

THE ROLE OF DISRUPTIVE INNOVATION IN CURRENT INNOVATION ECOSYSTEMS

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Abstract

Disruptive innovation introduces novel ideas, technologies, or business models that challenge existing norms. In an innovation ecosystem, disruptive innovations create a dynamic environment where established players must adapt their business models to avoid being overtaken by new entrants. Moreover, disruptive innovation contributes to the resilience and vitality of innovation ecosystems by fostering diversity and continuous improvement. They inject energy into the system, driving progress and ensuring that the ecosystem remains adaptable to change. On the other hand, there are incumbents which operate well-established business needs to cope with threats of disruptors. This paper aims at establishing managerial framework that enables incumbents to set up appropriate alert system that makes them adaptable to upcoming disruptive challenges. The paper is based on qualitative research namely contextual interviews with company experts and managers in IT sector. The findings showed that despite general awareness of disruptive innovation concept there was still a lack of information about potential impact of disruptive innovation on routine company business let alone counter-provision to be implemented for both mitigation of disruptive innovation impact or transformation of the phenomenon of disruptive innovation into opportunity or challenge. This paper offers solution that helps incumbents cope with a threat of disruptive innovation.

Key words: Disruptive innovation, innovation ecosystems, IT sector

JEL Code: O31, O32, O33

1. Introduction

1.1 Disruptive Innovation taxonomy

Nowadays, markets and industrial sectors face fundamental change. This sweeping change is characterized by more demanding, volatile and sometimes unpredictable customer needs. Pursuant to these changes companies must align their product portfolios to match customer needs. On top of that, this change in business environment leads to higher probability of the

occurrence of high-grade sometimes termed disruptive innovation (DI). There are several delimitations of DI pioneered preferably by Christensen (Christensen,1997; Christensen et al, 2015). They distinguish between DI and sustaining innovation (SI). While SI represents an incremental or radical development of existing products aimed at the retention of competitive position, DI provides new performance criteria based on a new technologies and new product configuration and usually has an impact on the market. In this respect we speak about disruption that takes effect when the innovation steals market share from companies which are not sufficiently prepared to challenge the advent of disruptors (Weinreich et al., 2021, Christensen, Raynor & McDonald, 2015). These mainstream companies (incumbents) are under threat to be consequently forced out of the market. By this way DI has a potential to fundamentally change markets (Christensen,1997; Christensen & Raynor, 2003). On the other hand, volatile and hardly predictable market provides companies with opportunity to proactively influence the market development through self-generated DI (Christensen, 1997; Rasool et al, 2018). It was observed that upon the launch DI are often underrated by incumbents because of lower performance as compared to mainstream products or limit market share within which DI operate. Incumbents usually neglect disruptor's ability to enhance DI performance which steadily squeezes incumbent's products out of the market.

As for the taxonomy of DI we can distinguished among three types of disruption: low-end disruption, high-end disruption and market disruption.

Low-end disruption is typical for disruptors who start to serve less demanding market which is willing to accept lower DI performance. DI then continuously increases its performance to match that one requested by customers. In this moment disruptor is able to offer customer-demanded DI performance at affordable price. In the same time incumbents boost the performance of SI in exchange for excessive price. Such outperformed products exceed customer requirements who then opt for less sophisticated but cheaper solution. They perceive DI as an alternative solution and migrate to the new product (Christensen, Raynor & McDonald, 2015).

High-end disruption contradicts to original Christensen's concept because of a different approach to satisfaction of customer's needs. DI performance as well as its price starts above customer expectation to continuously attract additional customer community to persuade them to buy a product. Typical examples are Apple or Tesla products which are of indisputable

superior performance, but they are sold at premium price. Subsequently these companies are able to bundle these products with other solutions (e.g. additional services) and incorporate them into customer innovation ecosystems. As an example, iCloud or interconnectedness between iPhone and Tesla cars can be mentioned.

Market disruption means creating completely new market for current non-consumers. DI creates price-affordable solution for those groups of customers who would have never been users of the product. Typically, low-cost airlines offer products even for low-income groups of customers like students or young families.

In addition, disruption can be also viewed from the standpoint of actors operating inside or outside the innovation ecosystem. With relation to the position to innovation ecosystem disruption can be classified as internal or external disruption. The former refers to competition for niches within ecosystem while the latter actors outside the ecosystem (Rosli & Candi, 2020).

It is crucial for incumbents to recognize disruptive potential of newcomers' products to avoid being ambushed by DI. There are ineffective approaches of some companies which evaluate disruptive potential of already existing products (ex post evaluation). These companies then strive to delay disruption process. This approach is rather passive due to little possibility to reduce accompanying risk of disruption to company own business. Therefore, it is inevitable to evaluate disruptive potential of innovation ex ante.

Anthony et al, (2008) provided innovation managers with some hints how to increase probability of DI commercial success. They recommend drawing attention to following aspect of DI implementation process:

- Follow a market-proven process - so your company can reliably create blockbuster businesses,
- Create structures, systems, and metrics - so the disruptive innovations that will power your firm's future growth receive the funding and personnel needed to succeed,
- Create a common language of disruptive innovation -- so managers can reach consensus around counterintuitive courses of action.

