

1 Factors driving and hindering business model innovations for mobility  
2 sector start-ups  
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4

5 **Abstract**

6 In cities around the globe companies are starting to provide alternative forms of transport.  
7 These include micro-mobility, bike sharing, Mobility-as-a-Service and autonomous vehicles.  
8 One of the challenges of these businesses is to design and innovate business models that are  
9 able to extract value from providing their services. This study analyses the internal and external  
10 factors that influence business model innovation within mobility sector start-ups. The factors  
11 are identified and analysed using in-depth interviews with mobility sector players. The results  
12 indicate that client/customer influence, legislation and the partners of the businesses are  
13 experienced as external influencing factors of business model innovation, whilst the firm's  
14 societal impact vision, a dedicated employee responsible for looking after business model  
15 innovation, the decision making structure and internal use of technology are experienced as  
16 internal influencing factors of business model innovation. These findings are relevant for both  
17 firms and policy makers as it allows them to understand what factors help drive innovation in  
18 the mobility sector.

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20 Key words: Business Model (BM), Business Model Innovation (BMI), new mobility services,  
21 start-ups

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## 1 Introduction

Innovative technologies and business models are enabling new forms of transportation. Over the past 15 years numerous novel mobility services, such as micro-mobility, bike sharing, Mobility-as-a-Service and autonomous vehicles have been developed and are gaining worldwide popularity (Spulber et al. 2016). These innovations are driven by a large range of factors including increasing urbanisation (Noland and Polak, 2002), access to internet via smartphones (Cohen and Kietzman, 2014), general market imperfections (Cohen and Winn, 2007) and environmental regulations (Rugman and Verbeeke, 2000). The crucial shifts in the industry have attracted many businesses, which are hoping to capitalise on the emerging opportunities by developing new business models (BMs) that can capture the value of providing people with innovative forms of transportation (Cohen and Kietzmann, 2014). As a result, the sector is seeing a diverse range of new BMs. These BMs are of crucial importance to the firms individually and to the industry as a whole. Teece (2010) states that a firm's BM is equally as important to its survival as the innovative product or service it provides. Regardless of the quality of the innovation, a private enterprise has to find a method to sufficiently capitalize on this innovation. Blank (2013) points out that many start-ups often have to innovate their BMs in the first few years to survive. The importance of firms to innovate their business model is further emphasised by a large number of studies that provide evidence that firms that undergo business model innovation (BMI) have a greater chance of being successful (Nelson, 2005; Voelpel et. al., 2004; Chesborough, 2010; Teece, 2007). The value of BMI is not only described in the academic literature, but it is also a fiercely debated topic within the mobility industry itself. For example, Zipper (2020) explains that Mobility-as-a-Service apps have been downloaded by millions of users across the world and many policymakers are in favour of such developments, however many providers struggle to make a profit. This is because even though a large number of individuals may use the app, the provider only makes revenue on specific actions like booking a journey through the app. The issue is similar in the micro-mobility sector. The sector has received more than \$6 billion in investments since 2018, but almost all major players are losing money (Bliss, 2020). These two examples further demonstrate how crucial it is for start-ups in this sector to participate in BMI, so that they can capitalize on their innovative mobility technologies.

As the innovations in the mobility sector are disrupting the established BMs, the development of new BMs will be of crucial significance to the development of the entire industry (Cohen and Kietzman, 2014; Kamargianni and Matyas, 2017; Vaskelainen, 2014). However, there are still a large number of gaps in the academic literature on BMI. Foss and Saebi (2017) believe these gaps in the literature are caused in part by the recentness of the BMI literature, whilst other scholars argue that the development of the concept in different silos prevents a robust and all-incorporating theory from being formed (Zott et al., 2011; Chesborough and Rosenbloom, 2002; Casadesus-Masanell and Ricart, 2010). One of these gaps in the literature is the lack of analysis on the factors that either drive or hinder innovation (Schneider and Spieth, 2013; Foss and Saebi, 2017). Foss and Saebi (2017) state that this is surprising as the topic is important to our understanding of how BMs come to be. Scheider and Spieth (2013) point out that only limited knowledge exists when it comes to the internal factors within businesses that can drive or hinder business model innovation, whilst Saebi (2015) states that the little attention on external business model drivers has led to highly abstract and general explanations of these driving factors. Furthermore our literature review found no previous literature on the influencing

1 factors of BMI in the mobility industry. Considering the gaps in BMI literature pointed out by  
2 numerous authors and the fast-moving developments in the mobility industry, this sector  
3 seems to be an appropriate industry to conduct further studies on driving and hindrance factors  
4 of BMI.

5 Against this background, the aim of this research is to identify and explain the factors  
6 influencing BMI in mobility sector start-ups. In doing so, the following research question will be  
7 answered:

8 *What external and internal factors drive or hinder business model innovation within new*  
9 *mobility start-ups and how and why does this process work?*

10 Throughout this paper the definition of BM from Chesbrough (2010) will be adhered to:

11 *“A business model is defined by its functions:*

- 12 • *Articulates the value proposition*
- 13 • *Identifies a market segment*
- 14 • *Specifies the revenue generation mechanism*
- 15 • *Defines the structure of the value chain*
- 16 • *Estimates the cost structure and profit potential*
- 17 • *Describes the position of the firm within the value network linking suppliers and*  
18 *customers*
- 19 • *Formulates the competitive strategy”*

20 This definition was chosen as it gives a tangible overview of what factors are part of a BM,  
21 making it easier to identify what innovations businesses have made to their BM. For the  
22 definition of BMI, this paper will adhere to the commonly used definition given by Foss and  
23 Saebi (2017): *“Designed, novel, nontrivial changes to the key elements of a firm’s business*  
24 *model and/or the architecture linking these elements.”*

25 The remainder of the paper is structured as follows. First, a number research papers on the  
26 driving and hindrance factors of BMI will be reviewed. Next, the methodology of in-depth  
27 interviews using thematic analysis will be presented. The discovered factors effecting BMI will  
28 then be identified in the results. These factors will be further analysed in the discussion. Finally,  
29 the paper will sum up the main factors found in the conclusion and link them to further research  
30 potentials.

## 31 **2 Literature Review**

32 For this literature review it was decided to narrow down the focus to a specific number of topics  
33 within the BM and BMI literature. This decision was made due to the fact that there is no clear  
34 consensus on the definition of BM, making the list of potential factors to discuss extensive.  
35 Furthermore, the purpose of this paper is to create a more in depth understanding of driving  
36 and hindering factors of BMI, and not to produce an exhaustive list of BMI antecedents.

