The introduction of Uber: An institutional analysis of UberBlack and UberX services across the globe

Master thesis

Jesse van Kollem (4191560)
Reinwardtstraat 7B
1093 GT Amsterdam
06-53796886

Innovation Sciences
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Supervisor: Koen Frenken

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Summary

The worldwide introduction of Uber's taxi services has spurred heated debates among media and politicians. Such debates mainly revolve around the introduction of the low-cost UberX service, as this service diverges from existing institutional practices. Uber also introduced the luxury UberBlack service which fits within existing institutional practices. Since Uber continues to leverage resources for the continuation of UberX after becoming prohibited in several countries, Uber is considered an institutional entrepreneur.

Since Uber introduces services worldwide, a viewpoint is incorporated that accounts for location choices of MultiNational Corporations (MNCs) in services. By combining Foreign Direct Investment (FDI) location theory and institutional entrepreneurship theory, this study aims at answering the question: How can the market entry timing strategy across cities worldwide of Uber's services be explained?

Uber's strategy has not been formerly researched as the introduction of its services across places and time. Furthermore, FDI literature looks at patterns of FDI in respect to location features and institutional entrepreneurship theory focusses on the actions taken by an actor to change an institutional field. This study tries to fill this gap in literature by expanding literature on institutional entrepreneurship with location choices of MNCs' that try to change institutional rules at chosen locations in their advantages.

Besides the use of existing datasets, data on where and when introductions of UberBlack and UberX had taken place was taken from www.WayBackMachine.org. Cox proportional hazards regressions with time-dependent covariates were performed to find which hypothesized patterns hold together, while controlling for the effect of legitimization over time.

Uber's market entry timing strategy worldwide can be explained as follows: Uber's city choices are driven by favorable institutional contexts. UberX is the main service Uber tries to diffuse, possibly on its own. Meanwhile UberBlack is used either to create legitimacy before introducing UberX or is introduced alongside UberX when enough potential profitability allows to make a profit on both services simultaneously in a city.

The conclusions of this study can contribute by making public debate concerning Uber more factual. As theoretical contribution, this study shows that since both favorable institutional contexts and legitimation processes are proven to be important, the combination of FDI by MNCs theory and institutional entrepreneurship theory is functional to research worldwide service innovations. Furthermore, institutional entrepreneurship theory and FDI by MNCs in services both lack an explanation for the possibility of using multiple services, with different levels of divergence, in one strategy.

1 Introduction

After having trouble hailing a cab on a snowy evening in 2008, Travis Kalanick and Garrett Camp came up with the idea of an app which orders a ride with nothing more than a tap on a button (Uber Technologies, 2016a). The idea led to the founding of Uber Technologies Inc. in 2009 and the introduction of the Uber iPhone app in San Francisco in 2010 (Arrington, 2010; Hoek, 2014). Uber positions itself as a tech company with the mission: *"Whether it's a ride, a sandwich, or a package, we use technology to give people what they want, when they want it."* (Uber Technologies, 2016a). Uber's idea of bringing supply and demand for ride and delivery services together on a ICT-platform has now, in 2016, spread to 503 cities in 73 countries across the globe.

Uber offers an array of ride services, all using the same ICT-platform, containing different levels of quality, pricing, size of vehicles and intended user groups (Uber Technologies, 2016b). Uber's ICT-platform enables new forms of payment, booking and rating functionalities (Meelen & Frenken, 2015). Uber claims to use the functionalities to ensure quality and trustworthiness of its rides and that current taxi regulations are not sufficient to do so (Rechtspraak.nl, 2014; Rienstra et al., 2015). The ICT-platform also enables the use of big data, for instance yield management is employed which adapts prices according to supply and demand of specific places and times (The Economist, 2012).

UberBlack is a regular taxi service provided by licensed taxi drivers working for Uber, this service is accepted in many countries (Meelen & Frenken, 2015; Rienstra et al., 2015). With the service UberX (called UberPOP in The Netherlands) everyone can sign up as a driver without a taxi license (Meelen & Frenken, 2015). This service created most controversy and regularly encountered legal issues, since UberX enters heavily regulated taxi markets without adhering to the regulations of these markets (Meelen & Frenken, 2015; Rienstra et al., 2015). Backed by data giant Google (Geron, 2013) and investment bank Goldman Sachs (Kokalitcheva, 2015), Uber has leeway: to buy lobbying activities (Sottek, 2014; Weise, 2015), to continue operations after being prohibited (Rienstra et al., 2015) and to pay fines given to Uber drivers for driving without taxi license (de Vries, 2015; NOS, 2014).

Foreign Direct Investment (FDI) location theory proves useful in explaining the location choices of Uber's services that do adhere to regulations, as FDI theory explains location choices of Multinational Corporations' (MNCs) foreign operations as a balancing act between possible yield, risks and comparative (policy) advantages of locations (Kolstad & Villanger, 2008; Yin et al., 2014). FDI literature tends to study location features that make locations more or less attractive for foreign investment (Glatte, 2015; Yin et al., 2014) and does not account for site selection of places were institutions get challenged. Therefore, a viewpoint is needed that can account for Uber's activities aimed at changing the institutionalized rules of the field in which they operate. Uber leverages resources for the continuation of its UberX service, which diverges from existing practices, to challenge existing institutions, therefore Uber can be considered an institutional entrepreneur (Battilana, et al., 2009).

Little is known about Uber's location choices in which institutional fields are challenged towards legalization of Uber's services. Therefore, this study aims at finding a pattern in Uber's enrollment choices across different cities around the world, the following research question is posed:

- How can the market entry timing strategy across cities worldwide of Uber's services be explained?

To answer the above question, the timing of the introduction of UberBlack and UberX[1] across the world are researched as the dependent variables. Answering this research question can show whether Uber's enrollment is following a 'rational' pattern across places and their respective variables. In terms of societal relevance, this can be useful for parties that are affected by Uber's expansion activities and have to act accordingly. More generally, the introduction of UberX has spurred heated debates worldwide, both in the media and among politicians. Any scientific advance and debate is deemed to be helpful to structure the public debate, albeit indirectly. In terms of scientific relevance, until now, 2016, Uber's strategy has not been researched according to the introduction of its services across places and time. Furthermore, there is little theoretical knowledge about how city location choices are made by MNCs as strategic choices in the context of trying to change institutional rules. FDI literature looks at patterns of FDI in respect to location features and Battilana et al. (2009) focusses on the actions taken by an actor to change an institutional field in respect to field characteristics. This study tries to fill this gap in literature by expanding literature on institutional entrepreneurship with location choices of MNCs' that try to change institutional rules at chosen locations in their advantages. Finally, the dataset gathered for this study can serve as a framework for comparative case study analysis to evaluate whether particular patterns of Uber's introduced services lead up to certain (legal) outcomes.

Hereafter the theory is elaborated, concepts and dimensions are given accompanied with the conceptual model of this study. The operationalization chapter follows by describing how dimensions are measured, gathered and analyzed. The results and conclusions chapters follow, and the research paper ends with a discussion.

2 Theory

2.1 Uber as institutional entrepreneur

Battilana et al. (2009) made a comprehensive literature review to propose a model of institutional entrepreneurship. Stemming from DiMaggio's (1988) notion of institutional entrepreneurship the theory explains how actors' agency can contribute to institutional change while institutions, in which they are embedded, pressure towards stasis (Battilana et al., 2009). In this view institutional entrepreneurs are change agents that: initiate divergent change, actively participate in the change process and leverage resources, to create new or change existing institutions (Ibid.). Uber fits well in this description as it introduces UberX that diverges from current shared understanding of how the taxi market should work. Furthermore, Uber actively participates in the change process by leveraging resources to provoke reactions from the existing institutionalized field, such as paying fines given to drivers (de Vries, 2015; NOS, 2014).

Interplay between 'field characteristics' and an 'actor's social position' determine for a large part whether an actor becomes an institutional entrepreneur, they are enabling conditions (Battilana et al., 2009). Institutional entrepreneurs implement divergent change by 'creating a vision' that appeals to other actors in the field they want to change, in order to 'mobilize allies' for the proposed institutional change (Ibid.). Although theory describes the creation of a vision for which allies are mobilized, this study focusses on the introduction of Uber's services. The UberX service that diverges from existing practices is seen in this study as a vision for which Uber tries to change existing institutions, as Uber

[1] UberX is in most countries the same as UberPOP, although after UberPOP was prohibited in The Netherlands Uber introduced UberX as a service were drivers do need a taxi license and do have a built in board computer (Taxi Pro, 2015). In this study the first introduction of either UberX or UberPOP is researched as this marks the introduction of a low cost Uber service that does not adhere to regulations. The introduction of higher priced UberBlack and even more luxury services is researched as the introduction of UberBlack, as these services adhere to regulations and, therefore, are generally accepted in countries.

tries to make this service legal after introduction. Whether the introduction of specific services leads to the mobilization of allies is beyond the scope of this study.

The model proposed in Battilana et al. (2009) serves as the basis for the conceptual model in this study. It is expected that divergent change implementation, that is 'introduction of services', would create an institutional reaction (Battilana et al., 2009). This reaction is expected to create a feedback loop influencing the interplay between Uber's 'social position' and 'field characteristics' (Ibid.). In figure 1 Battilana et al.'s (2009) model is shown.

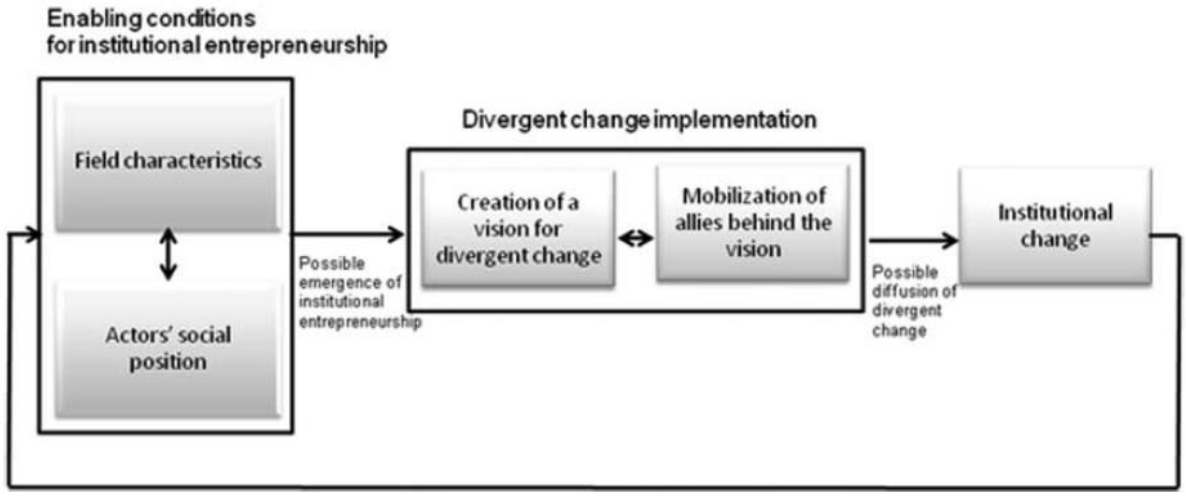

Figure 1: Model of the Process of Institutional Entrepreneurship as proposed by Battilana et al. (2009)

2.2 Conceptual model

In figure 2 the conceptual model is shown, which adapts figure 1 to Uber's situation. Dimensions in the conceptual model are elaborated in the respective section of the concept.

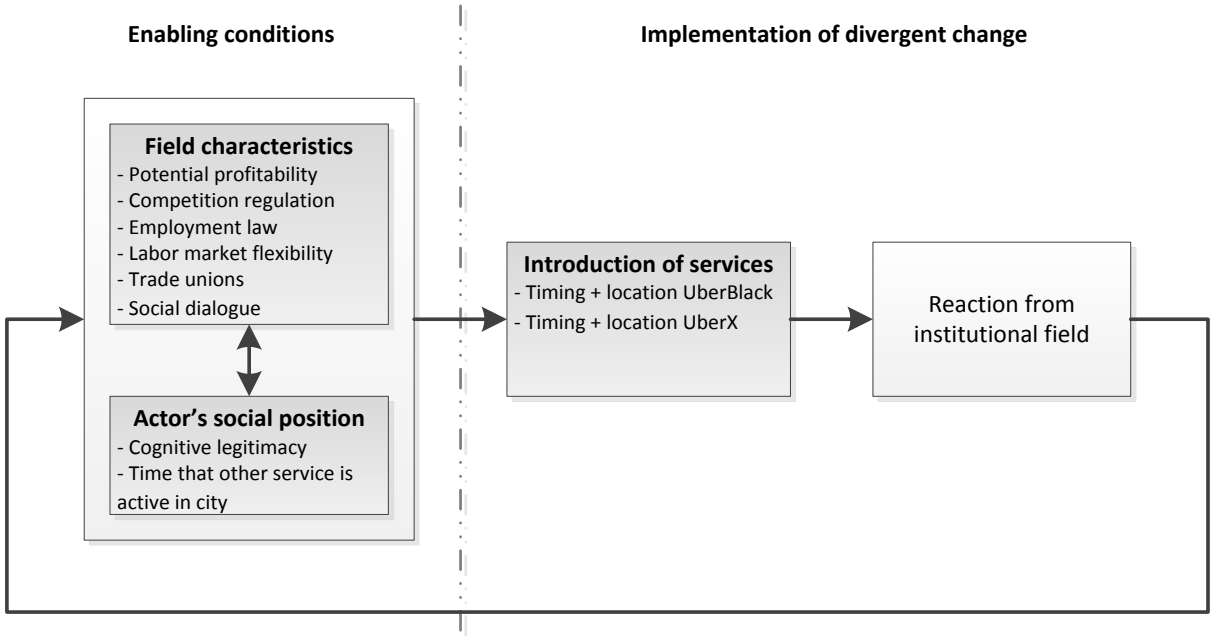

Figure 2: Conceptual model of the introduction of divergent services by an institutional entrepreneur in the taxi market, based on Battilana et al. (2009)

2.3 Introduction of services

FDI location theory explains location choices of MNCs and stems from 19th century work of Thünen, explaining location choices dependent on achievable yields and intensity of utilization (Glatte, 2015). The theory is often employed to study features that make a location more or less attractive for FDI (Yin et al., 2014). FDI in services is found to be market seeking and guided more by the institutional quality of a location in comparison to factors as political stability and investment risks (Kolstad & Villanger, 2008).

