seeking to build affordable housing, the decision-makers were wary of the risk involved in committing to something relatively new and unproven. Regulatory approvals for new housing developments were notoriously challenging for all players, but particularly disruptors new to the process. Those with approving authority were also sceptical of the quality of the homes and resistant to the design aesthetic which was often different from traditionally built homes. Further, the actors responsible for certifying, providing home warranties and insuring the homes were resistant to approving the homes built through non-traditional methods. While this last challenge was mostly resolved in time, it did create significant headwinds for these firms.

Discussion and conclusion

This research demonstrated challenges for disruptors trying to integrate into an existing ecosystem. Their approach and business model evolved from an identified opportunity for

a more innovative method of housing delivery, specifically addressing challenges to productivity, sustainability, labour supply, and shortfalls in production. Through these efforts, they were consistently confronted with friction between their approach and the existing market practices. The frictions that developed made it impossible for the firms to gain the necessary traction in the market. Efforts to synchronise at these points of friction met with only moderate success and oftentimes came too late.

Early on, the firms determined that it was vital their factory-produced homes were virtually indiscernible from traditionally built homes. They worked to ensure brick exterior cladding looked and felt like it was done imperfectly, by hand, belying the precision of its factory production. Other aspects proved more challenging. The speed at which they could produce homes was not aligned with the realities on a construction site, where timing was more fluid and prone to delays and stoppages. The produced modules needed to be stored, which led to space issues and transport challenges, and in some cases, mould developed in the stored units. Producing more sustainable homes was a natural result of their processes, but the market was not willing to pay a premium for this level of quality and the firms did not have an opportunity to reach a scale that could allow for more competitive pricing. In leveraging a different labour pool and largely eschewing traditional management teams – looking more to manufacturing professionals rather than experienced construction project managers – they faced severe challenges in the necessary site work after their modules left the factory. There were instances where a modular firm partnered with an established developer and that largely resolved these site-based issues, but that was an exceptional case that presented itself well after a track record of missteps had been established. When their orderbooks were too light to sustain their factories, two of the firms moved into developing their own sites – a move intended to increase their volume and assume more control of the situation, but which resulted in significant capital requirements and execution failures that contributed to their ultimate demise.

For firms seeking to disrupt a complex, regulated and deeply entrenched industry such as housing construction, inertia within the ecosystem and resistance from important collaborators may prove insurmountable. The points of friction may ultimately be the points of failure – early and ongoing identification and assessment is a critical exercise to be undertaken by a firm. In assessing friction points, firms can determine possible tactics to better synchronise with the ecosystem at critical junctures. In some cases, the firm may – at least initially – need to flex toward the ecosystem’s existing practices and expectations rather than expect the ecosystem to flex toward something new. While these firms disrupted the *process* of housebuilding, the *product* was intentionally aligned with the norm, and was thus largely in sync with the ecosystem. By providing a more sustainable product, they ultimately proved to be too unaligned with a market context that did not support a price premium for a more thermally efficient home. Work to encourage government grants and regulations for improved carbon performance could have helped

to level the playing field in terms of valuations and demand for a superior product, but such an effort would take time.

Firms may struggle to change an industry from the inside out for a host of reasons. Power imbalances, competing priorities, misaligned incentives, time constraints, resistance to change and complexity can thwart efforts to innovate within an ecosystem. For disruptors, assessing, addressing, and monitoring the points of friction is critical to finding synchronicity within an existing ecosystem to secure a viable position.

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