37 The definition of BM from Chesbrough (2010) was used to narrow down the scope of the  
38 literature review. This was done by looking at papers that are directly relevant to aspects of  
39 the BM definition provided by Chesbrough and by looking at driving and hindrance factors  
40 identified in Chesbrough’s paper. This led to the identification of a number of BMI influencing  
41 themes that are discussed in a range of papers. Almost all articles found in this literature review

1 focus either on external or internal factors that influence BMI. Therefore the literature review  
2 is divided into these two sections.

### 3 4 *2.1 External factors*

5 The first main theme is **technology**. Chesbrough (2010) describes that in some cases new  
6 technologies require innovations to a company's BM. De Reuver et al. (2009) find in their  
7 quantitative study that technology has a driving effect on BMI especially for start-ups and small  
8 businesses. Johnson et al. (2008) argue that there are two scenarios in which technology can  
9 play an important role in BMI. First, when an innovation makes a current product or service  
10 more accessible for a new target group, and second, when a new technology comes out which  
11 can be utilized by designing an appropriate BM.

12 Another theme that Johnson et al. (2008) cover is that of **customer preference** and its driving  
13 effect on BMI. This factor has an effect when there is an opportunity to deliver a slightly different  
14 service to customers that is more in line with their needs. The factor also has an impact when  
15 a shift in customer preferences requires a company to change its services or the way it delivers  
16 its services. This factor is acknowledged by Chesbrough (2010) who points out that BMI has  
17 been happening in the pharmaceutical industry due to the requirement changes of health  
18 providers that buy products from this industry. However, Rüb et al. (2017) also point out that  
19 customer preferences can be a barrier to BMI. Existing customers are familiar with the current  
20 BM and solely focusing on their perception inhibits a firm from innovating their BM beyond the  
21 requirements of its existing customers.

22 A further factor that was identified in numerous research papers was that of the **market**.  
23 Chesbrough (2010) found that traditional BMs can fail due to changes in the products offered  
24 by other players in the market. De Reuver et al. (2009) and Pucihar et al. (2019) also found  
25 that the market had a large driving effect on BMI for small and medium sized enterprises.  
26 Johnson et al. (2008) find that a competitor entering the market and offering the product at a  
27 cheaper price is a large driver for BMI. Saebi (2015) points out that the market can also be a  
28 hinderer of BMI. In the case of extremely volatile environments, it can be challenging for firms  
29 to detect and anticipate the latest market trends, as factors like customer needs and  
30 technological advancement are continuously changing in unforeseeable ways (D'Aveni, 1994;  
31 Jarrat and Fayed, 2001; Nath and Newell, 1998). This increases the risk for businesses to  
32 adopt new models seeing that there is little certainty whether this will improve performance.  
33 Furthermore, volatile market environments are often affiliated with intense competition  
34 (Matusik and Hill, 1998). This has a further negative effect on BMI, as firms may have fewer  
35 resources for innovations due to the lack of profits (Zahra, 1996; Zahra and Bogner, 2000). All  
36 this suggests that during times of intense competition, firms are unlikely to undergo BMI due  
37 to the improbable success rate and the lack of resources to afford it.

38  
39 Chesbrough (2010) also acknowledges that **regulation** can be a factor of influence on BMI as  
40 regulation can put certain requirements on the product and operations of a firm. Reuver et al.  
41 (2009) investigated a number of potentially regulatory drivers including 'deregulation,  
42 regulation from national authority, economic regulation, legal regulation, security regulation  
43 and customer protection regulation' (Reuver et al. 2009). They found that even though a  
44 number of firms indicated their BM had been affected by regulation, the majority of cases  
45 studied showed no evidence of regulation being an influencing factor of BMI.

## 2.2 Internal factors

The first internal theme is the **decision-making responsibility within a firm**. Chesbrough (2010) discusses that the appointment of an individual or group of individuals who are responsible for evaluating BMI potentials will help a company innovate their BM. However, the author is unsure about who in a firm should have this responsibility. The importance of the individual in BMI is further emphasized by Cavalcante et al. (2011). They find that an individual's ability to accept the need for change and their motivation to implement these changes is key for BMI. A dedicated person for BMI offers a vision on what innovations should be implemented to overcome certain obstacles. The stage of going through different experiments and trial and error processes is not viable without the analytical skills and motivation of these individuals. Evaluating the organization structure further, in Teece's (2007) theory of dynamic capabilities, decision-making responsibility plays an important role as well. He defines dynamic capabilities by how well a firm senses opportunities and threats, seizes opportunities, and manages threats and configurations. All these factors are influenced by decision-making responsibility. Firstly, decentralisation gives more autonomy across the company. This allows for the company to respond quicker to the external environment, as it avoids the decay of information that occurs when it travels through a hierarchical system (Teece et al., 1997). This argument is supported by Leih et al. (2015), who state that delegation caused by decentralization facilitates better communication between the relevant decision makers and external parties such as customers, suppliers and partners. The second factor identified by Teece (2007) is the formal decision making process. These processes where decisions have to be approved by multiple layers of management who need reports and written justifications slows down innovation and reinforce the status quo (Teece, 2007).

The second theme identified in the literature was that of the **psychological factors**. A number of authors evaluate different areas of this theme. Nelson and Winter (2002) describe decision bias as a potential factor hindering BMI. These hindrances can occur when decision errors are made due to factors like excessive optimism, loss aversion and isolation errors (Nelson and Winter, 2002). These biases can be overcome by systematically incentivising creative actions with rewards (Davidow and Malone, 1992; Handy, 1990). Stieglitz and Foss (2015) identify the factor of inertia in their paper. This is often caused by the fact that the incumbent BM has been developed over a long period of time, which has created a compelling logic for the existing BM. This factor ties in well with Chesborough's (2010) argument who described how information flows through a company. They argue that the success of the current Business Model strongly influences what information gets routed into the decision making processes of a company. This kind of 'dominant logic' helps a business navigate through a complex and chaotic environment, as this helps the organization filter out the information that is important to its business and disregard any information that is not in line with the firm's business model logic. This dominant logic can cause a barrier to BMI as it can lead the firm to miss information on other valuable uses of their resources that may not fit with their current business model. Rüb et al. (2017) further discuss psychological factors by focusing on the importance of a firm's identity and what influence this has on the workforce. This firm identity gives a company a competitive advantage in normal circumstances as it allows employees to align their personal identity with that of the company creating a more efficient workforce. However this strong feeling of identity can become a barrier for BMI, as changes in the BM will bring changes in

1 company culture which may be met with resistance from the workforce who are comfortable  
2 working in the current firm culture.