There is a chance that the incumbents can proactively influence market development and reinforce their competitive position (Christensen et al, 2018). The incumbent may aggressively invest in existing capabilities to extend current performance improvement trajectories to slow

or delay the onset of disruption. They may also approach proactive repositioning in profitable new niches. If possible, companies can make use of organisational ambidexterity to effectively manage conflicts arising from pursuing different types of innovation simultaneously. This may lead to the resolution of so called “Innovator’s dilemma”. Kapoor & Klueter (2015) noted that the incumbents can also seek to incorporate early disruptors immediately once they start to challenge incumbent market leadership. In practice, this can be arranged through either partnership with startups or licensing start-up’s know-how as soon as the impact of a disruptor reaches certain threshold. Direct acquisition of a start-up is an option. In specific situations the incumbents can pursue technology reemergence strategy which rests in redefining the meanings and values associated with their legacy technology as well as redefining the boundaries of the market they compete in (Raffaelli, 2018). Another way consists in the implementation of self-generated DI. Companies can adapt their existing innovation portfolios by incorporation of DI into their innovation portfolios. For this purpose, companies have to establish viable innovation portfolio management (IPM) that aims at the identification of the company’s promising ideas and evaluate them holistically to allocate resources for their development. For this purpose, Weinreich et al, (2021) proposed five-step methodological concept to integrate DI in value oriented IPM. This conceptual framework includes (i) idea screening, (ii) idea categorisation, (iii) holistic evaluation, (iv) portfolio creation, (v) monitoring. The inputs to this process are product ideas generated by the company based on their market and customers analysis. At the beginning of the process not only innovation topics are identified but also their disruption potential is assessed. The output is then product innovation portfolio of the most promising innovation projects that are expected to provide customer with requested customer value.

1.2 The interplay between disruptive innovation and innovation ecosystems

The concept of disruptive innovation ecosystems deals with specific type of innovation ecosystem which is capable of delivering disruption in undeserved markets. In addition, there are conditions that can be supporting to the emergence of disruptive innovation ecosystems. These conditions are (i) navigating risks, (ii) creating new markets and (iii) generating new roles (Nthubu, Richards & Cruickshank, 2022). Xin, Miao & Cui (2022) studied mutual interrelations among DI, innovation ecosystems and resources orchestration. They confirmed that innovation ecosystem cooperation and competition have positive effects on environmental resource orchestration which further influence green DI. Besides, attention has been paid to

disruptive technologies to be a part of disruptive innovation. In this context the importance of some attributes of disruptive technologies, namely their complementarity, novelty and quality has been addressed. It was proven that diversity, quality and novelty of complementary technologies within ecosystems contribute to subsequent disruptive innovation. This conclusion was exemplified by the development of electric car industrial sector in China where this industry is currently disrupting traditional mainstream gasoline automobile manufactures by delivering environmental characteristics (He, Lin & Zhang, 2023). The government can also play an important and strategising role in the development of disruptive innovation ecosystem. Government initiative may be helpful if domestic firms are reluctant to invest in technologies that can potentially disrupt the existing ecosystem and receive retaliation from powerful multinational corporations that control the ecosystem. The government initiative can be focused on promoting technology innovation, organising industrial networks and social capital and empowering institutional intermediaries. Examples taking from China show that (i) the network initiated by the government has more centralised structure at its inception, (ii) as the government-initiated network evolves into a government-orchestrated process, inter-cohesion increases and structural folds facilitate knowledge generation, (iii) as the network evolves into a embedded structure, the government and generally maintained their status during the transformation (Wang, Zhang & Li, 2020).

Rosli & Candi (2020) explored the development of disruptive innovation ecosystem in the segment of 3D printing. They identified four phases of the development of 3D printing innovations ecosystems (i) ecosystem formation, (ii) ecosystems growth, (iii) internal disruption and (iv) external disruption. In the stage of ecosystem formation, the authors accentuated the principle of exaptation as an approach that enables the innovation to serve the purposes which it was not originally intended for. Exaptation offers a route to innovation by allowing an artefact or one of its modules to be co-opted for a new function, potentially disrupting firms whose offerings previously satisfied that function. In this context they speak about exaptation-driven innovation.

The pre-condition of effective functioning disruptive innovation ecosystem is its ability to undergo transformation whenever external conditions are significantly changed. An ecosystem transformation approach is about outlining rationales for ecosystem change and considering how actors identify and execute new value propositions. Oghazi et al, (2022) proposed a framework that is composed of four phases (processes) that include: (i) ecosystem

transformation forces, ecosystem opportunity identification, (iii) value alignment and (iv) ecosystem revitalisation. These mutually interlinked processes serve as a basis for understanding ecosystem transformation. The framework suggests a circular model where four main mechanisms or stages can be used to understand the transformation process. In practice, firms take responsibility for change, and actors define new ecosystem roles, driving the entire ecosystem towards transformation based on new value propositions. This means that disruptive innovation and technological advancement, along with market needs, are driving ecosystem transformation through new value creation.

