Institution:
Durham University

Unit of Assessment:
17 Business and Management Studies

Title of case study:
Supporting the development of New Business Models and company strategy using a smart roadmapping toolkit

Period when the underpinning research was undertaken:
Between 2015 and 2019

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Kiran Fernandes	Professor	2013 - present
Nikolaos Goumagias	Postdoctoral research fellow	2013 – 2016

Period when the claimed impact occurred:
Between 2015 and 2019

Is this case study continued from a case study submitted in 2014? Y/N
N

1. Summary of the impact (indicative maximum 100 words)

Durham University Business School (DUBS) research into the analysis and re-engineering of a complex, commercial supply chain network has realised new business opportunities worth more than GBP800million. A road-mapping toolkit developed by DUBS, and adopted by NG Bailey, one of the UK's leading engineering companies, has had a transformational impact on process and decision making within the business and across its supply chains.

The impact of the toolkit, developed as part of the 'Customer of Choice' strategic supply chain initiative, has been far reaching. More than 300 companies in NG Bailey's supply chain have used it to benchmark, re-engineer and improve operations, reducing product development time by more than 40% and accessing a wealth of new revenue.

2. Underpinning research (indicative maximum 500 words)

The challenges of creating and capturing value from different links in an industry's value chain have been highlighted as one of the key priorities by industry [R1] and by the Government of the United Kingdom's Industrial Strategy. While there is some understanding in the extant literature of how companies can create and capture value to be flexible and innovative, there is limited practical help for managers to use value chain information to improve their business models.

In response, research by Fernandes and Goumagias at Durham University Business School has developed a new theoretical construct, called Business Model Archetype (BMA) [R2], which demonstrates how companies can improve their business models by creating and capturing value from different links in an industry's supply chain [R3, R4]. The researchers used biologically inspired evolutionary models to understand how constructing taxonomies of BMAs could capture the multidimensionality and heterogeneity of various organisational structures [R2, R4]. Building on Fernandes' previous work on technological process innovation [R5], this research specifically

focused on developing a context-specific BMA framework that helped strategy and technical teams understand and navigate the complex business terrain, using unique combinations of BMA business model structures.

The development of the concept of BMA represents both a contribution to knowledge and practice, as the developed BMA framework provides managers with a structure to connect different components of an organisational business model. Research [R2, R4] has demonstrated that companies can analyse their business model structures (e.g. partnership development mechanisms, channel management, etc) by using industry-specific taxonomies of BMAs. These context-specific BMAs are more efficient than traditional typology-based approaches that generally impose pre-existing industries' market structures (e.g. such as being multisided) while developing operational strategies.

Funding from the Centre for Process Innovation (CPI) enabled a feasibility study on the application of the BMA framework to benchmark and develop operational strategies within two pharmaceutical companies [R4 by Fernandes, Goumagias, and PhD student Kieran Purvis], which was then disseminated via a series of workshops in 2015 and 2016.

Fernandes and Goumagias developed a toolkit based on the BMA framework using a phylogenetic classification system that involves the categorisation of processes based on shared business model characters (e.g. how partnerships are developed). The BMA methodology and the toolkit were adopted by a leading UK engineering company called NG Bailey as part of its supply chain re-engineering initiative, 'Customer of Choice'. Over 300 companies from NG Bailey's supply chain participated in this initiative. This toolkit allowed managers to benchmark their processes and then select the optimum future strategy based on the taxonomy of a particular industrial sector.

3. References to the research (indicative maximum of six references)

R1. Kroh, T., Fernandes K. (2017). Impact of Industry 4.0 on Manufacturing Companies. Industry Report with PwC Deutschland.
R2. Goumagias, N., Cabras, I., Fernandes, J. K., Feng, L., Nucciarelli, A., Cowling, P., Devlin, S., and Kudenko, D. (2014). A phylogenetic classification of the video-game industry's business model ecosystem, in Collaborative Systems for Smart Networked Environments, Springer Berlin Heidelberg, p. 285-294 (Leading International Conference). DOI: 10.1007/978-3-662-44745-1_28
R3. Nucciarelli, A., Li, F., Fernandes, K., Goumagias, N., Cabras, I., Devlin, S., Kudenko, D. & Cowling, P. (2017). From value chains to technological platforms: The effects of crowdfunding in the digital game industry. Journal of Business Research, 78: 341-352. DOI: 10.1016/j.jbusres.2016.12.030
R4. Fernandes, K., Goumagias, N., Purvis, K. (2016). Biopharmaceuticals Industry Business Model Analysis and Report. Industry Report to the Centre for Process Innovation.
R5. Milewski, S., Fernandes, K. & Mount, M. (2015). Exploring technological process innovation from a lifecycle perspective. International Journal of Operations and Production Management 35(9): 1312-1331. DOI: 10.1108/IJOPM-02-2015-0105

The above work is published in internationally recognised peer reviewed journals [R3, R5], has been presented at a leading international conference [R2], and has also been internally reviewed [R1-5]; this body of work is rated above the 2* level required.

Details of Funding:

1. NEMOG: New Economic Models and Opportunities for digital Games (EP/K039857/1) GBP1,160,896 (14 October 2013 - 13 October 2016).
2. Centre for Process Innovation (CPI) GBP20,000 (2016).

4. Details of the impact (indicative maximum 750 words)

The impact described is strongly economic, with DUBS research having a direct effect on productivity and performance improvements in NG Bailey and its supply chain [E1]. It has also influenced regional economic strategy development in the North East of England [E2].