3 The third theme identified was the **complexity of the current BM** itself. One of the factors  
4 contributing to this is complementary effects. A BM has a large number of different elements  
5 that interact with each other. Therefore it is challenging to forecast how a change in one  
6 element may affect the rest of the BM. This uncertainty can make decision makers doubtful  
7 about implementing large changes (Rivkin, 2000). Furthermore, in a BM there is the  
8 requirement that all elements have to be coherent and closely complement each other for the  
9 model to reach its full potential (Milgrom and Roberts, 1990). To ensure this, all elements and  
10 interactions need to be thoroughly understood, which slows down the design of BMs. Due to  
11 this complexity of BMs it is often the case that innovative BMs make lower margins at the start  
12 (Chesbrough, 2010). Novel BMs usually deal with new customers and distribution channels,  
13 therefore taking time for a new BM to create the same coherency between all its elements as  
14 an established model has. This increases costs in the short run (Christensen, 1997; Amit and  
15 Zott, 2001). In this period where a company is building up a new BM alongside operating its  
16 legacy BM there is an obvious conflict for resources between the operational needs of the  
17 established BM and the need for experimentation on the new BM. As a result of this managers  
18 may be reluctant to initially invest in a new potential BM as the short run gains from this are  
19 less than investing in the established BM (Chesbrough, 2010).

20

21 The final theme identified by Chesbrough (2010) specifically is that of **BM experimentation**.  
22 This is an important internal driving factor. Chesbrough emphasized the importance of this,  
23 because in many cases it is not only unclear what the new BM should look like, there is also a  
24 lack of data on which decisions for the future BM can be based. Creating BM experiments  
25 solves this issue as a well-designed experiment can create data on the environment in which  
26 the new BM will operate in.

27 A summary of the reviewed literature is presented in Table 1.

28 **Table 1: Articles reviewing influencing factors of BMI**

Author(s)	Influencing factors discussed	Drivers/Hindrances
<b>External focus:</b>		
Chesbrough (2010)	<ul style="list-style-type: none"> <li>• Technology forces</li> <li>• Customer preferences</li> <li>• Market forces</li> <li>• Regulation forces</li> </ul>	Drivers
de Reuver et al. (2009)	<ul style="list-style-type: none"> <li>• Market forces</li> <li>• Legislative forces</li> <li>• Technology forces</li> </ul>	Drivers
Johnson et al. (2008)	<ul style="list-style-type: none"> <li>• Address potential customers</li> <li>• Capitalize on a new technology</li> <li>• Bring job-to-be-done focus</li> <li>• Fend of low-end disruptors</li> <li>• Shifting base of competition</li> </ul>	Drivers
Saebi (2015)	<ul style="list-style-type: none"> <li>• Volatile environments</li> <li>• Intense market competition</li> </ul>	Hindrances
Rüb et al. (2017)	<ul style="list-style-type: none"> <li>• Customer influence</li> </ul>	Hindrances
Pucihar et al. (2019)	<ul style="list-style-type: none"> <li>• Market forces</li> <li>•</li> </ul>	Drivers

Internal factors:		
Chesbrough (2010)	<ul style="list-style-type: none"> <li>• Low margins for innovative BMs</li> <li>• Conflict of resources</li> <li>• Cognitive barrier</li> </ul>	Hindrances
	<ul style="list-style-type: none"> <li>• Decision making responsibility for BMI</li> <li>• BM experimentation</li> </ul>	Drivers
Teece (2007)	<ul style="list-style-type: none"> <li>• Decentralised decision making</li> </ul>	Drivers
	<ul style="list-style-type: none"> <li>• Formal decision making process</li> <li>• Decision bias</li> </ul>	Hindrances
Stieglitz and Foss (2015)	<ul style="list-style-type: none"> <li>• Inertia</li> <li>• Complementary effects</li> <li>• Coherence</li> </ul>	Hindrances
Cavalcante et al. (2011)	<ul style="list-style-type: none"> <li>• Role of the individual</li> </ul>	Drivers
Rüb et al. (2017)	<ul style="list-style-type: none"> <li>• Firm identity</li> </ul>	Hindrances

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2 This literature review has looked at a number of driving and hindering factors for BMI. The  
3 themes discussed are all in line with the definition provided by Chesbrough (2010). The  
4 purpose of this paper is to further investigate these themes for companies in the mobility sector.  
5 Due to the qualitative approach of this study, further insights will be given to why these factors  
6 influence BMI. According to Foss & Saebi (2017) this further analysis of different driving and  
7 hindering factors is necessary as there may be a great variety of antecedents to BMI that are  
8 distinct in nature and influence various aspects of different businesses. Therefore, it is  
9 important to conduct more studies on this topic to further develop a more in depth  
10 understanding of different BMI driving and hindrance factors.

### 11 **3 Methodology**

12 A qualitative research approach was chosen for two main reasons. First, this type of research  
13 is widely associated with a more interpretative philosophy (Denzin and Lincoln, 2011).  
14 Interpretive philosophy is suitable for studying the influencing factors of BMI, as many of these  
15 factors will be dependent on human subjectivity and social constructs (Saunders et al., 2016).  
16 Second, qualitative studies can bring much insight into situations where the main issues are  
17 poorly understood (Feuer et al., 2002). Within the options of qualitative techniques, the  
18 decision was made to conduct in-depth interviews. Interviews are most relevant when the  
19 subject matter requires a more discursive approach (Brinkmann and Kvale, 2009). This  
20 approach is indeed necessary as one of the main aims of the study is to understand 'how'  
21 driving and hindrance factors have an effect on BMI. Semi-structured interviews were used as  
22 it gives the interviewee more opportunity to address the points that they find most relevant thus  
23 not confining the interview to factors already mentioned in the literature (Bryman, 2016).