The service UberBlack is accepted in many countries since it adheres to regulations of many places (Rienstra et al., 2015). This service is Uber's premium service: using luxury cars, using higher prices than other services and is the original Uber service (Uber Technologies, 2016b). Since this service is accepted in many countries it is expected that the introduction of UberBlack mainly follows FDI location theory, although UberBlack might be introduced as a temporal strategy as well.

Implementation of divergent change that builds on existing institutions is challenging, and those that break with existing institutions even more so (Battilana et al., 2009). Often such change entails 'loosening' the institutional embeddedness of the field and institutional entrepreneurs have to counter the opposition that benefits from the status quo (Ibid.). The more a proposed divergent change threatens established privileges and social positions, the more pronounced this pattern is expected to be (Ibid.). The introduction of UberBlack might be a part of loosening the institutional embeddedness of the field and to upset the actors' benefitting from the status quo.

UberX is Uber's economy service, this service is Uber's lowest priced service and often is cheaper than regular taxis (Uber Technologies, 2016b). UberX uses drivers that: drive in their own private cars without possessing a taxi license and thus lack associated obligations (Rechtspraak.nl, 2014). The Dutch court ruled the service prohibited since the interest of drivers are not protected enough by Uber (Ibid.). After which Uber continued operations (Rechtspraak.nl, 2014; Rienstra et al., 2015) while paying fines given to drivers (de Vries, 2015; NOS, 2014). Similar legal issues were encountered in every country researched by Rienstra et al. (2015). Meanwhile, Uber hires lobbyist to lobby for adaptation of regulation towards legalizing UberX (Sottek, 2014; Weise, 2015). In California and Washington DC regulations were amended to legalize UberX after having offered UberX illegally for some time (Rienstra et al., 2015). Thus, Uber seems to continue providing UberX to markets while leveraging resources aimed at changing regulations towards legalization of the service. This is why Uber is considered an institutional entrepreneur.

This study focusses on whether Uber choses locations where institutions are likely to be changed by Uber's actions. One can expect that Uber's choices in the sequence of cities where services are introduced are based, at least partially, by their assessment of the likelihood that they will succeed. That is, that regulations will be adapted such that UberX can operate legally. The exact activities of Uber aimed at changing institutions are much harder to research, due to limited availability of data and unwillingness of Uber to respond to interview requests.

As mentioned earlier, the introduction of services is expected to create reactions from institutionalized fields, which as a feedback loop influences the enabling conditions in the future (Battilana et al., 2009). The timing and location choices of the introduction of UberBlack and UberX are employed in this study as dependent variables.

2.4 Field characteristics

Field characteristics conceptualize the characteristics of the institutionalized field itself, although availability of data forces to include broad country level proxies for worldwide analysis. FDI in services is found to be both market seeking and guided by the institutional quality of places (Kolstad & Villanger, 2008) and Uber enters taxi markets. Therefore relevant taxi market potential and institutional characteristics dimensions are discussed below for the independent concept 'field characteristics'.

It is likely that Uber enters cities in which they can pursue higher levels of 'potential profitability', for which a dimension is added. The profitability for Uber is bound to the level of income that people generally earn in a location, since Uber earns its income as a percentage of the fare price. The per capita GDP of countries is included as a proxy for the income level of a city. Furthermore, the size of the city determines potential profitability as well, as in bigger cities it is expected that a larger amount of fares are driven. The following hypothesis is posed:

- H1: At any given point in time, the likelihood of Uber introduction in a city increases the higher the potential profitability for Uber is in that city.

Since Uber started out in San Francisco, California (U.S.) and is trying to expand its services worldwide, choices are made for locations where institutions are organized different than at Uber's HQ. Every city is located in a region, which is a part of a country. Cultures are also layered in an union like structure incorporating regional culture within a nation's culture (Hofstede et al., 2010). Within nations there are strong forces to further integrate inhabitants in national cultures due to institutions, such as national education systems or languages (Ibid.). Thus, (local) cultures are integrated and reflected in the national culture its institutions. Five institutional characteristic dimensions are added in which the institutional differences are compared, as country proxies.

Stemming from critique on linear models of economic growth the concept national innovation system emerged from efforts such as Lundvall (1988). The role of political, economic and cultural institutions was increasingly recognized in how technology and science progress, and how they create economic growth (Freeman, 1997). Since MNCs as Uber enter markets in which they can pursue growth benefits, Freeman's (1997) view that economic growth are both enabled and constrained by history of science, technology, economy, politics and culture seems useful. From this view, the possibilities for Uber to enter markets are enabled as well as constrained by the historical institutional context of these markets. The Institutional Profiles Database (IPD) 2012 describes 143 countries', from history originated, institutional characteristics and is designed for research on the relationship between institutions, economic growth and development (Bertho, 2013). The IPD covers institutional variables similar to those employed by others (Ibid.), such as in Kunčič (2013). The IPD gathered Likert-scale perception data, from experts, of de facto application of rules and institutional quality (Ibid.). From the IPD the differences between countries' institutional characteristics that are relevant for Uber's market are employed. In the case of The Netherlands, Uber claims to be hampered by competition regulation, while the judge claims that interest of the drivers need to be protected and that licensing does so (Rechtspraak.nl, 2014). Therefore, institutional characteristics that describe effectiveness of competition regulation and labor force conditions are chosen.

Competition regulation and employment law variables from Bertho (2013) are employed[2], since together they describe the extent experts perceive the effectiveness of the legal framework. Competition

[2] Some names of the sub-dimensions are formulated somewhat different in this document than in Bertho (2013). The following changes have been made: 'Competition regulation' was 'competition regulation, corporate

regulation is included as it should protect the interest of both consumers and producers by creating a level-playing-field. This is likely to stimulate introduction, as it tries to stimulate competition amongst corporations. Thus it is expected that higher scores on competition regulation lead to introduction earlier in time. Employment law is included since it describes to what extent law is perceived effective to protect employees from unwanted work conditions. In multiple countries heated debates have taken place about whether drivers are employees of Uber, and therefore need protection against Uber, while Uber claims that drivers are self-employed workers (Rechtspraak.nl, 2014; Rienstra et al., 2015). Therefore, it is expected, especially for UberX, that lower scores on employment law lead to introduction earlier in time. For the 'competition regulation' and 'employment law' dimensions the following hypotheses are posed:

- H2: At any given point in time, the likelihood of Uber introduction in a city increases when the level of competition regulation is higher.
- H3: At any given point in time, the likelihood of Uber introduction in a city increases when the level of employment law is lower.

From Bertho (2013) also trade unions, social dialogue and labor market flexibility variables are employed, as they describe how the working class is organized in a country. Trade unions variable is included as this describes the perceived extent of pluralism, independence, freedom and influence that trade unions have and thus how employees are potentially able to organize themselves. If many independent trade unions exist in a country and those have a lot of freedom and influence, it is expected that, especially for UberX, introductions are less likely earlier in time. Social dialogue is included as this describes the perceived extent a society has effective social dialogue and strike movements, thus whether employees potentially will revolt or discuss issues. It is expected that the more social dialogue exist in a country the less likely introductions take place earlier in time, especially for UberX. Both are especially expected for UberX since the service does not fit within the legal framework. Labor market flexibility is included as this describes the perceived extent of worker rigidity, mobility of workers and significance of informal work, which indicates whether employees will potentially work under uncertain conditions. Both services are expected to be introduced in societies with more labor market flexibility earlier in time, since Uber does not see its drivers as employees and does not give certainty that work is available (Rechtspraak.nl, 2014). For the dimensions 'labor market flexibility', 'trade unions' and 'social dialogue' the following hypotheses are posed:

- H4: At any given point in time, the likelihood of Uber introduction in a city increases when the level of labor market flexibility is higher.
- H5: At any given point in time, the likelihood of Uber introduction in a city increases when the level of trade unions is lower.
- H6: At any given point in time, the likelihood of Uber introduction in a city increases when the level of social dialogue is lower.

The variables described above from Bertho (2013) describe the effectiveness of social protection in a country, both the formal schemes (legal framework) as the informal ones (e.g. strike movements). Uber is trying to change institutional rules, as UberX can only be legalized by lowering standards intended as social protection schemes. For UberX it is expected that locations where it is likely that social protection schemes can be changed are chosen. It is expected that both the formal and the informal schemes are

governance', 'Trade unions' was 'trade union freedoms and pluralism' and 'Employment law' was 'compliance with employment law'.

important for this process. While for UberBlack it is expected that locations are chosen where Uber finds protection in the formal framework against being muscled out by local entities.

Finally, a decision for a geographic location has to be made with every introduction. It is expected that language influences Uber's introduction location choices, since doing business abroad is easier in countries where the same language is spoken. Furthermore, cities have a certain importance to countries, such as that countries have a capital were the political elite is stationed. Since Uber tries to change a country's institutions, it is likely that Uber enters a capital city earlier in time. Both language similarity and an indication whether a city is a capital are included as control variables in the analysis. Also a dummy USA control variable is included to check if Uber is an American phenomenon, since Uber started its services in the United States of America.

2.5 Actor's social position

Actors' social positions determine their relations to the environments in which they are embedded (Emirbayer, 1997; Emirbayer & Mische, 1998 in Battilana et al., 2009). Institutional entrepreneurs try to bridge interest and provide legitimacy in the eyes of several stakeholders from both their formal positions as well as socially constructed positions to change institutional fields (Ibid.). Since such positions are partly socially constructed, earlier activities, such as the introduction of services, influence perceptions of an actor's legitimacy in the eyes of stakeholders in the present. Access to markets and government protection are dependent on the level of legitimacy achieved earlier in time (Aldrich & Fiol, 1994).

Aldrich & Fiol (1994) distinguish two types of legitimacy, namely cognitive and sociopolitical legitimacy. "*Cognitive legitimation refers to the spread of knowledge about a new venture … [and] … sociopolitical legitimation refers to the process by which key stakeholders, the general public, key opinion leaders, or government officials accept a venture as appropriate and right, given existing norms and laws*" (Aldrich & Fiol, 1994, p. 648). Uber's introduction of services clearly create 'cognitive legitimacy' as Uber often gets media attention (for example Arrington, 2010; Hoek, 2014; Taxi Pro, 2015; The Economist, 2012). As for 'sociopolitical legitimacy', it depends on Uber's service to what extent and in what direction they influence Uber's sociopolitical legitimacy, for instance UberBlack is accepted in most countries (Rienstra et al., 2015) while UberX has been banned in many countries (Che, 2015; Rienstra et al., 2015).

The amount of earlier introductions in countries nearby and within the country are expected speed up the introduction process as Uber has gained more cognitive legitimacy in the vicinity of a place. In the beginning Uber can choose all possible cities in a country and it is expected that the most viable cities are chosen first. After a while the most viable cities are expected to be chosen and that city choices are more difficult later in time, slowing down the introduction process. Thus, it is expected that cognitive legitimacy speeds up the introduction process, but that the effect of a unit increase of cognitive legitimacy becomes smaller over time.

Furthermore, a quick-scan on www.waybackmachine.org shows that Uber seems to always first introduce UberBlack to build up legitimacy before trying to introduce UberX. UberBlack allows the company to create a user base, a brand name and creates legitimacy as a regular business. This is expected to support the success of UberX, which is usually introduced shortly after. The following hypotheses are posed for the 'time that other service is active in city' and the 'cognitive legitimacy' dimensions:

- H7: At any given point in time, the likelihood of Uber introduction in a city increases the more cognitive legitimacy Uber has built up within the vicinity of that city.
- H8: At any given point in time, the likelihood of UberX introduction in a city increases the longer UberBlack operates in that city.

3 Operationalization

This study has a quantitative character in which data is collected on the introduction of Uber's services and is compared to data from existing datasets. This study has a cross-sectional design, since more than one case is researched at a single point in time, using quantified data to find a pattern of association (Bryman, 2012). Since documents are researched to find predetermined categories, that is Uber's services and dates of introduction, this study can be considered a form of content analysis (Ibid.).

3.1 Dimensions & indicators

The field characteristics and control variables are measured with the use of existing datasets. Since all the datasets used claim statistical significance of their dimensions or consist of plain facts, the quality of the data is considered appropriate for inclusion.

It is most desirable to measure the real field characteristics of the taxi market. Although desirable, the differences between what kind of data is collected and how categorization of data is done by institutions worldwide makes it impossible to gather taxi field data for worldwide analysis. Therefore, proxies are included that can be collected worldwide. Attention is given to choose those proxies that best reflect the issues Uber is facing when entering fields.

An actor's social position is measured in legitimacy. Since it is concerned with the spread of knowledge about a venture, and Uber's knowability results from the attention given to the introduction of its services, it is appropriate to measure legitimacy through the numbers of introductions that Uber had before and through the time that other service is active in city.

Uber's timing of the introduction services is collected in place, date and type of introduction. The place of introduction is collected in a way that the location is delineated in its overarching dimensions. Thus, besides city names, also the countries are coded.