The process to impact:

The main impact of this research derives from the development of the BMA toolkit and the associated methodology which was adopted by NG Bailey as part of a supply chain re-engineering initiative, 'Customer of Choice'. This toolkit was adopted by more than 300 of NG Bailey's suppliers. The entire 'Customer of Choice' project team at NG Bailey has been trained in the developed BMA toolkit and associated methodology. Professor Fernandes was invited by NG Bailey's Group Head of Supply Chains & Strategic Projects to join a Foresight Group tasked with the role of overseeing the use of this toolkit.

NG Bailey collected data from the 300-plus participating companies in March 2017 and December 2018 to measure the direct impact of the initiative. The companies reported a cumulative increase in profitability of GBP800million [E1] and a reduction in product development lead times of more than 40%.

Wider dissemination of this research has taken place via the Confederation of British Industry (CBI) global flagship Business Voice programme through its *The innovation game* podcast, the North East LEP (NELEP) [E2], TIGA – the Independent Game Developers' (trade) Association [E3] and a Durham University Massive Open Online Course (MOOC) on *Open Innovation* [E6].

Details of the Impacts

1. Re-engineering of a Supply Chain

This toolkit and the BMA methodology formed the basis of re-engineering NG Bailey's supply chain, which has over 2,000 suppliers. A key benefit for NG Bailey has been the ability to benchmark, re-engineer and improve its supply chain network. As a result of this research, NG Bailey undertook a comprehensive overhaul of its supply chain (called Customer of Choice). Professor Fernandes, via several workshops, trained the entire Customer of Choice project team (approximately 10 within the United Kingdom, including the Group Head of Supply Chain & Strategic Projects) at NG Bailey to use the BMA framework and the toolkit. The re-engineering initiative has resulted in NG Bailey making a step change in several of its core supply chain and procurement activities (supplier engagement, vendor management, procurement, outsourcing and tendering), as a result of this research.

A quote from the Group Head of Supply Chain states that this *research "allowed us to re-engineer the entire supply chain of the company [NG Bailey]. The impact of this activity has been extensive. The company was able to make several changes to our core value activities through the use of the developed toolkit… This research from Durham has helped NG Bailey become a more innovative and customer-focused company"*. The Group Head of Supply Chain further states that *"this research has helped us win several industry awards including: Specialist Contractor of the Year and BIM Initiative of the Year at the Building Industry Awards"* [E1].

2. Changes in operational practice

Implementation of this research, as part of the Customer of Choice project, allowed NG Bailey to benchmark core processes like tendering, product development, supplier engagement, vendor management and partnership in more than 300 participating engineering supplier companies in the United Kingdom. The supplier companies were provided with their individual benchmarked details as well as support via the trained NG Bailey Customer of Choice project team (CCPT). The CCPT helped participating companies understand and optimise critical project decision points in order to avoid costly core supply chain delays.

For example, inappropriate component selection in early-stage product development may only become apparent as scaled trials are undertaken. The CCPT had regular contact with the 300-plus participating companies over 20 months (starting from early 2017). An end of project survey, conducted and administered by the CCPT, has reported a reduction in product lead times of 40% and new income generation over GBP800million within the participating companies. According to the company's Group Supply Chain Head, he "*was able to use this toolkit to benchmark over 300 companies…provide them with strategies to bring about a step change in their decision-making activities – by influencing their business models.*" [E1]

3. Wider Industry & Regional Policy Impact

Engagement with umbrella organisations to maximise the reach of this research forms part of DUBS' impact strategy and the research team has worked with CBI, NELEP and TIGA to reach a wider range of businesses. Professor Fernandes leads the NELEP's Innovation Observatory [E7], which is tasked with assisting the NELEP Innovation Board to develop innovative strategies to support 'more and better jobs' through the development and commercialisation of new products, processes, applications and business models. This research has informed the Strategic Economic Plan (SEP 2017- 2021) for the North East [E7]. In the letter from Alan Welby, the Innovation Director for the NELEP, he states that this research (Fernandes') *"shows the opportunities and threats to the region's companies from a rapidly developing, increasingly tech-focused dynamic world marketplace"* [E2]. Lessons and best practice from this research were adopted by CBI and widely disseminated to its members via their global flagship Business Voice programme, *The innovation game* (a podcast available to over 190,000 CBI members) [E5]. This research was also featured in Durham's MOOC on *Open Innovation*, which has over 7000 global participants enrolled [E6]. The toolkit and the methodology were also presented at several industrial workshops to leading biologics manufacturing companies and were adopted by companies like [redacted] to benchmark and analyse their business models [E4]. TIGA, which has also adopted this research, has widely disseminated the toolkit to help its members optimise their value chains, with a number of events and symposiums, including at TEDx York on 16 November 2018. Dr Richard Wilson OBE, CEO of the Games Industry Association TIGA, in his testimony states *that "this research, via a series of practical toolkit (sic), introduces the notion that technical teams*

and organisations can derive competitive advantage not only through superior technologies but also through the ability to navigate the complex business and technological terrain using unique combinations of BMA" [E3].

5. Sources to corroborate the impact (indicative maximum of 10 references)

E1. Letter from NG Bailey (dated 5 November 2018).

E2. Letter from Director of Innovation of the North East Local LEP (received 12 March 2019).

E3. Letter from CEO of TIGA (Independent Game Developers' Association) (received 23 January 2019).

E4. Letter from Director of Performance Development at the Centre for Process Innovation, (dated 9 May 2018).

E5. Screenshot (taken 25 January 2019) of the website hosting the CBI podcast *The innovation game* in which Fernandes was featured in January 2017.

E6. Screenshots of the DU Futurelearn course on *Open Innovation*, featuring Prof. Kiran Fernandes (taken 25 January 2019), plus statistics on course participants.

E7. The Strategic Economic Plan for the North East, published by the North East LEP (dated January 2017) (page 30).