24 A number of firms across the mobility sector were selected for the interviews. As the study  
25 focuses on start-ups, all firms selected were younger than seven years. In total, nine interviews  
26 were conducted. While the authors acknowledge the limited sample size, Brinkmann (2012)  
27 states that a smaller sample size can be an advantage as it allows for more detailed analysis.  
28 Furthermore, other studies in the BMI and transportation area have also worked with a similar  
29 small sample sizes (e.g., Frankenberger et al., 2013; Lindell and Wittbom, 2019; Sosna et al.,  
30 2010 ; Rüb et al., 2017)

1 Table 2 presents the characteristics of the participating firms.

2 **Table 2: Interviews conducted**

Firm	Business	People interviewed	Total number of interviews	Age of firm
Firm 1	Drone- Manufacturer	CEO	1	<5
		Technical Manager & Sales and Business Development		
		Cooperate liaison		
Firm 2	Manufacturer of high-tech, electrical and autonomous vehicles	Project Manager	1	<5
Firm 3	Scooter- sharing/micro- mobility service provider	Country Head of Marketing	1	<2
Firm 4	Bike-sharing/micro- mobility service provider	Business Developer	1	<5
Firm 5	MaaS Provider	Lead Product Manager	2	<5
		Chief Strategic Partnership Officer and co-founder		
Firm 6	MaaS Provider	Sales Manager	1	<7
Firm 7	MaaS Provider	CEO	2	<2
		Data analyst		

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4 Using logic and the current literature, the specific interview questions were prepared by the  
 5 author. These were then reviewed and revised and a number of new important aspects and  
 6 questions were identified, this procedure followed the recommendations of Bryman (2016).  
 7 The interview guide was structured so that participants were first asked general questions  
 8 about factors influencing their BMI (e.g., what are some of the major business model changes  
 9 that you have experienced when working at the firm, and what drove these changes?) before  
 10 they had to answer specific questions related to previous literature (e.g., Has technology used  
 11 internally allowed you to adopt an innovative business model?). This was done to mitigate any  
 12 biases in the answer provided. All interviews lasted between 30 and 65 minutes and were  
 13 conducted between June and August 2019.

14 Eight of the nine interviews were recorded and transcribed. The interview with firm 3 was not  
 15 recorded due to technical difficulties. The interview transcripts were analysed using a thematic  
 16 analysis approach. This entailed tagging the individual sections in the interview transcripts that  
 17 seemed related to the research questions according to the interviewer, this was done based  
 18 on the methodology suggested by Brinkman (2016). As the aim of this paper is to reflect and  
 19 add to findings of previous literature a deductive approach was used when applying these  
 20 themes (Nowell et al., 2017). This means that sections were selected for various reasons  
 21 including: the interviewee stated their importance, they were mentioned by numerous

1 interviewees, they had a strong link to the existing literature, or the researcher found that these  
 2 concepts are logically relevant to each other. After all interview transcripts had been tagged,  
 3 the individual tags were evaluated by the author. Categories were then formed by grouping  
 4 together tags that had strong similarities. This was done until a number of theoretical themes  
 5 developed that were related to the majority of factors described by the interviewees (Gioia et  
 6 al. 2013). Nvivo (2018) software was used for this analysis. Next, the transcripts were reread  
 7 and the codes re-evaluated to ensure that the themes built were the most appropriate in  
 8 explaining the phenomena described by the interviewees.

9 To supplement the conducted interviews, secondary data was collected from the company's  
 10 websites, annual reports and blogs. All these documents were scanned and statements with  
 11 regards to BMI were noted and linked to one of the themes identified in the interview  
 12 transcripts. To ensure the anonymity of the participating firms no direct quotes from their  
 13 company's media are used in this paper.

14  
 15 **4 Results**

16 This section will explain the most prominent influencing factors that were discussed during the  
 17 interviews. The factors were chosen due to the frequency with which they were mentioned or  
 18 the stated importance by the interviewees. The section is divided into internal and external  
 19 factors.

20 Table 3 presents an overview of the factors identified in the current literature and the most  
 21 important factors discussed by the interviewees.

22 **Table 3: overview influencing factors**

		Internal/External factor	
		Internal	External
Hinderer/driver	Driver	<ul style="list-style-type: none"> <li>• Dedicated position/team for BMI*</li> <li>• Decentralised decision making*</li> <li>• Firm societal impact vision*</li> <li>• Internal use of technology*</li> </ul>	<ul style="list-style-type: none"> <li>• Market forces</li> <li>• Technology forces</li> <li>• Capitalize on a new technology</li> <li>• Bring job-to-be-done focus</li> <li>• Fend of low-end disruptors</li> <li>• Shifting base of competition</li> <li>• Partner influence*</li> <li>• Legislative forces*</li> <li>• Client/customer influence*</li> </ul>
	Hinderer	<ul style="list-style-type: none"> <li>• Low margins for innovative BMs</li> <li>• Cognitive barrier</li> <li>• Formal decision making process</li> <li>• Decision bias</li> <li>• Inertia</li> <li>• Complementary effects</li> <li>• Coherence</li> <li>• Internal use of technology*</li> </ul>	<ul style="list-style-type: none"> <li>• Volatile environments</li> <li>• Intense market competition</li> <li>• Client/customer influence*</li> <li>• Legislative forces*</li> </ul>

23 \* The most important factors stated by interviewees.

## 1 4.1 External factors

### 2 **Customer/Client influence on BMI**

3 A number of participants (firms 1, 2, 4, 5, 6, 7) indicated that their clients or customers had  
4 influenced the innovation of their BMs. These innovations were driven by the fact that the  
5 current offering of the BM adopted by the company was not in line with customer and client  
6 demand. Therefore the firms were forced to change their BM accordingly.

7 All these firms were able to recognise their customers' needs by establishing good  
8 communication channels with them. In the case where a firm was focussed on selling their  
9 products to other businesses (firm 1, 2) communication was ensured by organising regular  
10 meetings. Interviewee firm 2:

11 *“And we organise, not on a monthly basis, but maybe every two three months, design*  
12 *reviews with our future key customers if you want. To understand how they operate,*  
13 *what are the issues at the moment, where are they struggling, and how can we use our*  
14 *technology to answer their needs and to make sure that with our technology they will*  
15 *be able to be more efficient.”*

16 For firms that focus on selling their products to customers (firm 4, 5, 6), these communication  
17 channels often comprised of in-app ratings, reviews, social-media and interviews. As firm 4  
18 stated:

19 *“We have a helpdesk which can be contacted by mail or by phone or by chat. So they*  
20 *can send emails, they can review the app in the market and they have, we have social*  
21 *media so they can comment on social media.”*

22 These communication channels enabled the firms to undergo appropriate BMs that ensured  
23 their BMs could satisfy their customers' demands.

24 A MaaS provider and the manufacturers of high-tech electrical vehicles and drones (firms 1,  
25 2, 7) stated that their clients are continuously involved in the development of their product and  
26 operations. As both these firms are still in the development stages of their businesses, these  
27 alterations suggested by clients significantly changed the firms' BMs as their products and  
28 operations have a major influence on what customer segments and value propositions the firm  
29 focuses on. As the interviewee from firm 2 put it:

30 *“The customer and the technology, these are the main drivers for the thing we do. First,*  
31 *you need to answer a need, so you can develop the best technology out there but if it*  
32 *is not solving any problem, what's the point. So you need to solve an issue, by the*  
33 *technology and through a good understanding of what the issue is and what the*  
34 *customers are waiting for.”*

35 This statement is in line with reports made on Firm 7's company website which state that they  
36 adapt their platform solutions depending on the local need of their customers. This means that  
37 their revenue model and product offerings may differ per location. On the company's blog they  
38 state that engaging with different stakeholder groups including public consultation is a key area  
39 of this decision-making process.