3.2 Operationalization table

Table 1: Operationalization table of the introduction of divergent services by an institutional entrepreneur in the taxi market

Concept(s):	Dimension(s):	Indicator(s):	Coding:
Enabling conditions (Independent variables)			
Field characteristics	***Potential profitability***		
	- *A.) City population*	Number of city inhabitants (from GeoNames.org, 2016).	Ratio: 0 – ∞
	- *B.) GDP per capita*	Country's GDP per capita in 2013 US$ (from Worldbank, 2016).	Ratio: € 0 – ∞
	Competition regulation	Extent that barriers for market entry are imposed, the efficiency of market regulations and the importance of large suppliers in the market (from Bertho, 2013). Composed by adding 5 scores together.	Ordinal/ Quasi-interval: 0 – 20
	Labor market flexibility	Extent of labor market rigidity, mobility and importance of informal	Ordinal/ Quasi-interval:

		work (from Bertho, 2013). Composed by adding 2 scores together.	0 – 8
	Trade unions	Extent of independence and pluralism of trade unions (from Bertho, 2013). Composed by adding 3 scores together.	Ordinal/ Quasi-interval: 0 – 12
	Employment law	Extent of compliance with employment law, employment protection, workplace inspectorate and efficiency of industrial tribunals (from Bertho, 2013). Composed by adding 3 scores together.	Ordinal/ Quasi-interval: 0 – 12
	Social dialogue	Extent of effectiveness of social dialogue with firms, branches and governments and the amount of strikes (from Bertho, 2013). Composed by adding 3 scores together.	Ordinal/ Quasi-interval: 0 – 12
	Every subject in Bertho (2013) is composed from multiple scores, each of the scores is composed of multiple Likert-scale questions.		
Actor's social position	***Cognitive legitimacy at a certain point in time***		
	- A.) National legitimacy	Number of services that were introduced before, within country.	Ratio: 0 - ∞
	- B.) Legitimacy in neighboring countries	Number of services that were introduced before, within neighboring countries (direct land borders and borders by tunnel or bridge).	Ratio: 0 – ∞
	Time that other service is active in city	Categorization of time that the opposing service is active in the same city.	Nominal: 6 categories
Control variables	***Language***	English and Spanish spoken by more than 9% of population (from Mayer & Zignago, 2011).	Dichotomous: Yes/No (2 variables)
	Capital city	Indication whether city is capital city of country (from Mayer & Zignago, 2011).	Dichotomous: Yes/No
	USA	Indication whether city is in the USA (from GeoNames.org, 2016).	Dichotomous: Yes/No
Implementation of divergent change (Dependent variables)			
Introduction of services	***Time and location of the introduction of UberBlack and UberX services***	Type of service introduced.	Nominal: UberBlack or UberX
		Month of introduction.	Interval: 1 – 74
		Place of introduction (city & country).	Nominal: Name (2 variables)

3.3 Data collection

3.3.1 Dependent variable: Introduction of services

The dependent variable, Uber's introduction data, is collected from Uber's websites and archived captures of its websites on the Internet Archive's www.WayBackMachine.org. WayBackMachine is a digital library that archives websites since 1996 to preserve cultural artifacts of digital information on the web and grand permanent access to this information for research and other purposes (Internet Archive, n.d.). Dependable on usage statistics from Alexa and the amount of links to other pages

WayBackMachine archives every website more or less often (Ibid.). Only sites that included specific coding to be excluded from WayBackMachine are not archived, and sites with little visitors are archived less frequent (Ibid.). WayBackMachine archived the URLs used by Uber from introduction in July 2010 onwards.

When Uber started, it used the URLs www.Uberapp.com and www.Ubercab.com. In January 2011 the website was moved to www.Uber.com, which is the current main-URL of Uber's website. In the beginning Uber's '/learn' subpage[3] showed the available services and cities. From 2 February 2012 onwards Uber lists the cities in which services are available on its '/cities' subpage. From the moment services are available in a city, Uber shows available services on individual '/[city name]' subpages[4]. Besides, Uber maintains a PR website, the Uber Newsroom website, on which Uber publishes news and promotion articles to inform about its activities. The archived websites, the live website itself as well as the Uber Newsroom website were used as sources for the dependent variable.

Data on Uber's introductions was gathered from 1 July 2010 till 31 August 2016. An introduction was gathered as the date, the city, the country and the service that was introduced. Although initially date of introduction data was gathered as the specific date of introduction, it was later recoded for methodological reasons[5] to the month in which the introduction took place. 1 July 2010 till 31 July 2010 is considered *month 1* and 1 August 2016 till 31 August 2016 is considered *month 74*. Assigning an introduction to a month was done by checking whether the introduction took place between the first date of the month and the last date of the month. The number assigned to the month is calculated by how many months from July 2010 the month took place. The length of the month is accounted for by always considering the length of the months in the calculations.

Both the introductions of UberBlack and UberX were gathered, although these services were sometimes named different across countries. Also the conditions of services were sometimes slightly different across countries. If services were named different and or had slightly different conditions, it was still tried to place these observations under one of each services. If UberBlack or similar was introduced it was gathered as UberBlack. It was considered similar to UberBlack if the service: used the UberBlack logo (for that country), used the word "quality" or "luxury" in the service description and the service demanded specific types of luxury cars. If UberX or similar was introduced it was gathered as UberX. It was considered similar to UberX if the service: used the UberX logo (for that country), used the word "low-cost" or "economy" in the service description and the service could be performed with any type of car. If a service failed to fit within the description, the introduced service was neglected.

A four step procedure was executed to identify the dates, locations and services. Step one consisted of using WayBackMachine to research archived '/learn'[6] and '/cities' subpages. The date a city became listed on the archived subpage was (temporarily) noted, as well as the city name was noted. The '/cities' subpage is often archived multiple times per month. To easily identify which cities emerged and disappeared from '/cities' subpages, a software tool was developed to compare the data displayed on

[3] With subpage this study indicates the HTML structure of the website, it indicates what is added after the slash to the web address of the respective main web site.
[4] Per city such a website exists, so [city name] should be replaced with the name of the place where Uber is active.
[5] To calculate the used Cox PH model the data needed to be transformed into a counting process style dataset. Thus, in which for every time interval for every subject a row of data would show the values of the subject in the respective time interval. The dataset would be very big if the time interval was on a daily basis.
[6] Only the first seven introductions were displayed on the '/learn' subpage. In that time only UberBlack existed in a few big cities, so for these observations it was possible to immediately note the country of introduction and the service of introduction.

two separate (archived) versions of the subpage. This tool gives visual aids in respect to which words have been changed, appeared or disappeared.

Step two consisted of researching the archived '/[city name]' subpages. These subpages would show active services in that city and would confirm the country of the city. Since '/[city name]' subpages contain less links to other sites and (probably) are less visited, they are archived less frequently than the '/cities' subpage. Often these subpages were archived once a 2 months, a time lack between the archived '/cities' and '/[city name]' subpages is possible. In order to overcome this uncertainty the following was done:

- If only one service was introduced in the city, than the date it appeared on the '/cities' subpage was noted.
- If two services appeared in separate archived versions of the '/[city name]' subpage, than the first introduced service was noted on the date it appeared on the '/cities' subpage. For the second service the date it appeared on the '/[city name]' subpage was temporarily noted and further researched in step three.
- If two services appeared in the first archived version of the '/[city name]' subpage, than both services were further researched in step three.

Step three consisted of researching Uber's PR site, the Uber Newsroom website, for cities where two services were introduced. In 176 cases Uber introduced two services in one city. By searching the city name on this site, all news and promotion articles written by Uber about the city were retrieved, including the date it was put online. In cases when only the second service needed to be further researched:

- If the Newsroom articles provided information about when the second service started, than the date the article was uploaded or the date announced in the article was noted. Otherwise, the date it appeared on '/[city name]' subpage is noted.

If both services were further researched on the Uber Newsroom website:

- If the Newsroom articles provided information for, at least, when the second service started, than the date the article was uploaded or the date announced in the article is noted as the introduction of the second service. The first service is noted on the date it appeared in the '/cities' subpage.
- If the Newsroom articles did not provide additional information on which service was first, than both services were noted on the date they both appeared in the '/[city name]' subpage.

Step four consisted of gathering data from the live website between 29 June 2016 and the end of August 2016. Since all archived data was gathered and the data had reached present time, also live data was collected. By checking Uber's website two times a week (using the aforementioned software tool), the introduction data was gathered in that period with a maximum four day time lack. Near the end of August it was decided to stop data collection and proceed with the gathered dataset.

3.3.2 Dataset quality

Since 176 cities where two services were introduced have been additionally researched, an assessment of the research method can be made. By comparing dates of the Uber Newsroom articles with the dates of archived WayBackMachine websites, it can be assessed whether WayBackMachine is accurate.

During the procedure described above, for 176 cities, the difference between the date it appeared on the '/cities' subpage and in the Uber Newsroom articles was noted when it appeared to be bigger than one week. Since January 2013 only 13 pairs of cities showed to deviate more than one week and less than 3 weeks, while others deviated less than a week. Pre January 2013 WayBackMachine was less accurate,

showing 4 cities to deviate more than a month. Probably this has to do with that usage statistics determine for a part how often a website gets archived. Therefore all introductions prior January 2013 were checked and adjusted according to the articles on the Uber Newsroom website. Only for 10 cities the entire procedure would not produce certain precise dates of introduction, for which the first archived '/[city name]' subpage date was noted. This date could be latter than the actual introduction, but at least it is certain that the service existed on this latter date.

3.3.3 Right censored units of analysis

To provide more insight in which cities are chosen by Uber, also cities that are not chosen are included in the sample. By accounting for cities that are not chosen it becomes possible to control for which factors make it less likely that an introduction will appear. Thus, it avoids the general bias in research of only looking at units of analysis that experience the event under study.

Since Uber introduced services in 503 cities, also 503 right censored cities were randomly sampled where no introduction took place during the researched period of time. From GeoNames.org (2016) a dataset was downloaded containing all the world's cities and villages with above 1000 inhabitants. The dataset contained cities in every country of the world. 90% of the cities where Uber is active has above 95,000 inhabitants, therefore a threshold of 95,000 on the number of inhabitants was set on the GeoNames.org dataset. A filter was applied to also exclude cities from the list where Uber was already active. After which every city was assigned a random number, the list was sorted according to these random numbers. Thereafter a random sampled set of 503 right censored cities with above 95,000 inhabitants was gathered to be included in the dataset, resulting in a dataset of total 1006 units of analysis. Fortunately the random sampled set, at the first instance, contained cities for which data was almost fully available, only in a few instances of missing values exist. For instance, on GDP per capita a few values were missing, just as is the case with cities where Uber introduced services. It seems, from a quick scroll through the dataset, that missing values are mainly to be found in units of analysis were Uber introduced services.

3.3.4 Independent variables

The independent variables consist of both time-independent as time-dependent variables. Time-independent variables are characteristics that remain the same over time, such as the country belonging to the city. Time-dependent characteristics change over time and can be calculated for a specific point in time, such as legitimacy variables. The time-independent variables are gathered using existing datasets devised by Bertho (2013), GeoNames.org (2016), Mayer & Zignago (2011) and Worldbank (2016).

Employed time-dependent variables consist of the variables describing the actor's social position: national legitimacy of service, legitimacy in neighboring countries of service and time that other service is active in city. Since this study employs both Kaplan-Meier analysis as well Cox proportional hazards analysis, the precise calculation depends whether the model can account for time-dependent covariates. The differences between the both analysis, and the differences in how time-dependent variables are calculated, are further elaborated in the data analysis section 3.4.

National legitimacy of service is collected by calculating how many introductions have taken place within the country before a specific date. Legitimacy in neighboring countries of services is collected by calculating how many introductions have taken place in countries neighboring the country before a specific date. In order to do so, NaturalEarthData.com (n.d.) data was used to calculate which nations

border[7]. Since this would only calculate direct land borders, the few instances that nations border by a bridge or tunnel were included manually, such as Denmark bordering Sweden and Saudi Arabia bordering Bahrein.

Time that other service is active in city is collected categorical since often only one service is introduced in a city. If not collected categorical, than the value of zero months can mean both no activity of other service as well as it can mean active for less than a month, while everything is assumed to have same distance between numbers[8]. All calculations entail whole months, thus the length of the month is accounted for, similar to how month of introduction variables are calculated.

3.4 Data analysis

Data is analyzed using multivariate statistics, both UberBlack and UberX are tested separately as dependent variables. Furthermore two types of tests are employed, Kaplan-Meier survival analysis and Cox proportional hazards regression analysis. Two types of services combined with two types of tests makes four datasets total. Both models calculate the probability of experiencing an event, while controlling for censored units of analysis that did not experience the event (Walters, 2009). Some data is measured at country level, while the analysis is at the city level. However, in many countries, Uber is only active is one or a few cities. Hence, a multi-level approach is deemed not to have so much added value.

3.4.1 Time-independent datasets

Kaplan-Meier plots show whether the hypothesized patterns can be seen in a descriptive manner in respect to one categorical variable. This model cannot handle time-dependent variables, therefore the datasets used for the Kaplan-Meier plots are coded as time-independent datasets. Thus, every unit of analysis, 1006 units, has one row of data describing the values of variables for the entire researched timeframe. Since two dependent variables (UberBlack and UberX) exist within the data, they are considered as two separate datasets although the data is gathered in one table.

The Kaplan-Meier datasets for UberBlack and UberX contain event status variables, which are coded as '0' if the unit of analysis is right censored and '1' if the service was introduced within the researched period. If the service was introduced (event status '1') than the month of introduction is coded as the month number, since time intervals of months are used. If the unit of analysis was right censored (event status '0'), than the month of introduction is coded as month 74, the last month of the researched period. Basically the right censored units are handled as being in the research up until the last day of the research, while dropping out of the research at the last day without an introduction.

The time-dependent national legitimacy, legitimacy in neighboring countries and time that other service is active in city are calculated time-independent in these datasets. If the unit of analysis had an introduction of the service within the researched period, than the date of introduction of the service was used to calculate the variables. If the unit of analysis was right censored, than the values for the variables were calculated at the end of the researched period, that is month 74.

Since Kaplan-Meier plots can only handle categorized independent variables, categories needed to be constructed for continuous variables. Descriptive statistics for categories made are shown above the respective Kaplan-Meier plot.

[7] Many thanks to Andrew Heiss for providing a programing script to perform the operation on https://gist.github.com/andrewheiss/926b9d60a26e29f6bf32.

[8] The Cox model can only perform listwise deletions, therefore 'NA' values combined with '0' values would delete at least 50% of the cases.

3.4.2 Time-dependent datasets

The Cox proportional hazards regression model shows which hypothesized patterns hold in combination with other variables. This model can handle time-dependent variables and shows hazard ratios of the relative risk of experiencing an introduction at any point in time.

Due to the time-dependent variables, counting process style datasets were constructed. For every moment a time-dependent variable could differ, for a unit of analysis, the values within that timeframe needed to be calculated. In order to do so, it was calculated in which months the values of time-dependent variables changed. Also the model required that the units of analysis were included in the dataset until the moment of introduction. Thus, it was also calculated until which moment the city should be included in the dataset. With help of Therneau, Crowson, & Atkinson (2016) and Thomas & Reyes (2014) datasets were constructed in which: for every city for every timeframe that variables could differ, until the moment an introduction took place in that city, a row of data would show the values within that timeframe for the city. Resulting in datasets of 45,912 rows for UberBlack and 36,266 rows for UberX.

