

INDUSTRIES SHAKEN – NOT STIRRED: OPTIMISING DISRUPTIVE TECHNOLOGIES ARE THERE DIFFERENT PATHS FOR DISRUPTIVE TECHNOLOGIES? ALTERNATIVE TRAJECTORIES TO OPTIMISATION OF DT

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ABSTRACT

History has repeatedly shown that DT offers incumbent enterprises opportunities to strengthen and penetrate their market position whilst providing new product/market combinations to emerging enterprises. As business models based on sustaining innovations do not tend to create new growth platforms, a firm wishing to make the strategic choice to shape an innovation into a disruptive growth business should enter new markets with a strategy based around disruption, commercialising products with lower performance, less functionality, and lower prices. This paper identifies constructive ways of utilising DTs and attempts to show how DT can become a capability-enhancing strategic asset with potential to create an improved business model.

INTRODUCTION

Threats and opportunities brought about by the continuous need for change and innovation, and the recent world events requiring increased focus on security and resilience [5], make it imperative for firms to revisit their strategies and increasingly focus on efficient introduction, management and exploitation of emerging and disruptive technologies. Large corporations are known as significant sources of innovation due to their extensive research and development capabilities. However, their strict organisational culture often restricts their ability to pursue novel technological opportunities, and small and medium-sized firms seem to have better opportunities to develop the emerging technologies up to a level of disruption, where they shake the industry or even initiate a new one.

Based on exploratory case studies of two companies in logistics/ transportation industry with different strategies to manage and introduce technologies, this paper aims at challenging earlier recommendations for the best practice strategy to technology management and especially disruptive technologies (DT). Furthermore, we identify more constructive ways of utilising DTs, both in large and medium-sized organisations, and attempts to show how DT can become, if properly managed, a capability-enhancing strategic asset with a potential to create an improved business model.

TECHNOLOGY MANAGEMENT IN TRANSPORTATION/ LOGISTICS INDUSTRY

The fundamental question in the field of strategic management is how firms achieve and sustain competitive advantage. Building upon the idea of creative destruction, Joseph Schumpeter was the first scholar to capture the problem of finding the right equilibrium between exploration and exploitation strategies [7], which are frequently associated with radical and incremental innovations in the literature. The underlying difference between radical and incremental categories is that whereas incremental innovations are developed with modest advancements to the old technology following the logic of exploitation strategy and preserving the status quo of the industry, radical innovations mainly result

from utilisation of exploration strategy and have an industry equilibrium-disturbing character [2, 3, 6, 8, 9].

Being highly capital-intensive and therefore encouraging innovations and efficient management of technologies, the transportation industry has been the beneficiary of many significant technological advancements suggesting that efficient management of technological discontinuities – and DTs in particular – ought to have a profound impact on any firm’s strategy [6]. Failing to understand the role that technology can take as a key strategic resource of a corporation can impede it becoming a strategic asset [1].

To illustrate different strategies to manage new technologies and show how these technologies can be used as strategic assets, we study two companies in the transportation industry. The first case firm, United Parcel Service (UPS), is an example of how new technologies can help a company to improve its operating performance. The company still basically provides the same service it did in 1907 – delivering packages for customers. However it is using advanced technology to improve the way it operates its primary business and to leverage those skills and infrastructure to move into other related lines of business. By contrast, the technology used by Octopus Card to operate the system is itself a DT, representing a very distinctive setting and view of technology management from UPS.

DT Optimisation Business Model

Octopus Card’s technology management strategy is built around the introduction of DT (exploration strategy) whereas UPS progressively introduces technologies that strengthen its market position (exploitation strategy). Both these allow us to plot a new direction of interaction between market creation and market penetration, where the benefits of both can materialise. As depicted in Figure 1, by tracking and merging the separate paths taken by both companies, it is possible to generate a scenario for a new business model enabled by technologies being embedded in both products/services and processes. We have named this the “DT optimisation model”.