40 Other interviewees stated that the clients had more influence on altering the value proposition  
41 of the firm. For instance, firms 4 and 5 (bike-sharing, MaaS provider) made major alterations

1 to their subscription and rental models to satisfy customer needs and to ensure that it was  
2 clear to customers what the value of their product entailed. Firm 5 altered their entire payment  
3 system from a model where customers buy transport credits beforehand, to a subscription  
4 model where customers buy a monthly subscription. Customers not understanding the initial  
5 payment system caused the drive for this change:

6 *“this was something we tested in the beginning and realised in the test and in the user*  
7 *feedback that we got that people didn’t like this model, and they found it actually very*  
8 *difficult to understand, which was kind of a surprise for us, . . . , So that was definitely*  
9 *one the big changes we saw in the beginning that we needed then to come up with*  
10 *different kind of value proposition, different type of productization and different kind of*  
11 *pricing so it affected the whole product, it effected the value proposition, and it definitely*  
12 *effected the business model we saw there.”*

13 These examples all demonstrate how firms’ clients and customers forced the firms to innovate  
14 their BM. However, examples were also given where customers hindered the setting up of  
15 innovation in the BM. Firms 5 and 6 (MaaS providers) explained that clients were reluctant to  
16 use their services due to their novelty and fears that it would cut in their revenues. This slowed  
17 the process in which these firms could roll out their business models. As an interviewee at firm  
18 5 said:

19 *“We realised that we needed to create this kind of interim steps towards the vision that*  
20 *we were really thinking about. That people really trust all the transportation and give up*  
21 *their cars and really replacing the private vehicle, so we realised that it’s not so easy*  
22 *for people to jump from not subscribing or having not even heard of mobility as a service*  
23 *to ordering a subscription plan where the price point would be of course quite high.”*

#### 24 **Effect of legislation on BMI**

25 As with clients, legislation has had a varied effect on different business models. All firms  
26 indicated that legislation had created a hindrance or had been a driver for innovating their BM  
27 (firm 1, 2, 3, 4, 5, 6, 7). The mechanisms behind this influencing factor varied. Some firms  
28 stated that the lack of regulatory recognition indirectly prevented them from stimulating  
29 demand in their product, other firms described that the lack of recognition directly blocked them  
30 from introducing new BM aspects, whilst again other stated the restriction put on their  
31 customers drove innovation in their BM.

32 The manufacturing firms (1, 2) indicated that the slow response in regulatory recognition of  
33 their new product made it more difficult for them to develop their business. This was because  
34 the passive development in legislation prevented firms from testing their products or producing  
35 their products according to a legislative standard which increased the difficulty of selling their  
36 products. For example, firm 1 (drone-manufacturing) stated:

37 *“They’re not building it regarding a standard, so how can you trust it. If a client buys it,*  
38 *the client wants to ensure it, the insurance company will ask has this been through a*  
39 *certain standard or who has build it. Now it’s home made or without standards. That*  
40 *will affect our business plan.”*

41 The lack of recognition of a regulatory body also led to other problem as experienced by MaaS  
42 providers and micro-mobility firms (firm 3, 5, 6, 7). These firms stated that these problems

1 included being unable to apply for certain tax breaks, or being prevented from creating certain  
2 value propositions that are inherent in competitors' BMs, like firm 6 stated:

3 *“So they could develop specific packages, but it's not the case here in ... at the moment.*  
4 *The local authorities, the regional authorities, they decide the fares, the tariffs of the*  
5 *transport, so we as a private entity, we cannot create a mobility package.”*

6 In some cases however legislation has driven the innovation and expansion of business  
7 models (firm 4, 5). This has happened when changes in legislation made the services offered  
8 by these mobility firms more attractive for a larger variety of customers, which in turn led the  
9 mobility firms to adapt their BMs to better fulfil these potential customer needs. For example,  
10 firm 4 (bike-sharing) started to focus more on last mile commuter travel and form partnerships  
11 with train stations, as changes in regulations banned people from taking their bike on a train:

12 *“And so it has become quite complicated for people that want to cycle to work but have*  
13 *a long trip to get to work. The idea was that you can actually bike after your train or*  
14 *before your train, so you are providing the solution and you can leave your bike at*  
15 *home. So that was I think also this kind of regulation where now they don't want these*  
16 *bikes on trains, so this is actually is quite good for us.”*

### 17 **Partner influence on BMI**

18 During the interviews it became clear that the business' partners also had a significant  
19 influence on BMI (firm 3, 4, 5, 6, 7). These firms indicated that working together with their  
20 partners created the opportunity or need for new unexpected BMs. These changes were  
21 sometimes implemented because of the demands a partner had, whilst in other occasions  
22 these innovation were implemented due to recognition of opportunity on both sides.

23 Firm 3, 4 and 7 had to make significant changes to their BM due to the demands or capabilities  
24 of their partners. For example, firm 3 (bike-sharing) stated that they took over the responsibility  
25 of maintenance and operation of their bike fleets from their partners in certain cities, as the  
26 increasing size of the bike fleet could not be handled by one partner. Having multiple partners  
27 in one city caused inefficiencies and prohibited smooth A-B trips as the revenue had to be split  
28 between different partners:

29 *First of all, bike shops have a very small quantity of bikes. So this was good for the*  
30 *beginning. But at one point it gets complicated if two bike shops want to do it in the*  
31 *same city. Technically that's a miss. So that was one of the first issues we encountered.*

32 *so at the very beginning it was A-to-A trips because we could not organize that the*  
33 *bikes could be left wherever you wanted in a virtual station. Because we worked with*  
34 *bike shops, several bike shops in the city. When trying to implement the A-B model the*  
35 *issue was, how do you split the money between the two bike shops, the one where the*  
36 *bike was taken from or where the bike was left. That's why we started operating*  
37 *privately*

38 These statements are further supported by the company's website that states their business  
39 models are defined by the agreements they have with their local partners, which can differ in  
40 terms of ownership and general responsibilities.