In the Cox datasets also event status variables are used for UberBlack and UberX and show whether the introduction took place within the respective timeframe. Thus, if coded as '0', than the unit of analysis was censored for that timeframe. If for every possible timeframe this variable was coded as '0', than the unit of analysis is a right censored unit of analysis during the entire timeframe. If coded as '1', than the introduction took place within the respective timeframe. After an introduction took place, the city would be removed from appearing in later timeframes.

The time-dependent variables national legitimacy, legitimacy in neighboring countries and time that other service is active in city are calculated as follows: If the introduction took place within the timeframe, than the date of introduction was used to calculate the values. If the introduction did not took place within the timeframe, than values were calculated using the date the timeframe started.

Due to the time-dependent format, the variable time that other service is active in city is calculated as the activity of the opposing service than is tested in the Cox regression. The category both services introduced on same date of the variable is inherently time-independent, while other categories do change over time. Therefore this category is not calculated in the Cox regressions.

4 Results

This chapter discusses the results of the research, starting with the descriptive statistics of gathered variables. Descriptive statistics are shown as how they were originally gathered, that is, before they were calculated into time-dependent datasets. In short, the time-independent sets are shown. Thereafter data is discussed in a descriptive manner using a timeline and Kaplan-Meier plots. Followed by discussing the results of the time-dependent Cox proportional hazards regression models in respect to the hypotheses posed earlier.

4.1 Descriptive statistics

Table 2 shows the descriptive statistics of the time-independent datasets. Both datasets have the same independent variables, except for cognitive legitimacy variables. UberBlack is tested together with the legitimacy variables for UberBlack, and UberX is tested with UberX legitimacy variables. Cities where only one service is introduced is considered a right censored unit of analysis in the dataset of the other service. For the dataset of UberBlack a total of 191 (19% of n=1006) introductions are gathered between month 1 and 74. For the UberX dataset the total number of introductions is 488 (48.5% of n=1006) between month 25 and 74. Since Uber has introduced services in 503 cities of which 488 were introductions of UberX, it seems that UberX is the most important service for Uber's business.

In table 3, the correlation table, it appears that the dummy variable USA correlates with other variables and is therefore excluded from the Cox proportional hazards regressions. Also the legitimacy variables seem to correlate between UberBlack and UberX. This is nothing to be concerned of, since these variables are not tested together in one model. More strange is the correlation between the variables labor market flexibility and social dialogue as they are derived from a single third-party dataset, and therefore should not have been included in a single dataset. Nevertheless, both were employed in the Cox proportional hazards regression, after which one is excluded to check whether the correlation had a significant impact on the results of the regression model, which is further elaborated below.

Table 2: Descriptive statistics of time-independent datasets UberBlack and UberX

	N	Range	Minimum	Maximum	Frequency within group	Mean/Group Proportion		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Dummy event UberBlack	1006	1	0	1	191	.190		
Month of introduction UberBlack	1006	73	1	74		69.08	.375	11.887
Dummy event UberX	1006	1	0	1	488	.485		
Month of introduction UberX	1006	49	25	74		66.02	.341	10.817
City Population	946	22,309,758	5,716	22,315,474		859,185.037	60,448.123	1,859,209.76
GDP PC in 2013 $	1001	102,496.74	413.70	102,910.44		24,678.450	692.500	21,909.717
Competition Regulation	1004	14.33	3.17	17.50		11.781	0.057	1.816
Labor Market Flexibility	1004	8.00	0.00	8.00		5.278	0.064	2.027
Trade Unions	1004	8.67	1.50	10.17		5.817	0.040	1.279
Employment Law	1004	11.67	0.33	12.00		6.937	0.061	1.939
Social Dialogue	1004	10.17	0.00	10.17		5.522	0.061	1.921
Neighboring Legitimacy UberBlack	1006	73	0	73		10.49	.465	14.736
National Legitimacy UberBlack	1006	73	0	73		16.64	.830	26.325
Neighboring Legitimacy UberX	1006	214	0	214		23.70	1.316	41.728
National Legitimacy UberX	1006	214	0	214		32.31	1.742	55.237
Time that other service is active in city (6 categories, see below)	1006	5	1	6				
1: Both services introduced on one date					25	0.025		
2: UberX active before UberBlack					49	0.049		
3: None or one of services is introduced					830	0.825		
4: UberBlack active 0 – 6 Months before UberX					34	0.034		
5: UberBlack active >6 – 12 Months before UberX					38	0.038		
6: UberBlack active for more than 1 year before UberX					30	0.030		
Dummy English +9%	1006	1	0	1	463	0.460		
Dummy Spanish +9%	1006	1	0	1	337	0.335		
Dummy capital of country	1006	1	0	1	79	0.079		
Dummy USA	1006	1	0	1	227	0.226		
Valid N (listwise)	939							

Table 3: Correlations table of time-independent datasets UberBlack and UberX (in variable names: leg.=legitimacy)

Pearson correlations Sig. = 2-tailed		City Population	GDP PC in 2013 $	Competition Regulation	Labor Market Flexibility	Trade Unions	Employment Law	Social Dialogue	Neighboring Leg. UberBlack	National Leg. UberBlack	Neighboring Leg. UberX	National Leg. UberX	Dummy English +9%	Dummy Spanish +9%	Dummy capital of country	Dummy USA
City Population	Cor.	1	-,129**	,140**	-,166**	,128**	-.023	-,107**	-,069*	-,160**	-,073*	-,162**	-,085**	-,107**	,272**	-,132**
	Sig.		.000	.000	.000	.000	.477	.001	.035	.000	.026	.000	.009	.001	.000	.000
	N	946	941	944	944	944	944	944	946	946	946	946	946	946	946	946
GDP PC in 2013 $	Cor.	-,129**	1	-.040	,399**	-,628**	,109**	,350**	-.035	,617**	-,133**	,520**	,391**	,478**	-.014	,692**
	Sig.	.000		.204	.000	.000	.001	.000	.265	.000	.000	.000	.000	.000	.657	.000
	N	941	1001	999	999	999	999	999	1001	1001	1001	1001	1001	1001	1001	1001
Competition Regulation	Cor.	,140**	-.040	1	-,179**	,072*	,373**	.032	-.029	-,280**	-.016	-,235**	-,345**	-,323**	.033	-,332**
	Sig.	.000	.204		.000	.023	.000	.314	.350	.000	.607	.000	.000	.000	.303	.000
	N	944	999	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
Labor Market Flexibility	Cor.	-,166**	,399**	-,179**	1	-,190**	,498**	,803**	-.044	,080*	-,078*	.057	,284**	,108**	.036	,126**
	Sig.	.000	.000	.000		.000	.000	.000	.161	.011	.014	.073	.000	.001	.251	.000
	N	944	999	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
Trade Unions	Cor.	,128**	-,628**	,072*	-,190**	1	-,113**	-.003	,098**	-,355**	,164**	-,313**	-,242**	-,184**	-.023	-,416**
	Sig.	.000	.000	.023	.000		.000	.935	.002	.000	.000	.000	.000	.000	.469	.000
	N	944	999	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
Employment Law	Cor.	-.023	,109**	,373**	,498**	-,113**	1	,457**	-,088**	-,368**	-,068*	-,330**	-,315**	-,220**	,136**	-,354**
	Sig.	.477	.001	.000	.000	.000		.000	.005	.000	.032	.000	.000	.000	.000	.000
	N	944	999	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
Social Dialogue	Cor.	-,107**	,350**	.032	,803**	-.003	,457**	1	-,195**	.013	-,205**	-.007	,210**	-.040	.035	.041
	Sig.	.001	.000	.314	.000	.935	.000		.000	.674	.000	.834	.000	.200	.275	.196
	N	944	999	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
Neighboring Leg. UberBlack	Cor.	-,069*	-.035	-.029	-.044	,098**	-,088**	-,195**	1	.004	,951**	.018	-,091**	,176**	-,128**	-,081*
	Sig.	.035	.265	.350	.161	.002	.005	.000		.896	0.000	.562	.004	.000	.000	.010
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006
National Leg. UberBlack	Cor.	-,160**	,617**	-,280**	,080*	-,355**	-,368**	.013	.004	1	-,120**	,861**	,561**	,686**	-,169**	,915**
	Sig.	.000	.000	.000	.011	.000	.000	.674	.896		.000	.000	.000	.000	.000	0.000
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006
Neighboring Leg. UberX	Cor.	-,073*	-,133**	-.016	-,078*	,164**	-,068*	-,205**	,951**	-,120**	1	-.027	-,157**	,099**	-,117**	-,186**
	Sig.	.026	.000	.607	.014	.000	.032	.000	0.000	.000		.399	.000	.002	.000	.000
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006
National Leg. UberX	Cor.	-,162**	,520**	-,235**	.057	-,313**	-,330**	-.007	.018	,861**	-.027	1	,488**	,590**	-,160**	,787**
	Sig.	.000	.000	.000	.073	.000	.000	.834	.562	.000	.399		.000	.000	.000	.000
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006
Dummy English +9%	Cor.	-,085**	,391**	-,345**	,284**	-,242**	-,315**	,210**	-,091**	,561**	-,157**	,488**	1	,304**	-,099**	,585**
	Sig.	.009	.000	.000	.000	.000	.000	.000	.004	.000	.000	.000		.000	.002	.000
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006
Dummy Spanish +9%	Cor.	-,107**	,478**	-,323**	,108**	-,184**	-,220**	-.040	,176**	,686**	,099**	,590**	,304**	1	-,113**	,761**
	Sig.	.001	.000	.000	.001	.000	.000	.200	.000	.000	.002	.000	.000		.000	.000
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006
Dummy capital of country	Cor.	,272**	-.014	.033	.036	-.023	,136**	.035	-,128**	-,169**	-,117**	-,160**	-,099**	-,113**	1	-,140**
	Sig.	.000	.657	.303	.251	.469	.000	.275	.000	.000	.000	.000	.002	.000		.000
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006
Dummy USA	Cor.	-,132**	,692**	-,332**	,126**	-,416**	-,354**	.041	-,081*	,915**	-,186**	,787**	,585**	,761**	-,140**	1
	Sig.	.000	.000	.000	.000	.000	.000	.196	.010	0.000	.000	.000	.000	.000	.000	
	N	946	1001	1004	1004	1004	1004	1004	1006	1006	1006	1006	1006	1006	1006	1006

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

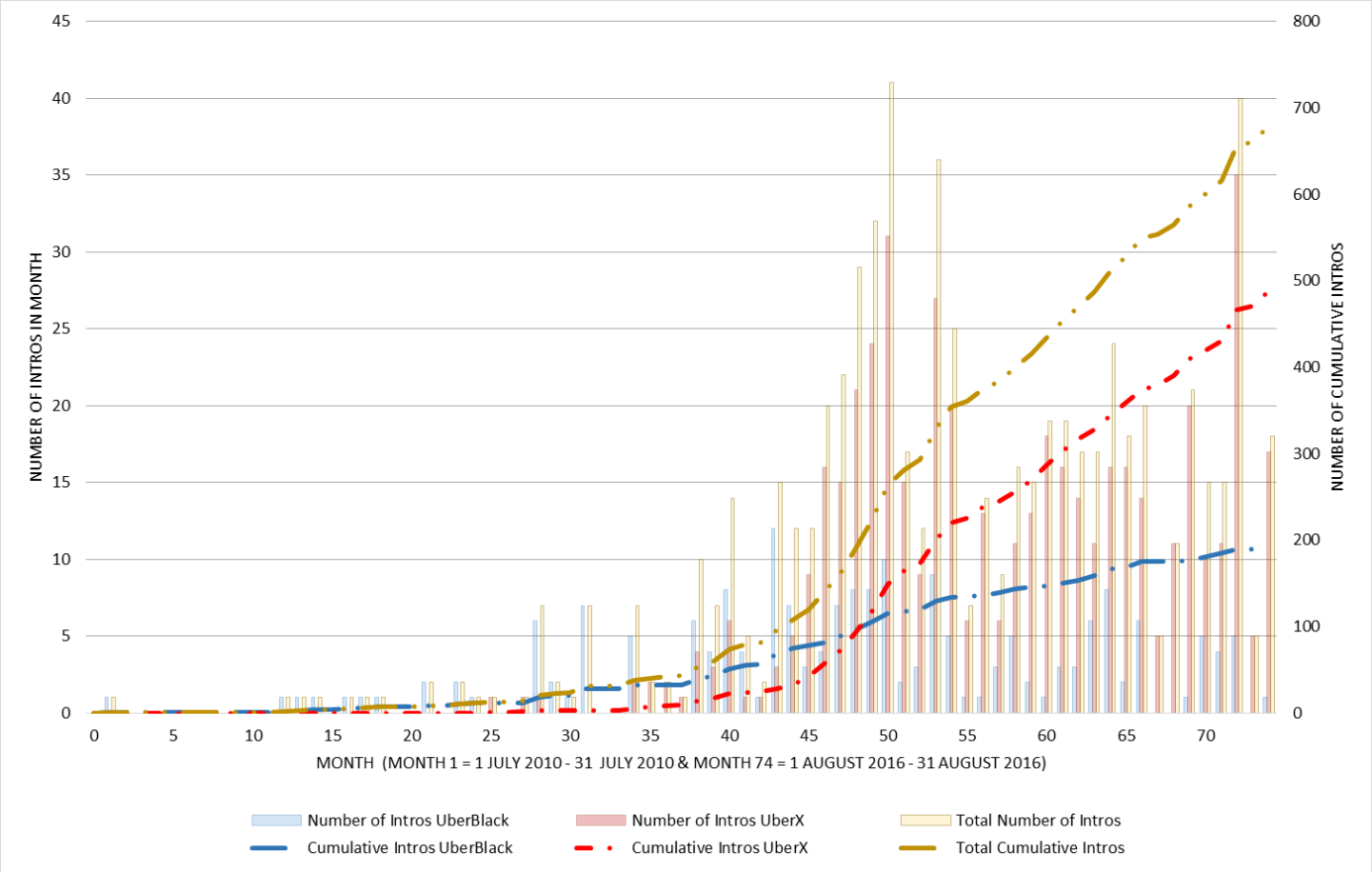

Figure 3: Timeline of UberBlack and UberX introductions, per month as well as cumulative