2. Methodology

The role of disruptive innovation was mapped out through qualitative content analysis. Web of Science (WoS) and Scopus were the databases subjected to search in course of time period 2007-2024. Searching code disruptive innovation AND innovation ecosystem* was applied. After shortlisting topical references, it was collected 36 papers, the most relevant of them were referred to in this paper. In addition, contextual interviews with company managers, executives and experts were conducted. The aim of contextual interviews was to gain an opinion of experts on the role of disruptive innovation in existing innovation ecosystems. Basically, the questions concerning the impact of DI on routine company business, company response to DI, impact of DI on market dynamics, understanding customer demand for disruptive products, success factors in market niches or the role of strategy in creation of response to DI were raised. Alongside the activities that the companies have already implemented in terms of their preparedness to the advent of disruptive innovation was the focus of interviews. As a matter of fact, 21 semi-structured contextual interviews with company manager, experts and IT professionals were conducted. The respondents were chosen to represent companies of various size from small companies, through mid-size companies to big companies (based on company size typology respecting headcount (less 50 employees, 50-250 employees, more than 250 employees). On top of that one IT freelancer was interviewed. The interviewees represented a broad spectrum of the IT industry, from large multinational corporations to agile startups. This diversity ensured a well-rounded view of how different types of organizations perceive and respond to disruptive innovation.

All the respondents were sufficiently familiar with disruptive innovation concept. The interviews were recorded and transcribed by respective iPhone application. Some of them were conducted online through Teams platform. The interviews were conducted between 2022-2024.

Open coding was used for the interpretation. The interview data were systematically coded by means of MAXQDA. At first, responses were categorized into themes and sub-themes relevant to the framework and its application in various market contexts. The coding process proceeded in two phases consisting in initial coding phase and advanced coding and categorization. As for the initial coding phase key phrases were extracted and emphasized. These extracted phrases served as the fundamental elements of our initial coding strategy, setting the groundwork for a more comprehensive and in-depth analysis. As for the advanced coding phase relevant terms and phrases were categorized and interpreted accordingly.

3. Results

Basically, all 21 interviewees were familiar with the concept of DI. They were aware of the role and potential impact of DI on existing company business. On the other hand, they had little notion about the possibility of the mitigation of the impact of DI on company business. The interviewees generally believed they could roughly identify which companies, products, or services might disrupt the mainstream market. They acknowledged that such disruptions typically unfold over an extended period, allowing some level of anticipation. Some of the respondents also highlighted the role disruptive business models (DBM) which have a potential to transform existing IT market. Typically, Open-source software, Software-as-a-Service (SaaS), and commercial licensing strategies, have significantly altered the competitive landscape. These models, benefiting from community contributions and innovative licensing, have made it challenging for traditional businesses to compete. Given the emphasis placed on business models by the interviewees, it's suggested that criteria like "Business model is different" be given greater importance in the evaluation framework. This aligns with the industry's perception that innovative business models are often at the core of successful disruptive innovations. The results obtained indicated that there is a general awareness and recognition of disruptive innovation among managers, there are significant challenges in confidently predicting and effectively responding to these disruptions. Additionally, evolving business models are reshaping competitive dynamics, necessitating new strategies and approaches for companies to remain viable and competitive in the face of disruption. This insight has led to the recommendation that business model-related factors should be weighted more heavily in the assessment of contributing factors for identifying disruptive innovations. Respondents also put the barriers to confident action into spotlight. Despite their ability to sense potential disruptions, several factors hindered confident and proactive responses. They

emphasised factors that can put brake on reasonable proactive response. Basically, it deals with (i) the lack of confidence and certainty in their assessments, (ii) fear of false positives, where a predicted disruption does not materialise, (iii) pessimism regarding the success of others, possibly leading to underestimation of potential disruptors, (iv) insufficient evidence or proof to convince decision-makers or boards to allocate resources appropriately..

Conclusion

The conclusions showed that DI could pose a threat to sustaining company business in terms of discontinuation and reconfiguration of existing value chain. DI usually leads to re-distribution of the value generated by innovative solution. Newcomers offering disruptive products that are offered through disruptive models cut off the portion of original customer value for themselves. On the other hand, the incumbents stand a chance to defy the advent of DI by using several vehicles like investing into existing company capabilities, repositioning products in new profitable niches, acquisitions of startups or licensing their know-how and technology reemergence. The incumbents can also incorporate DI or its elements in their product portfolios or place emphasis on sustaining innovation that can be at least temporarily competitive to disruptive products. The precondition for successful DI challenging is always timely recognition of DI threat which must be followed by the implementation of counter-provisions. In general, the companies must inevitably adapt their business models to improve selected components of BM. The core improvement must refer to improved value proposition design to convince customers about benefits coming from the purchase of innovative company products.

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