41 Two other MaaS providers (firm 5, 6) explained that forming partnerships with third parties  
42 which sell MaaS services on their own platform was a major expansion to their business model

1 as it added a new customer channel. The initiative to integrate MaaS services with these third  
2 party players occasionally came from the firm itself and occasionally from the partner. In this  
3 situation it became possible to expand the BM through a partnership that led to this innovation.  
4 As the interviewee at firm 6 stated:

5 *“So looking more to the convenience of the platform. Also to, let’s say, multiply the*  
6 *sale of tickets. Our company has developed the web services of mobility services, so*  
7 *we are able to export the web services to third parties. For example, we did it with the*  
8 *Italian mail authority, and they have their own app for financial services, payments etc,*  
9 *but they also provide to their own users the possibility to pay the parking and buy*  
10 *transport tickets. Or with gas and oil company, ..., they also have their own app to pay*  
11 *the gas, so, they can also provide banking payment to the end-users.”*

#### 12 4.2 Internal factors

##### 13 **Firm’s societal impact vision**

14 Many interviewees declared that their firm had a strong vision regarding the impact on society  
15 they wanted to make. These firms explained that this vision drove BMI as the firms  
16 continuously looked for new BMs that fulfil their vision more effectively (firms 2, 3, 4, 5). This  
17 vision has been stable throughout the lifespan of the firm and was of influence to most BMI  
18 decision made by the firm, as one of the interviewees (firm 5) stated:

19 *“It’s an evolution that we’ve known. So we know what the vision is, that is the vision,*  
20 *it’s been the vision since the beginning”*

21 For example, firm 2 (manufacturer of high-tech, electrical and autonomous vehicles) stated  
22 that the firm sees itself as a technology company in the new mobility sphere and this  
23 encourages them to strive to develop a whole portfolio of mobility solutions in which they  
24 control the technology. The mentality has led them to engage with new business models:

25 *“So we’re a technology company and we’re working on a lot of new innovation aspects,*  
26 *but mainly everything is linked to the new mobility environment, so we’re working on*  
27 *offering different new sustainable products. The van and the bus are two examples of*  
28 *this, all of our products need to be a 100% electric, and they should be autonomous*  
29 *ready, so these are the kind of key innovation, but at the same time, we are also working*  
30 *on mobility as a service, so its not only on the vehicle side, but it’s very much the whole*  
31 *mobility world. So we’re also working on software as a service, and we’re also working*  
32 *on... even robotics to be fair.”*

33 This statement is backed by their company website that states that they provided unified  
34 transport solutions that address every aspect of transportation. This includes the vehicles  
35 themselves and the digital and non-digital infrastructure.

36 Firms 3, 4, 5 (micro-mobility and MaaS provider) also stated that their vision goes beyond  
37 their current product as their mission is to completely replace the need for cars. This holistic  
38 vision has led the firms to continually expand their BMs to offer sufficient replacements for  
39 cars. For firm 5 this meant expanding to long distance travel, a concept novel to MaaS  
40 providers:

41 *“So it needs to extend, because unless we really can, well let’s put it the other way if*  
42 *we only cover your needs within the urban city centre, what do you do when you have*

1            *to go into the countryside. Well you end up buying a car at one point because you need*  
2            *to travel there and then we lose you as a customer. So that's why we know we have to*  
3            *extend the segments”*

#### 4    **Decision-making responsibility**

5    A topic that was also discussed during the interviews was the influence of specific individuals,  
6    teams and the decision making structure itself on BMI (firm 2, 3, 4, 5, 6, 7). A particular person  
7    or team was often seen as a large internal driving source of innovation. For example, a  
8    manufacturing firm and two MaaS providers (firms 2, 5, 7) stated that one of the clear  
9    instigators of innovation within the BM was the CEO and founder. As an interviewee from firm  
10   7 put it:

11            *“the new ideas are mainly coming from the CEO. Because he says he wants stuff, and*  
12            *he puts the direction of the company basically. Of course we discuss it, but he mainly*  
13            *gives the direction.”*

14    On the other hand some firms indicated that they have a team that is dedicated to ensuring  
15    innovation throughout the firm and the business model (firm 2, 4, 5, 6). According to the  
16    interviewees, these teams ensure that innovation continues to take place and that the business  
17    model is developed in line with the direction the firm wants to go in. As the interviewee from  
18    firm 6 stated:

19            *“in parallel, there are people who work on innovation and who create new business*  
20            *models, as I said, to expose services to third web parties, for example was something*  
21            *that came out but it was separate, it is still separate from the rest of the ordinary works.”*

22    Not only the decision makers were pointed out as important drivers of BMI. Firm 2, 3 and 4  
23    expressively stated that their flat hierarchy and the responsiveness of management to  
24    employees’ opinions led to innovative expansions of the business model, as the interviewee  
25    of firm 2 stated:

26            *“so if you look at the organisation structure of the company. We probably have three to*  
27            *four levels, maximum. So even if you are one of the engineers working at the bottom*  
28            *you can go directly to, and you’re actually working with your chief on a daily basis, he*  
29            *is literally 2 metres away. You can see how the offices are made, everything is made*  
30            *in a way that is, you need to be able to go and discuss with everyone in the business,*  
31            *to test your idea, present, and have feedback, and to understand if it is a good idea, or*  
32            *is it not a good idea, and have this direct communication.”*

#### 33   **Internal use of Technology**

34    Another theme that arose in a number of interviews was that of internal technology used (firm  
35    1, 2, 5, 6, 7). In these cases the BM was very much influenced by the technology available as  
36    the BM had to evolve around the technology. This factor had a different influence on different  
37    companies, as some experienced it to be a driving factor whilst other experienced it as a  
38    hindering factor.

39    Both the manufacturing firms (firm 1, 2) mentioned that innovations in the technology that they  
40    are using can drastically change their business models, as new technologies may offer  
41    completely different value propositions with new client segments. Firm 2 described how the  
42    fast changing development of technology is influencing them on a daily basis:

1 *“I guess, everything is constantly evolving, especially with technology at the moment*  
2 *everything is, you know what is true one day, the next day is probably not true, so there*  
3 *is a lot happening especially in this industry at the moment, because it is really the first*  
4 *time that the technology is enabling a lot of new innovations which where probably not*  
5 *possible 10 years ago.”*

6 On the other hand, the MaaS providers (firms 5, 6, 7) indicated that technology was a  
7 hindrance factor for their BMI. This was due to the fact that they could not implement payment  
8 systems for their MaaS platforms immediately as it proved difficult to design a payment system  
9 that could be integrated with a number of separate transport providers, as the interviewee in  
10 firm 6 phrased it:

11 *“Yes, the technicalities, the design of the platform, it was complex because we had to*  
12 *talk with the transport companies because they asked for certain requirements, specific*  
13 *requirement of how the tickers should be displayed. I don’t know if you have*  
14 *downloaded it but if you buy a ticket, depending on the transport company the user has*  
15 *to for example scan a sticker on the bus, or show the digital ticket to a certain validator*  
16 *on board. This makes the system complex”*

## 17 **5 Discussion**

### 18 *5.1 Links to previous literature*

19 A number of influencing factors found in this study are in line with previous literature. First, the  
20 influence of clients and customers on BMI are mostly in line with the results of Reuver et al.  
21 (2009), Johnson et al. (2008) and Rüb et all. (2017). These articles found that market-driving  
22 forces, especially customer demands, influence BMI and can have both a driving or hindering  
23 effect. In this study, five firms indicated that clients and customers have had an influence on  
24 their BMI and four of these five stated that they have had a driving influence on their BMI. Two  
25 firms stated that customer influence was a hindrance factor.