	UberBlack				UberX			
			Censored				Censored	
Dummy USA	Total N	N of Events	N	Percent	Total N	N of Events	N	Percent
In other country	779	121	658	84.5%	779	288	491	63.0%
In USA	227	70	157	69.2%	227	200	27	11.9%
Overall	1006	191	815	81.0%	1006	488	518	51.5%

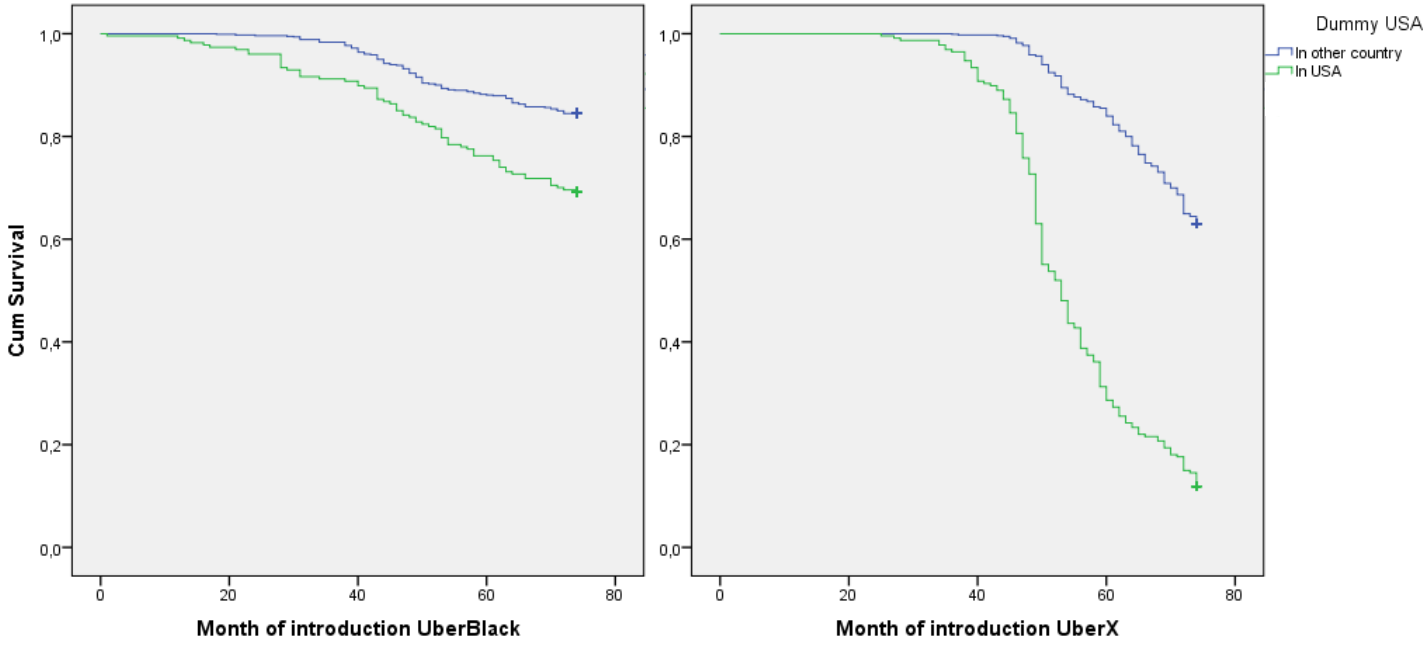

Figure 4: Kaplan-Meier survival analysis Dummy USA

4.2 Description and visual representation of data

4.2.1 Timeline of introductions UberBlack and UberX

Figure 3 shows the number of Uber's introductions over the time researched. Cumulative UberBlack introductions seem to be dispersed in a somewhat linear pattern. Although, this pattern mainly emerges from month 25 and seems to slow down from month 54 onwards. Before month 25 UberBlack introductions are sparse, the time between the first introduction and the second is almost one year.

UberX had its first introduction in month 25 and has, similar to UberBlack, a slow start. From month 35 onwards more introductions of UberX emerge and especially from month 45 the process speeds up. The cumulative introductions of UberX seems to shows a slightly S-shaped pattern, with the steepest increase between month 45 and 55. Nevertheless, near the end of the researched period, month 72, a high amount of UberX introductions took place.

Since UberBlack seems to follow a linear pattern while the pattern of UberX seems to be slightly S-shaped, it seems that UberX is the service Uber is putting its focus on. The number of UberX introductions easily surpass the number of UberBlack introductions. Furthermore, the moment UberX introductions started to speed up, the speed of UberBlack introductions started to slow down. UberX was always most introduced service per month from the moment the number of UberX introductions in a month surpassed the number of UberBlack introductions.

4.2.2 Kaplan-Meier survival analysis

Kaplan-Meier plots are used to give a visual presentation of the data. By providing a visual presentation combined with a small description of what can be seen in the plots, it becomes easier to interpreted the outcomes of the Cox proportional hazards regression later on. The plots are always discussed in pairs, in which the UberBlack plots can be seen at the left hand side and the UberX plots to the right.

Since the dummy USA variable correlates with other variables, it is only discussed here. Figure 4 shows that the percentage of introductions is much higher for cities in the United States of America in the sample than for all other countries together. The same difference between a linear pattern and, this time inverted, S-shaped pattern can been as discussed in section 4.2.1.

It should be noted that the biggest proportion of introductions took place in the United States of America. That is, 36.7% of all UberBlack introductions, 40.1% of all UberX introductions and 39.8% of all introductions together. Therefore the upcoming plots should be read while keeping in mind that the group were the United States of America falls into is expected to have a high percentage of introductions. The Kaplan-Meier survival analysis graphs show the proportion of cumulative survival across time. So they can be read as either: the proportion were no introductions took place at time-*t* or ((1-[proportion])*100)% were introductions took place at time-*t*.

For the United States of America the lines in figure 5 are the same as in the dummy USA graphs, although the other top 5 introduced countries are added for comparison. It can be seen that in comparison with these countries that the United States of America remains having the highest percentages of introductions. In the UberBlack plot it seems that the Russian Federation remains behind in the percentage of introductions, while the others, excluding United States of America, end on roughly similar percentages. In the UberX plot it seems that China, India, Russian Federation and Brazil end at a somewhat similar level. In Mexico UberX has been introduced in a higher percentage of the cities, especially near the end of the research.

Top 6 introduced countries	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
United States of America	227	70	157	69.2%	227	200	27	11.9%
India	91	10	81	89.0%	91	27	64	70.3%
China	79	11	68	86.1%	79	28	51	64.6%
Russian Federation	44	2	42	95.5%	44	15	29	65.9%
Mexico	37	6	31	83.8%	37	23	14	37.8%
Brazil	35	5	30	85.7%	35	12	23	65.7%
Other countries	493	87	406	82.4%	493	183	310	62.9%
Overall	1006	191	815	81.0%	1006	488	518	51.5%

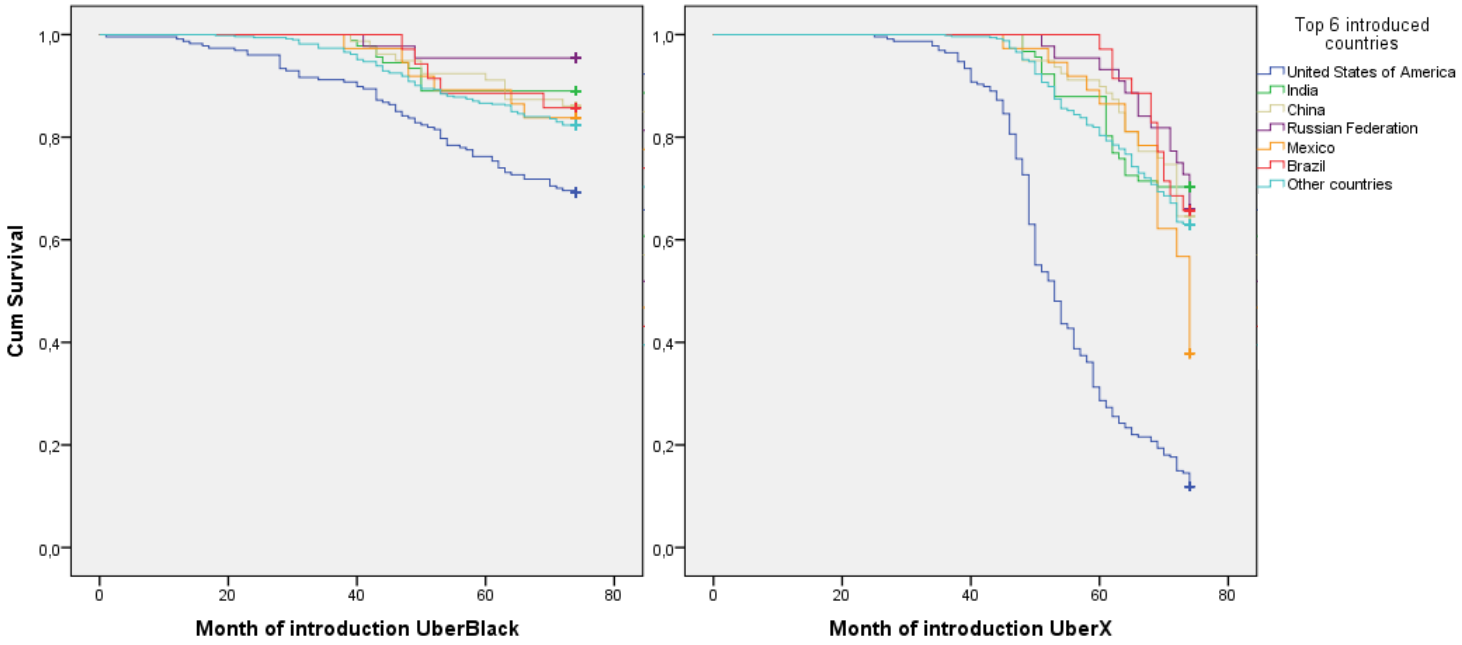

Figure 5: Kaplan-Meier survival analysis Top 6 introduced countries

4.2.2.1 Potential profitability

The city population variable, figure 6, seems to predict earlier introduction in bigger cities for both services. For UberX it seems that the group of the smallest cities' trend is becoming steeper from month 50 till month 60. The differences in percentages of UberX introductions for the three groups with the biggest cities is smaller in comparison to the group differences for UberBlack introductions.

What stands out in figure 7, the GDP per capita variable, is that Uber only in two occurrences introduced UberX in low income countries, in Tanzania and in Madagascar. Although, it should be noted that the lower middle income group is not rich, as this group receives between 2.80 $ and 11$ a day and includes countries like Ghana, Vietnam, Indonesia and Uganda. The general picture suggests that higher income would lead to a higher percentage of introductions earlier in time. Also notable is that in both plots the lower middle income and higher middle income groups tend to start out at the same rate before diverging.

City Population	UberBlack Total N	UberBlack N of Events	UberBlack Censored N	UberBlack Censored Percent	UberX Total N	UberX N of Events	UberX Censored N	UberX Censored Percent
5,000 - 250,000 inh.	483	23	460	95.2%	483	122	361	74.7%
250,001 - 500,000 inh.	168	25	143	85.1%	168	72	96	57.1%
500,001 - 1,500,000 inh.	179	54	125	69.8%	179	131	48	26.8%
1,500,001 - 3,000,000 inh.	51	26	25	49.0%	51	45	6	11.8%
Above 3,000,000 inh.	65	44	21	32.3%	65	58	7	10.8%
Overall	946	172	774	81.8%	946	428	518	54.8%

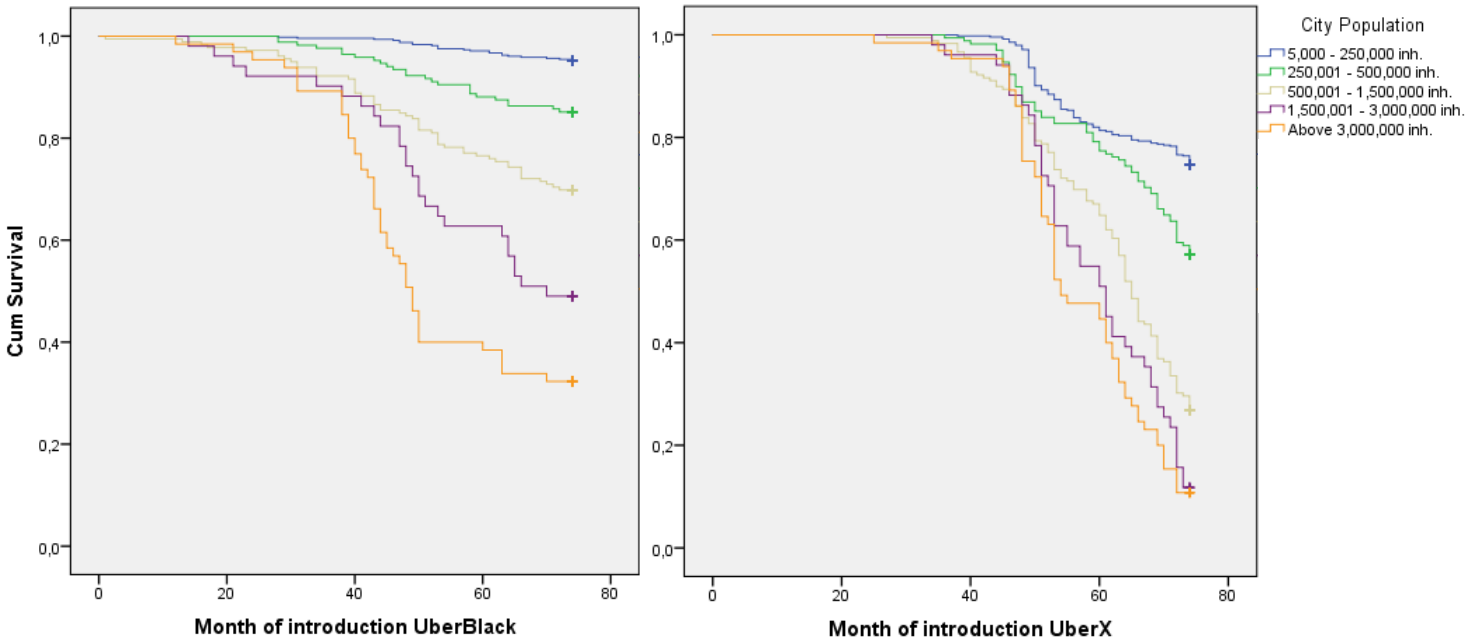

Figure 6: Kaplan-Meier survival analysis City Population

GDP PC in 2013 $	UberBlack Total N	UberBlack N of Events	UberBlack Censored N	UberBlack Censored Percent	UberX Total N	UberX N of Events	UberX Censored N	UberX Censored Percent
Low income (0 - 1,025 $)	20	0	20	100.0%	20	2	18	90.0%
Lower middle income (1,026 - 4,035 $)	204	17	187	91.7%	204	45	159	77.9%
Higher middle income (4,036 - 12,475 $)	267	43	224	83.9%	267	104	163	61.0%
High income (above 12,475 $)	510	130	380	74.5%	510	334	176	34.5%
Overall	1001	190	811	81.0%	1001	485	516	51.5%