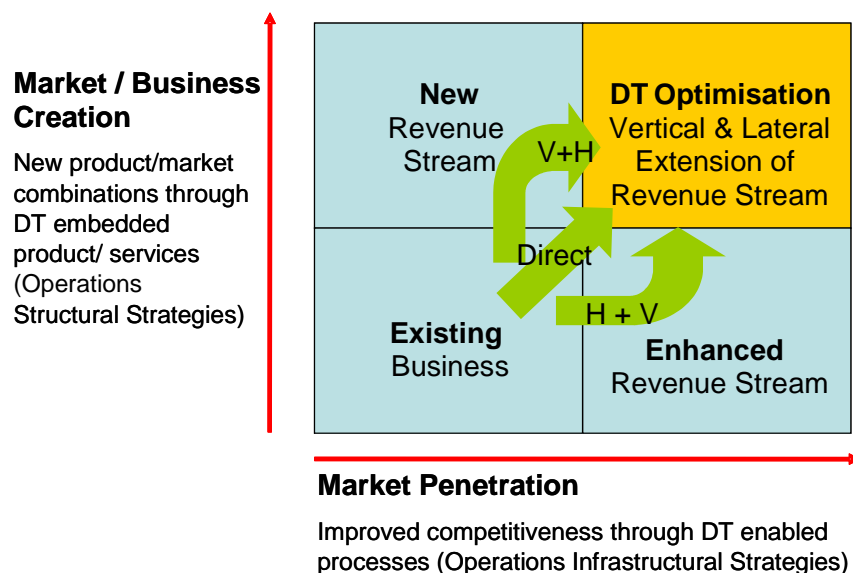


FIGURE 1: Disruptive Technology Optimisation Model

TRAJECTORIES TO THE DT OPTIMISATION BUSINESS MODEL

According to our analysis, the transition to the disruptive technology optimisation business model can follow one of the three trajectories: vertical-horizontal (V+H), horizontal-vertical (H+V), or a direct path as represented by the arrows in Figure 1. The V+H and H+V trajectories consist of two steps, the main difference being in the sequence in which these steps are taken, whereas the direct approach is a single movement process.

Vertical-Horizontal (V+H) Trajectory

As suggested by its name, the (V+H) trajectory begins with a firm first expanding its business vertically through changes in technology *stock*, i.e. in the assets of the firm in the form of technology incorporated in specific components; machinery, skill sets, organisational rules and information [4], or in form of incrementally improved existing applications *before* a clear sign of the market readiness for such technological performance is received. This has two important implications for businesses. From small businesses' perspective the V+H trajectory is risky, as it implies that the firm is exposed to significant R&D investments over technology, which may not be accepted by market as such. On the other hand, from the large established firm perspective, there is a risk that the tight, tacit customer relationships and organisational culture may blind them to the value creation enabled by DTs as they typically provide smaller profit margins until they get accepted by larger markets.

Horizontal-Vertical (H+V) Trajectory

Whereas following vertical trajectory V+H involves business expansion through technology stock and structural strategies, the H+V trajectory involves deploying *infrastructural* strategies and concentrating on the technology as *flow* i.e. firm's capacity to diffuse technology from and to the external environment.

Direct Trajectory

Following direct trajectory requires simultaneous application of the vertical and horizontal paths, significant amount of management will power, highly disciplined workforce, and access to substantial funding is required. The risks are high, but so are the rewards, as market share is captured from established firms whilst new markets and business areas are created. In addition, many of the drawbacks of the V+H and H+V paths can be avoided by following direct trajectory. The examples of firms that have successfully adopted this trajectory include eBay and Yahoo!.

CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Our analysis of two cases from the transportation/logistics industry, demonstrate that disciplined implementation of appropriate marketing strategies and proper identification of key operational objectives are keys to the successful utilisation of new technologies. In another words, the paths that our case study organisations have followed show that technology-embedded processes and products create opportunities for generating new business models that have the advantages of both market creation and penetration. In addition to the experimentation and exploitation strategies, in the face of DT, the optimal strategy may well be a mixture of the two strategies with the ultimate goal of minimising the negative impacts and maximising desirable consequences.

A list of references will be available by contacting the authors of this paper.