26 Second, five firms indicated that a member of staff who had the dedicated responsibility of  
27 making decisions regarding BMI often drove BMI. Three firms stated that this was the CEO,  
28 while four firms indicated that they also had a specific team that was responsible for making  
29 BMI decisions. This highlights the conclusion of Cavalcante et all. (2011) who emphasis the  
30 role of the individual in BMI. These findings are also strongly linked to those of Chesborough  
31 (2010), who suggests it is vital for a company to have a dedicated person responsible for  
32 making BMI decisions if that company wishes to conduct BMI. This study finds that firms who  
33 have a dedicated role for BMI decisions indeed experience this as a BMI driving factor. The  
34 current study also adds to Chesborough’s finding as it shows that this responsibility can be  
35 given to people with different roles in the company, something that Chesborough was unsure  
36 off.

37 Third, this study found that the decision-making structure in a firm can be a driving factor for  
38 BMI. Three firms indicated that the flat hierarchical structure of their firm allowed for increased  
39 BMI. This finding supports the theory of Teece (2007), who states that decentralised  
40 organisations are more likely to innovate as information can flow into the company more easily  
41 and be directed to the relevant decision-maker.

42 Fourth, two firms indicated that internal technology had driven their BM. This finding  
43 corresponds with that of Johnson et al. (2008) who claim that technology should influence BMI

1 because of the development of innovative BMs that utilise the value of new technologies.  
2 Furthermore three firms stated that technology acted as a hindering factor of BMI, as the  
3 technology on which their BM was based on could not be modified to incorporate necessary  
4 changes to their BM. This finding that has not been identified in the literature reviewed.

5 While there are many factors that support previous literature, there are findings in the current  
6 study that contradict previous work. The findings on legislation are in contrast with the findings  
7 of De Reuver et al. (2009). All firms interviewed in the current study stated that legislation had  
8 an effect on their BMI; six firms had experienced legislation as a hindrance factor, while one  
9 firm experienced legislation as a driver of BMI. De Reuver et al. (2009) found that legislation  
10 only influenced BMI in a small number of firms investigated. This discrepancy may be  
11 explained by the fact that the studies are based on different industries. De Reuver et al. based  
12 their study on a number of different sectors while this current study focuses only on the mobility  
13 sector. Furthermore, legislation might play an exceptionally important role in the mobility sector  
14 due to the emphasis on safety and the involvement of local and national governments.

15 Two findings discussed in the results section have not been mentioned in the literature  
16 reviewed. These are the influence of the firms' partners and the influence of the firms' societal  
17 impact vision on BMI. A number of explanations can be found for the absence of these factors  
18 in the literature analysed. First of all, these concepts might be missing from the literature simply  
19 because of the novelty of the topic and the reciprocal knowledge gaps that exist (Schneider  
20 and Spieth, 2013; Foss and Saebi, 2016). An additional explanation might be that these  
21 influencing factors of BMI are unique to the mobility industry. However, this is less likely, as  
22 businesses in every industry are reliant on partners and the impact vision of a firm can be  
23 relevant for any societal situation (Osterwalder et al., 2005). A third possible explanation could  
24 be that these factors are strongly linked to start-ups and that the literature reviewed may have  
25 focussed on incumbent industries which caused them to overlook these influencing factors of  
26 BMI.

27 Having discussed all the findings from this research and how they relate to the existing  
28 literature, it is also interesting to note that some findings in previous literature where absent in  
29 the results of this study. These include the findings explained by Saebi (2015) that points out  
30 that intense competition can be a hindrance factor to BMI. A possible explanation for this is  
31 that competitiveness in the markets examined was not high enough for this mechanism to  
32 work. Another set of factor that cannot be found in the results of this study are those identified  
33 by Stieglitz and Foss (2015). Their paper states that inertia, complementary effects, and  
34 coherence can hinder BMI. None of these effects were stated by the interviewees as hindrance  
35 factors, a possible explanation for this is that the study conducted by Stieglitz and Foss (2015)  
36 focused more on incumbent firms than on start-ups.

37 Figure 1 presents an overview of which factors identified in this study support or oppose the  
38 current literature and which factors identified are novel to the literature analysed.

39

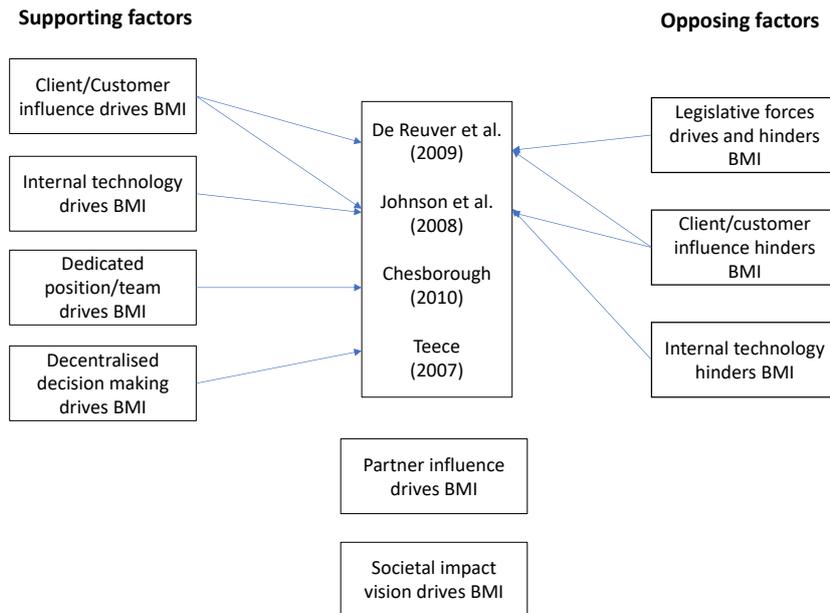


Figure 1: Factors supporting/opposing current literature, and novel factors

### 5.2 Mechanism behind influencing factors

This paper also managed to uncover more information about the mechanisms behind the influencing factors of BMI. Therefore it is possible to give further explanation on why some factors have been described as both a driver and hinderer. Furthermore, the study revealed that these influencing factors do not always operate in isolation of each other; in some cases it is the interaction between the different factors that either drives or hinders BMI.