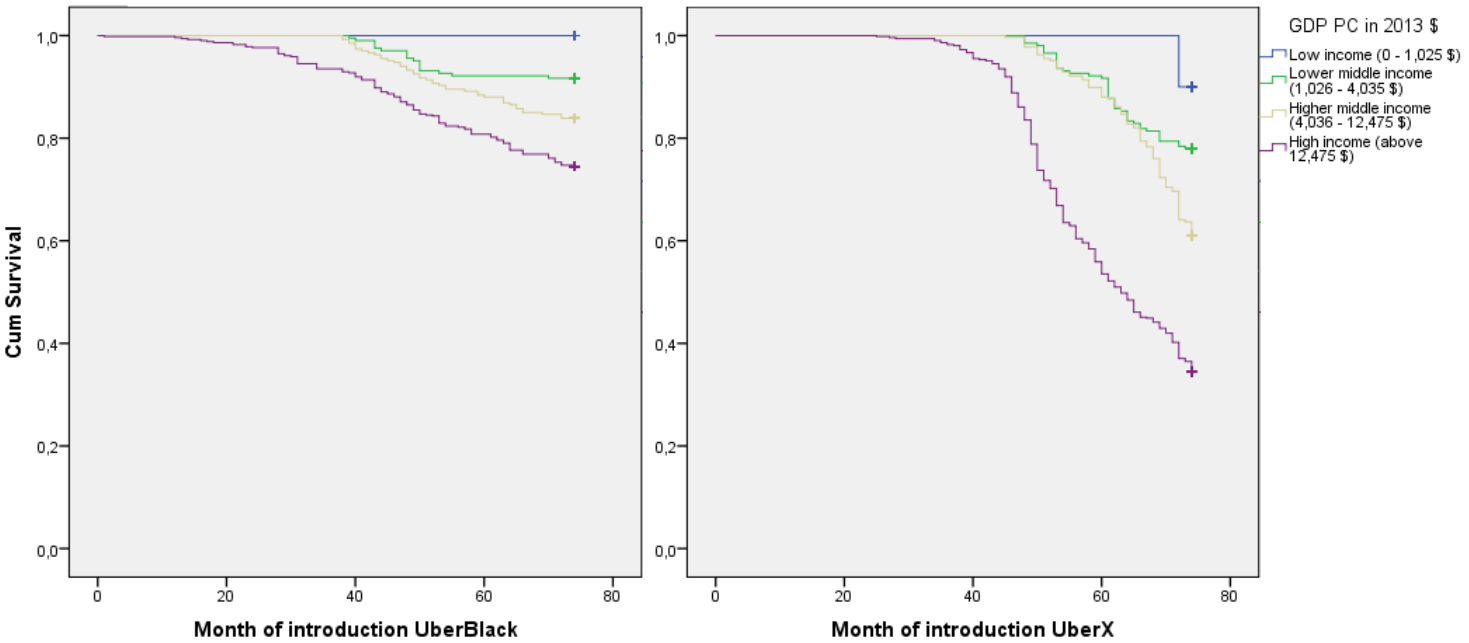

Figure 7: Kaplan-Meier survival analysis GDP per capita in 2013 $

4.2.2.2 Institutional characteristics variables

For the variable competition regulation, figure 8, it should be noted that countries with low scores on competition regulation are rare. The two groups with the highest levels of competition regulation seem to end up in the same percentage of introductions, although it should be kept in mind that the United States of America had the most introductions. Fortunately the Cox proportional hazards regression tests all the institutional characteristics variables as continuous variables, and thus avoids issues of how groups are constructed.

In figure 9, the labor market flexibility variable, the United States of America falls into the group with the highest scores. It seems that for UberBlack the other two groups end at about roughly the same percentage, while in the UberX plot they end up at different percentages. Notable is that the two groups with the lowest scores seem to follow a similar pattern for a part of the time frame before diverging.

The trade unions variable, in figure 10, shows that for UberBlack that the three groups remain close to each other. Nonetheless, lower scores on the trade unions variable than the United States of America end up having a higher percentage of introductions. For UberX the two groups with lowest scores end up at roughly the same percentage. The highest scoring group follows a diverging pattern in the UberX graph, notably the introductions start later and seems to be slower than in the other groups.

For the variable employment law, in figure 11, both plots show the United States of America group end up with the highest percentage introductions, followed by the group with highest scores on the variable. For UberX it seems that the lowest and highest scoring groups follow roughly the same trend between month 50 and 60 before diverging.

The last institutional characteristics variable in figure 12, social dialogue, shows for UberBlack that the group of the United States of America and the highest scoring group follow a similar trend. The lowest scoring group keeps behind in the plots for both services. For UberX al three groups seem to follow their own trend. It is noteworthy in the UberX graph that the highest scoring group seems to start later in time than the group with the United States of America, then almost catches up before slowing down again.

Competition Regulation	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
0 - 9	45	1	44	97.8%	45	5	40	88.9%
>9 - 12 (group of USA)	588	110	478	81.3%	588	305	283	48.1%
>12 - 20	371	79	292	78.7%	371	177	194	52.3%
Overall	1004	190	814	81.1%	1004	487	517	51.5%

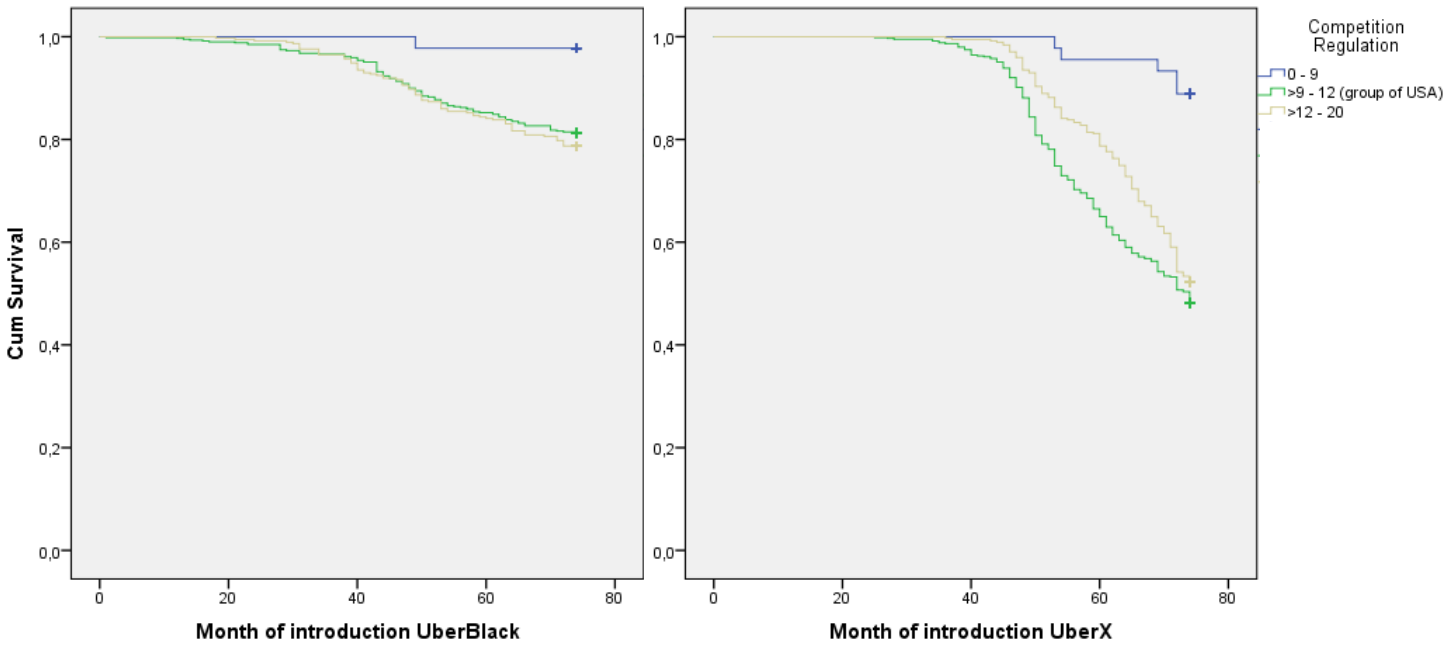

Figure 8: Kaplan-Meier survival analysis Competition Regulation

Labor Market Flexibility	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
0 - 3	132	21	111	84.1%	132	41	91	68.9%
>3 - 5	182	25	157	86.3%	182	80	102	56.0%
>5 - 8 (group of USA)	690	144	546	79.1%	690	366	324	47.0%
Overall	1004	190	814	81.1%	1004	487	517	51.5%

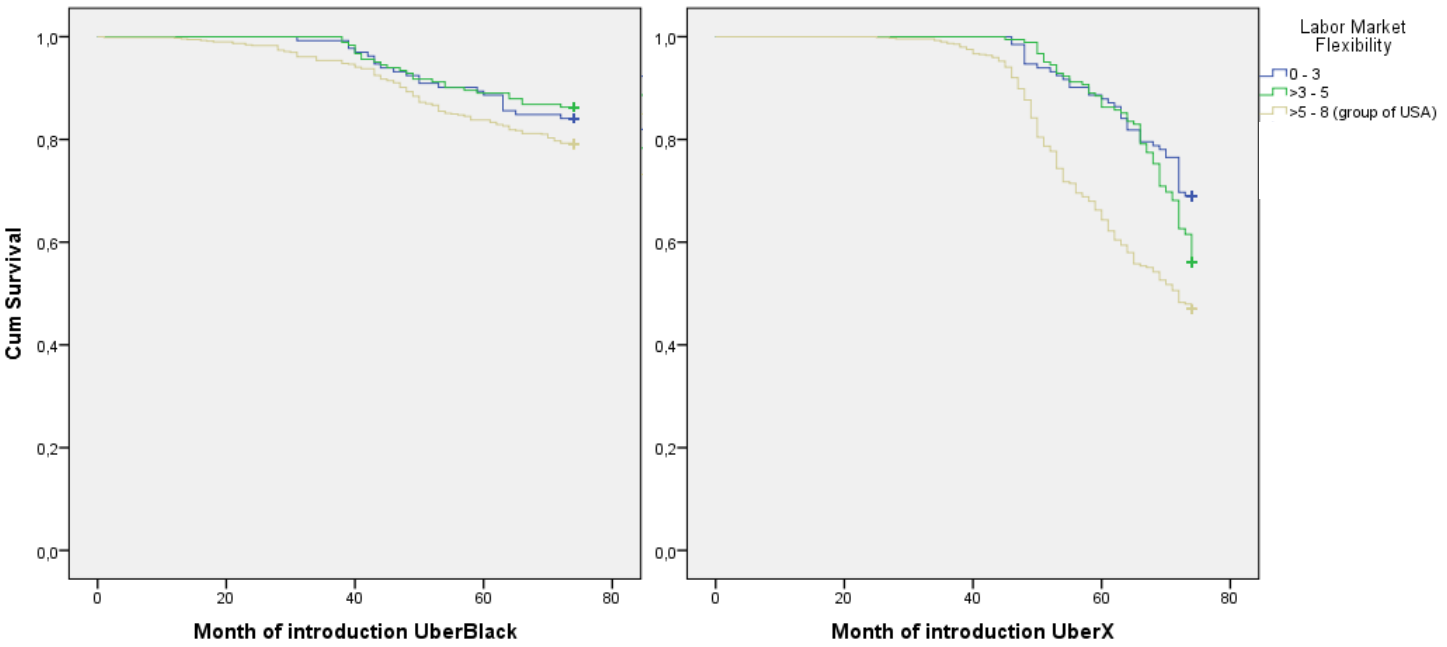

Figure 9: Kaplan-Meier survival analysis Labor Market Flexibility

Trade Unions	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
0 - 4.75	143	34	109	76.2%	143	70	73	51.0%
>4.75 - 7.25 (group of USA)	722	136	586	81.2%	722	369	353	48.9%
>7.25 - 12	139	20	119	85.6%	139	48	91	65.5%
Overall	1004	190	814	81.1%	1004	487	517	51.5%

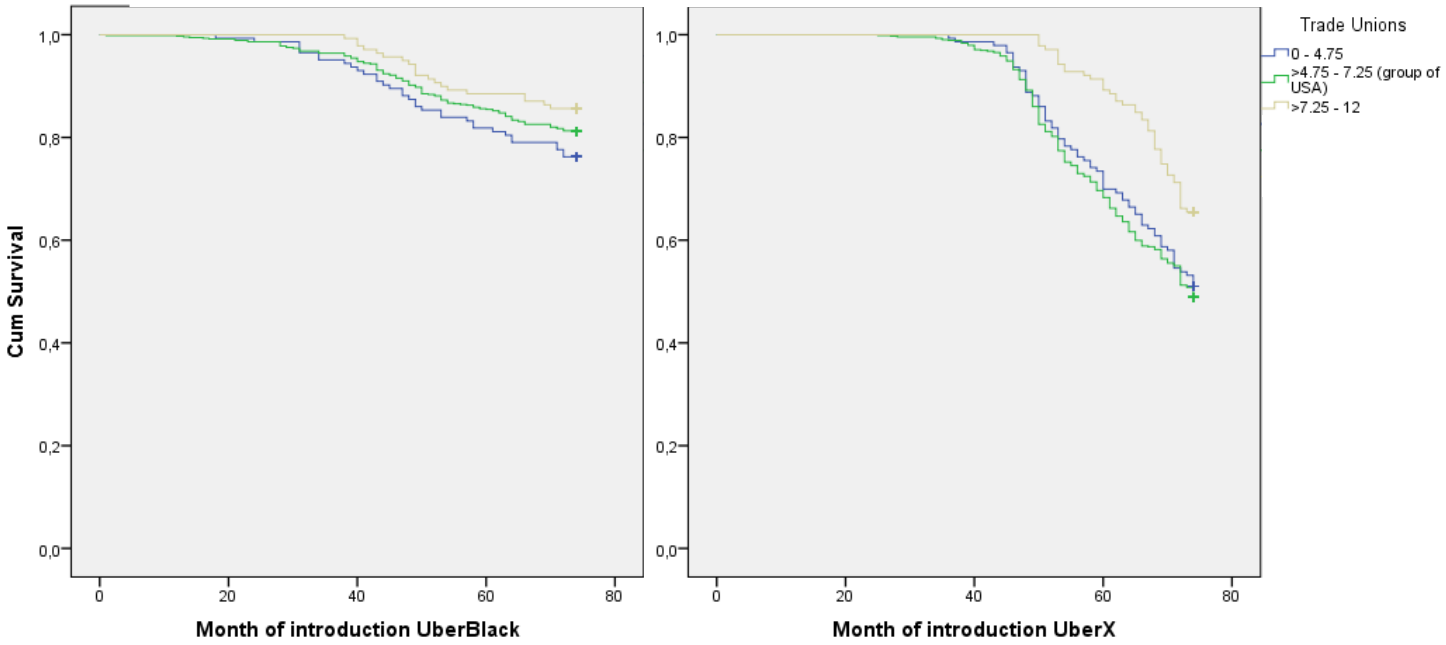

Figure 10: Kaplan-Meier survival analysis Trade Unions

Employment Law	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
0 - 5	140	19	121	86.4%	140	41	99	70.7%
>5 - 7 (group of USA)	461	101	360	78.1%	461	276	185	40.1%
>7 - 12	403	70	333	82.6%	403	170	233	57.8%
Overall	1004	190	814	81.1%	1004	487	517	51.5%

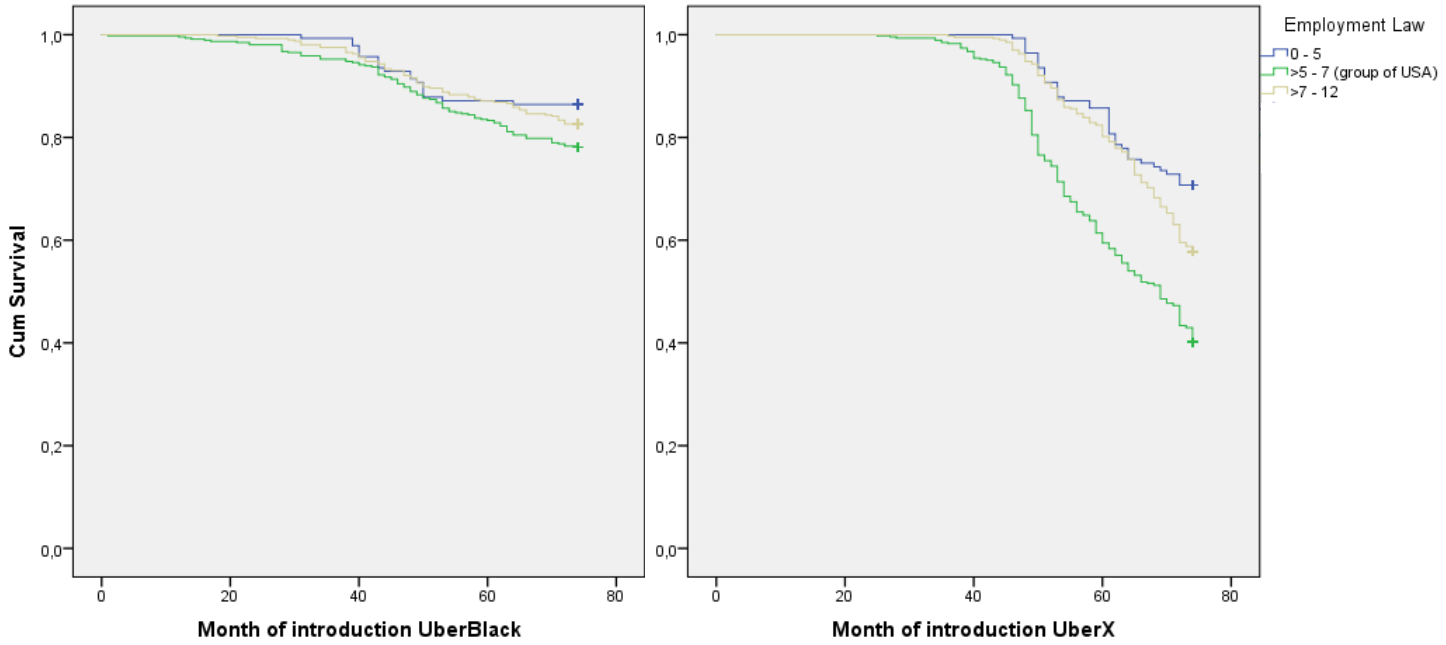

Figure 11: Kaplan-Meier survival analysis Employment Law

Social Dialogue	UberBlack Total N	UberBlack N of Events	UberBlack Censored N	UberBlack Censored Percent	UberX Total N	UberX N of Events	UberX Censored N	UberX Censored Percent
0 - 4.75	265	33	232	87.5%	265	88	177	66.8%
>4.75 - 7.25 (group of USA)	564	119	445	78.9%	564	321	243	43.1%
>7.25 - 12	175	38	137	78.3%	175	78	97	55.4%
Overall	1004	190	814	81.1%	1004	487	517	51.5%

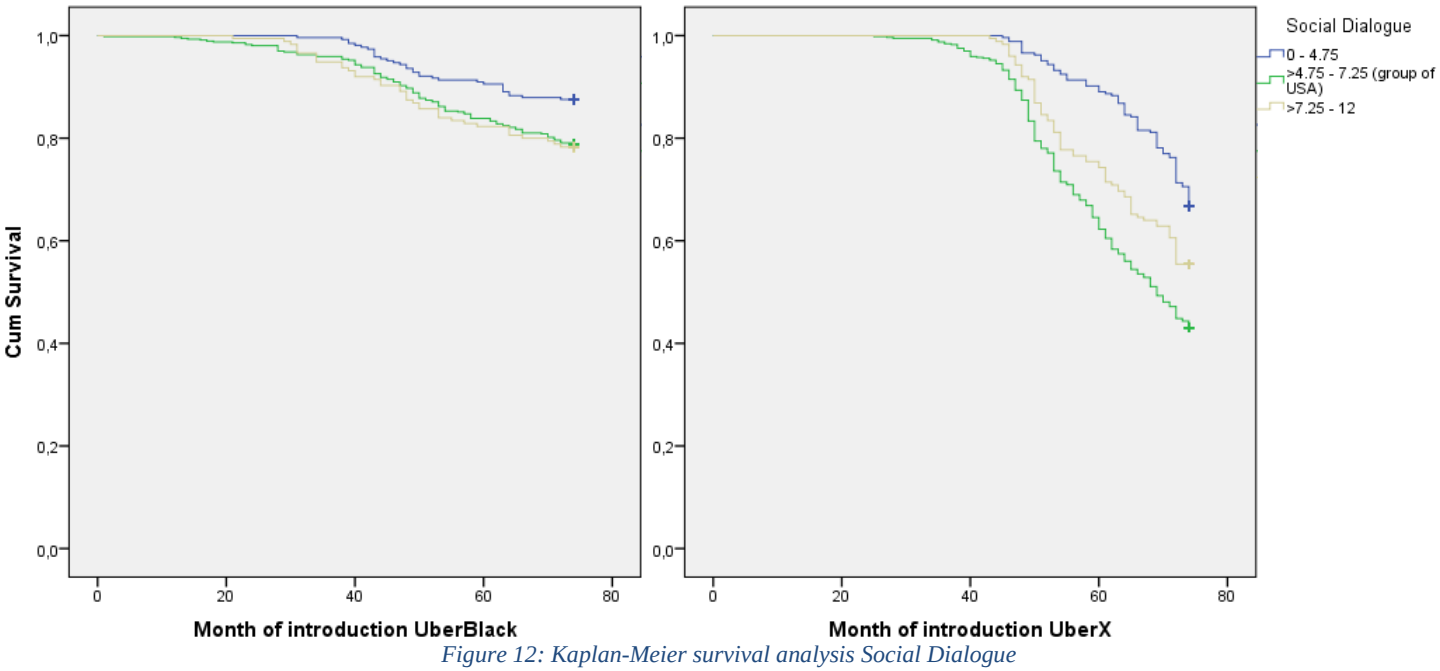

Figure 12: Kaplan-Meier survival analysis Social Dialogue

4.2.2.3 Actor's social position

For the cognitive legitimacy variables it would not make sense to do Kaplan-Meier analysis, since they are inherently time-dependent. Before progressing from the first group to other groups time needs to pass and therefore there is also a time lack before groups with higher levels of legitimacy exist.

Furthermore, it is expected that legitimacy in the beginning is easy to build up, since a lot of cities with no services can be chosen from. Later in time the amount of cities with the right characteristics become scarcer as the best cities are already chosen. Since Uber introduces services to stay, it is expected that legitimacy would not get lower over time. To account for these issues the legitimacy variables are tested as the square root values in the Cox proportional hazards regression analysis.

In figure 13 the UberBlack plot clearly shows that from the beginning the trends progress from longer periods of UberBlack activity before UberX, to smaller periods. Eventually it reaches the trend of introducing both services on the same date and finally into introducing UberX before UberBlack. The UberBlack activity active between +6 and 12 months before UberX group seems to catch up with the longer than 1 year group in the graphs of both services. Thus it seems that Uber at a certain moment also introduces UberX especially in places where UberBlack was active for an intermediate period of time.

The UberX graph is more cramped together, suggesting that from the start of UberX the plan was to introduce UberX in the places where UberBlack was already active as fast as possible. Furthermore, there are only 15 cities with only UberBlack compared to 191 UberBlack introductions (7.9%). While there are 312 cities with only UberX compared to 488 UberX introductions (63.9%). All the points taken toghether, it seems that UberBlack is a good predictor for the introduction of UberX, while UberX is not a predictor for UberBlack, since UberX is often the only service that is introduced.

Time that other service is active in city	UberBlack				UberX			
	Total N	N of Events	Censored N	Percent	Total N	N of Events	Censored N	Percent
Both services introduced on one date	25	25	0	0.0%	25	25	0	0.0%
UberX active before UberBlack	49	49	0	0.0%	49	49	0	0.0%
None or one of services is introduced	830	15	815	98.2%	830	312	518	62.4%
UberBlack active 0 – 6 Months before UberX	34	34	0	0.0%	34	34	0	0.0%
UberBlack active >6 – 12 Months before UberX	38	38	0	0.0%	38	38	0	0.0%
UberBlack active for more than 1 year before UberX	30	30	0	0.0%	30	30	0	0.0%
Overall	1006	191	815	81.0%	1006	488	518	51.5%

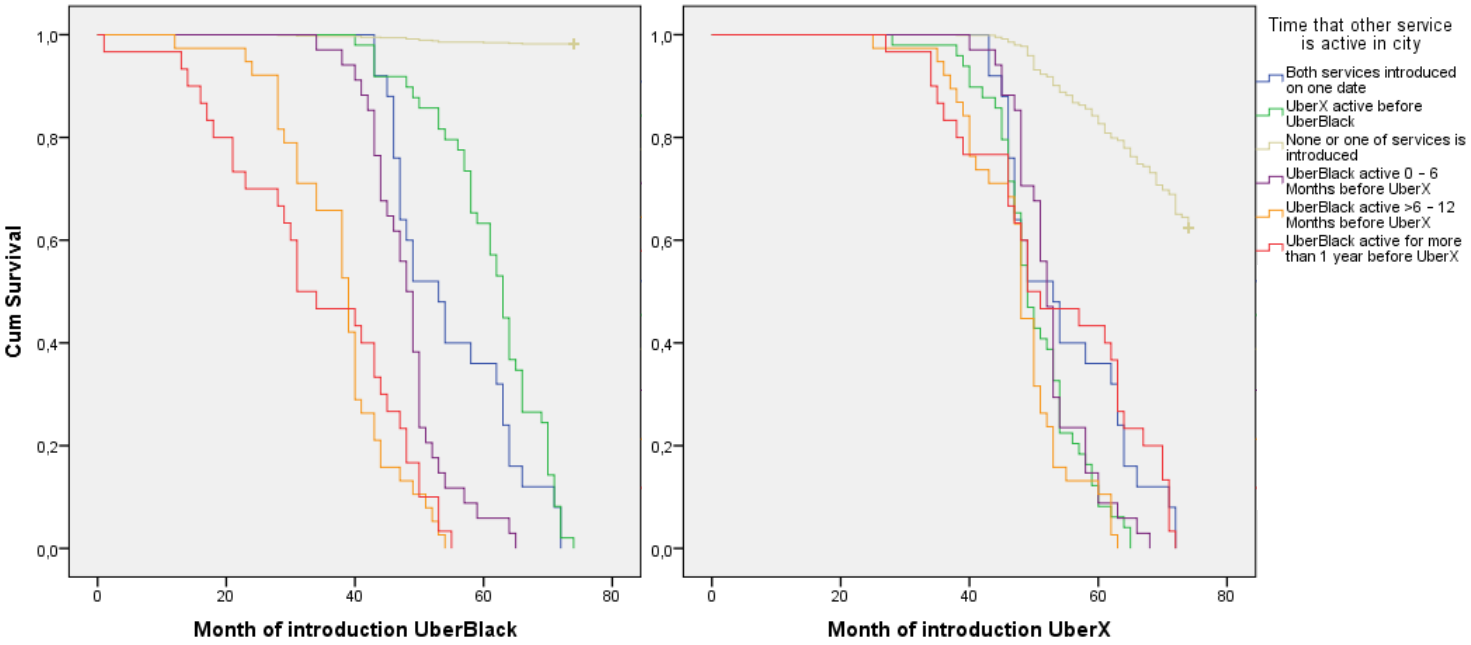

Figure 13: Kaplan-Meier survival analysis time that other service is active in city

4.2.2.4 Control variables

The language variables in figure 14 and 15 seem to have similar patterns. Besides, the language variables also seem to follow similar patterns as the dummy USA variable. Nonetheless the figures suggest that speaking the same language leads to a higher percentage of introductions earlier in time.