Regarding the client/customer influence, four firms experienced this as a driver while two firms experienced it as a hinderer of BMI. The difference between these two effects is not entirely clear. The argument could be made that customer driven innovation occurred when customers had comments on a specific part of the BM i.e. the product, or the payment system (firm 1, 2, 4, 5), and that customers were a hindrance factor to BMI when the total uptake of the service offered by the firm was low (firm 5, 6). However, more support is needed to find the exact distinction between the two effects.

For legislation, the discrepancy between the factors acting as drivers or hinderers is clearer. The factor acted as a hinderer when the legislation or lack of legislation directly applied to the product or service offered by the firm (firm 1, 2, 4, 5, 6, 7). It acted, as a driver when legislation was applied more indirectly to the firm through altering the client's needs (firm 4, 5). This is where there is a large interaction between the customer influence and legislation. These firms experienced legislation changes to open up opportunities for acquiring new customers, which led to BMI. Even though the change in legislation was the driving factor behind this change, the factor had an indirect effect on the model, as it first influenced customer needs, which then led the company to innovate their BM.

For the internal use of technology, the factor was a driver when the technology used internally could be set-up independently and used in the firm's product (firm 1, 2). In the cases where the technological solution had to connect with technologies used by partners, the firms experienced technology as a hindrance factor (firm 5, 6, 7). In the results section it is described how two firms could not implement their innovative BM because of the complexity of making

1 their technology compatible with the technology used by the partner companies. In this case it  
2 was both the factor of technology and the factor of partners which together caused a major  
3 BMI hindrance factor.

4 Firms' societal impact vision is another example of an influencing factor that interacts with  
5 other components. In the results section it is explained that this vision continuously drives BMI  
6 across a number of companies, however these visions are often established when the  
7 company is founded (firm 2, 3, 4, 5). Therefore it may seem counterintuitive that a consistent  
8 vision leads a firm to continuously innovate its BM. This is because firms are often not able to  
9 establish a BM that fits their vision due to other influencing factors like technology, customers,  
10 and partner demands. However, these factors may change over time. Therefore, the dynamic  
11 between the firm's vision and other influencing factors leads to a continuous innovating force  
12 on the firm's BM.

13 All these examples show that BMI influencing factors can have different effects depending on  
14 how they interact with other influencing factors, this interconnection between different  
15 influencing factors has not been extensively investigated in the previous literature that was  
16 reviewed.

## 17 **6 Conclusion and future research**

18 This paper used qualitative methods to analyse different influencing factors on BMI for start-  
19 ups in the mobility sector. The importance of further investigation of this topic is emphasized  
20 in previous literature (Schneider and Spieth, 2013; Foss and Saebi, 2016). These papers show  
21 that even though previous research has been done on this topic, more research is necessary  
22 to further identify and describe the large range of potential influencing factors. The mobility  
23 sector was specifically chosen as this sector has seen a wave of innovative technologies in  
24 recent years. These new technologies have encouraged the development of new BMs for  
25 example Mobility-as-a-Service and Micro-mobility providers. However as Zipper (2020) and  
26 Bliss (2020) show many of these BMs still struggle to capitalize on the value that their  
27 technologies offer, making BMI is this industry crucial for further development. The cases  
28 discussed in this paper give insight into some of the hindering and driving factors of BMI that  
29 mobility sector start-ups may experience.

30  
31 In the cases examined further support was found that the factors client's wishes and needs,  
32 decision making structure and internal use of technology had an influence on BMI, this finding  
33 is in line with what previous literature suggests. On the other hand, all interviewees indicated  
34 that legislation had an influence on their BMI, this finding is in contrast with previous literature  
35 which found limited suggestions that legislations influences BMI. Two significant driving factors  
36 were also identified in the cases studied that have not been mentioned in the literature  
37 reviewed. These are the effect of partners on BMI and the effect of the firm's societal impact  
38 vision. Due to the qualitative nature of this study it was possible to gather more details on the  
39 mechanisms behind these influencing factors. This allows the paper to demonstrate why  
40 factors have a different influence on BMI in different situations. The paper also shows how  
41 certain influencing factors have interacted with each other in the cases investigated. This  
42 interaction influences the BMI outcome and has not been thoroughly investigates in previous  
43 literature. It is hoped that the analysis of these case studies is an insightful addition to the

1 current literature, as it gives an overview of some of the most influential driving and hindrance  
2 factors of BMI experienced by a number of firms within the mobility sector.

3 This study experienced three main limitations. First, the sample size of this research was  
4 limited to nine interviews at seven different firms. This limits the generalisability of the findings.  
5 Even though some scholars argue that a limited sample size can be beneficial as described in  
6 the methodology section, other scholars argue that a larger sample size is required for more  
7 meaningful results (Bryman, 2012). Second, for this study mostly one employer was  
8 interviewed for each firm. This exposes the study to an increased chance of biasedness as the  
9 answers given may be influenced by an employee's role. For instance, the majority of people  
10 interviewed have outward facing functions which will lead to more emphasis on external  
11 factors. Third, the thematic analysis method used to analyse the interview transcripts has  
12 limitations as well. Bulmer (1979) argues that the prior knowledge a researcher obtains from  
13 initially studying the previous literature can influence the outcome of the analysis, creating a  
14 certain bias in the results.

15 Further research is needed for a number reasons. First of all, additional research could help  
16 find further support for the BMI influencing factors discussed. This study took a qualitative  
17 approach and asked interviewees what factors influenced innovation within their BM.  
18 Additional quantitative research over a longer period of time is needed to find further support  
19 for the causation between the factors mentioned by interviewees and BMI.  
20 Second, at each firm the number of people interviewed was limited to one or two. This causes  
21 certain limitations discussed in the previous section. Therefore, in future studies on this topic  
22 multiple people from the same firm could be interviewed to create more reliable data. Third,  
23 the BMI influencing factors presented in this paper are not exhaustive, therefore more research  
24 will need to be done in exploring other influencing factors. Finally, this study focussed  
25 specifically on the new mobility industry. Additional assessment will have to be done to  
26 discover whether the results found for the mobility sector are generalizable to other industries.

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