Figure 16 suggests that the percentage of introduction is higher earlier in time when cities are capital cities of countries. Notably both graphs seem to follow an inverted S-shape pattern for both services.

Dummy English +9%	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
9% or lower speaks English	543	78	465	85.6%	543	195	348	64.1%
+9% speaks English	463	113	350	75.6%	463	293	170	36.7%
Overall	1006	191	815	81.0%	1006	488	518	51.5%

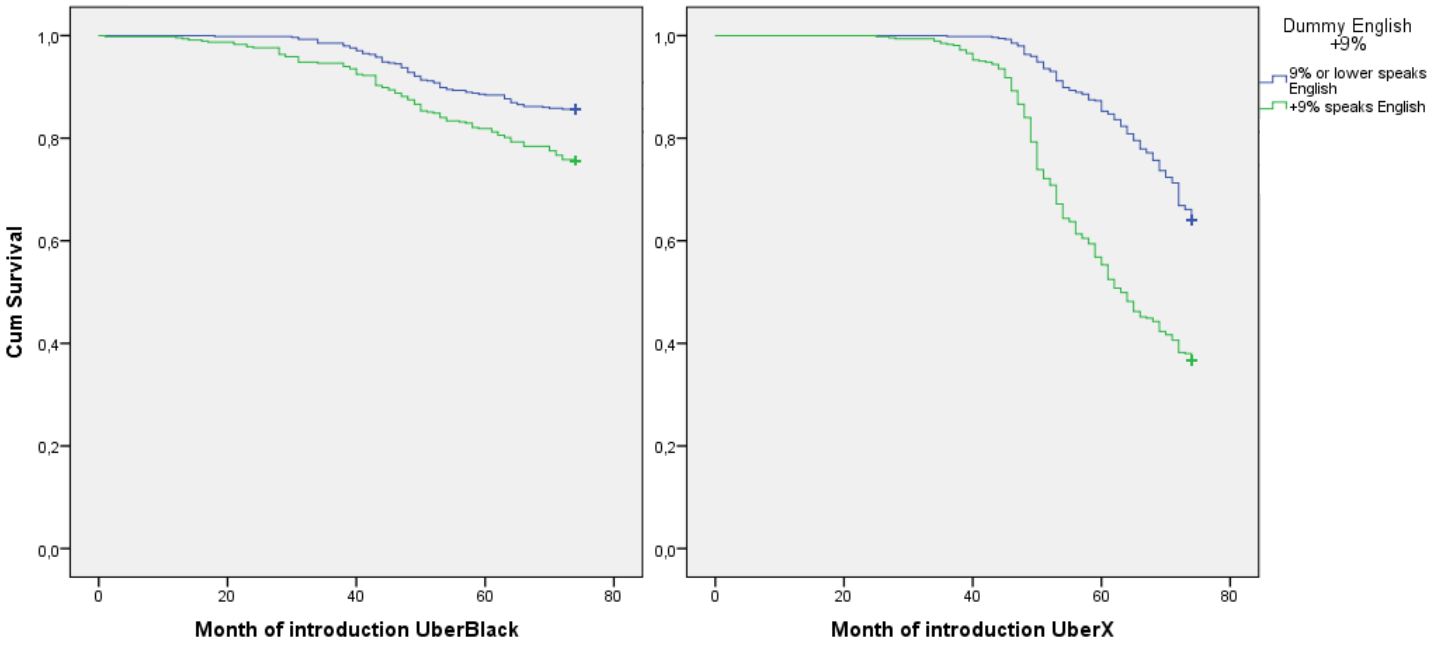

Figure 14: Kaplan-Meier survival analysis Dummy English +9%

Dummy Spanish +9%	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
9% or lower speaks Spanish	669	106	563	84.2%	669	235	434	64.9%
+9% speaks Spanish	337	85	252	74.8%	337	253	84	24.9%
Overall	1006	191	815	81.0%	1006	488	518	51.5%

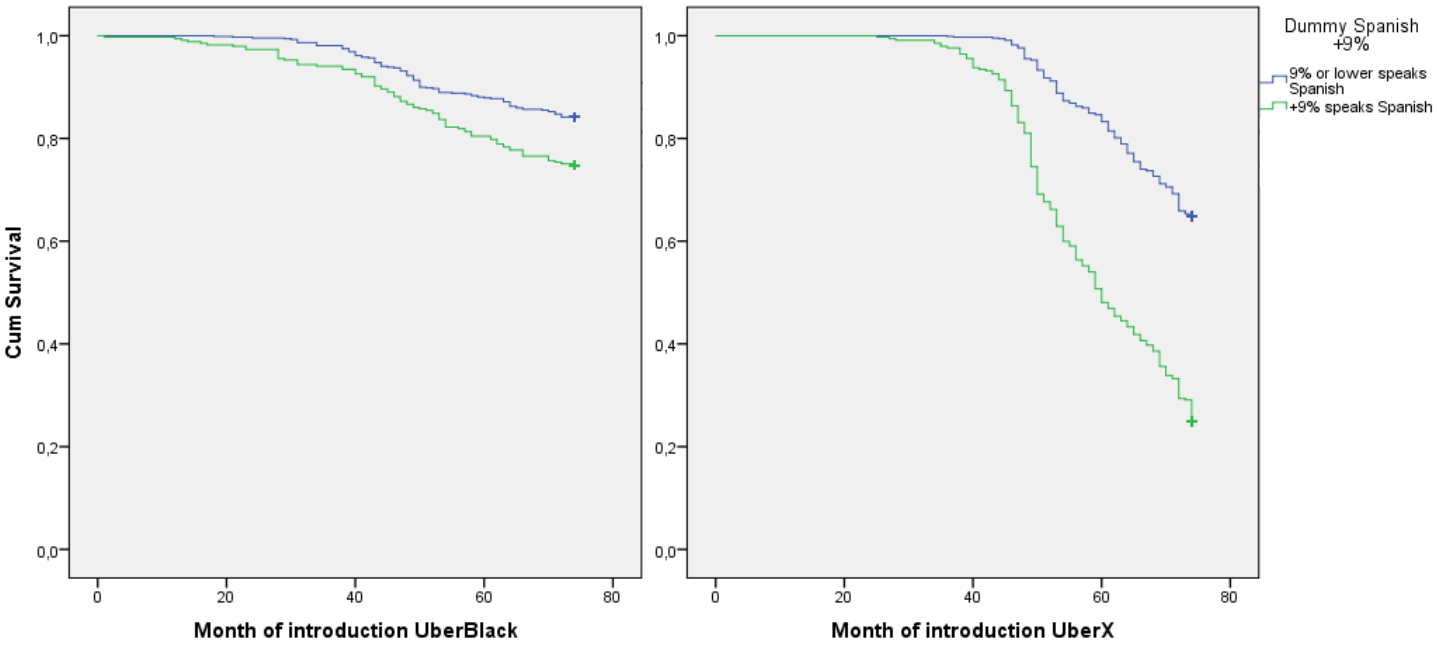

Figure 15: Kaplan-Meier survival analysis Dummy Spanish +9%

Dummy capital of country	UberBlack				UberX			
	Total N	N of Events	Censored N	Censored Percent	Total N	N of Events	Censored N	Censored Percent
Other city	927	147	780	84.1%	927	423	504	54.4%
Capital city	79	44	35	44.3%	79	65	14	17.7%
Overall	1006	191	815	81.0%	1006	488	518	51.5%

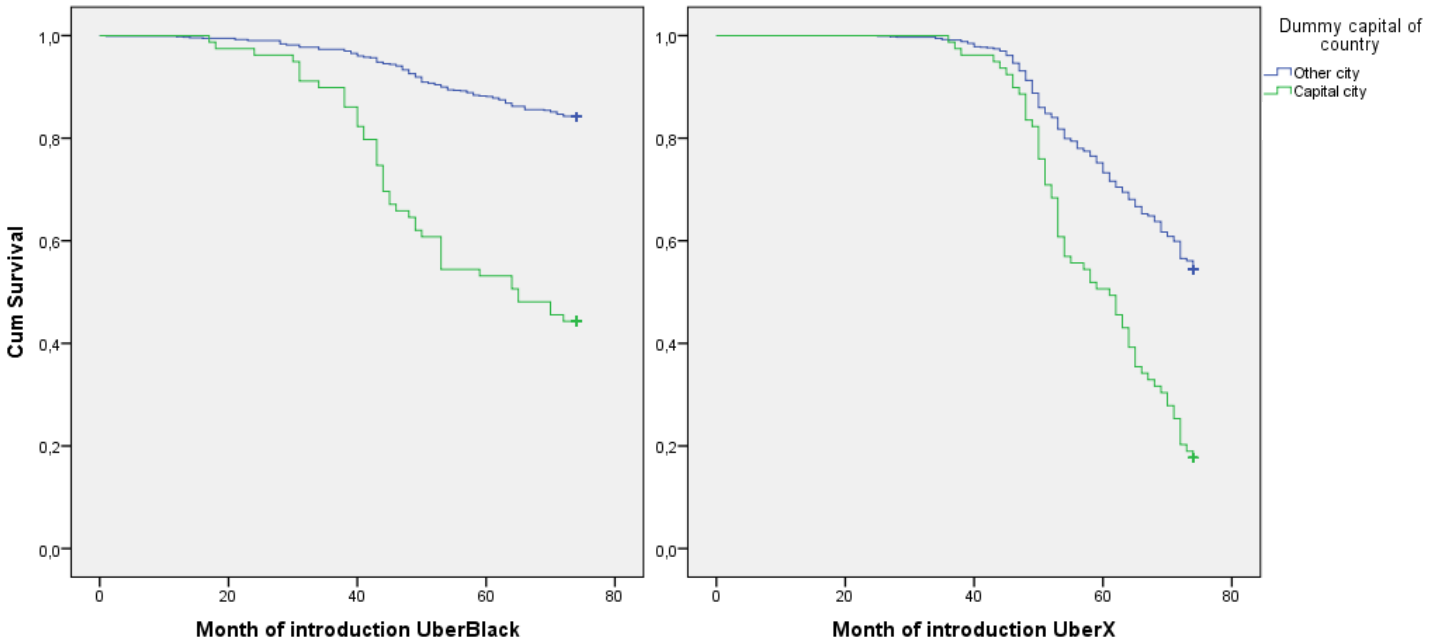

Figure 16: Kaplan-Meier analysis Dummy capital of country

4.3 Cox proportional hazards regression with time-dependent covariates

In table 4 the results of Cox proportional hazards regression are presented. The model handles time-dependent covariates, meaning that the model controls for how variables of a unit of analysis differ over time until introduction takes place.

The model outputs hazard ratios which should be interpreted as: the relative likelihood of introduction at any moment in time created by one unit increase in the independent variable when all other variables are held constant (Spruance et al., 2004). Keep in mind the range of the variable in question, because the hazard ratios should be multiplied to the power of the units difference when comparing (theoretical) cases. For example, the likelihood of UberBlack introduction in a city of five million inhabitants is (1.335995^4=) 3.19 compared to a city with one million inhabitants, when all other variables are held constant.

As mentioned earlier in section 4.1, two of the institutional characteristics variables showed correlation. Therefore the Cox regression is performed both with all variables and with the exclusion the social dialogue variable. It was also checked what happened if the labor market flexibility variable was excluded. The exclusion of labor market flexibility did not make much difference in respect to the exclusion of social dialogue.

The exclusion made the model perform different on the trade union variable for UberX, although this is only in the calculation of significance. Furthermore, the employment law variable in the UberX calculations has become insignificant after exclusion, while the difference in Z values is small between both models. Overall, the hazards ratios and significance calculations for both services remain nearly the same with and without exclusion of social dialogue, except for a few insignificant variables. The Cox regressions excluding social dialogue are seen as the leading results, since social dialogue is in no

situation significant and the model still incorporates a high number of variables after exclusion. Thus, the data discussed below are taken from the calculations without the social dialogue variable. The results are interpreted significant at the 0.05 level.

4.3.1 Potential profitability

The Cox regression shows that for both services the city population variable is significant and shows that larger cities are more likely to be chosen by Uber. This pattern is more present for UberBlack, as the hazard ratio is 0.15 (15%) higher than the ratio for UberX. At any given point in time, for every million inhabitants a city is larger the likelihood that UberBlack is introduced is 1.335995, when keeping all other variables constant. For UberX the hazard ratio is 1.1886134.

Since for city population the range between the smallest and biggest city is 22.3 million inhabitants, the difference in the hazard ratios between both services can become large when we compare smaller cities with bigger cities. For instance if the biggest city is compared to the smallest city in the sample, than the hazard ratio suggests that the likelihood of UberBlack introduction is 638.92 in the biggest city compared to the smallest city. For UberX introduction the likelihood is 47.14 in the biggest city in comparison to the smallest city. Thus, a small difference between hazard ratios can become a big difference due to the range of the variable in question.

A similar pattern emerges for the GDP per capita variable as both services are more likely to be introduced in cities with higher levels of income. Furthermore, once again, this pattern is more apparent for UberBlack than for UberX but the difference is 0.02 (2%) in this case. At any given point in time, the relative likelihood that UberBlack is introduced is 1.032121 for every thousand of 2013 $ higher GDP per capita, when keeping all other variables constant. For UberX the hazard ratio is 0.0114921 for every thousand $ higher GDP per capita. With a range of 102.496 in the variable, the likelihood of UberBlack introduction at any time in the city with the highest income is 25.55 compared to the city with the lowest income. For UberX the likelihood is 3.23 in the city with the highest income compared to the city with the lowest income.

Hypothesis 1 suggested that Uber is more likely to introduce services in cities where potential profitability is higher. The hypothesis is confirmed for both services, although it should be mentioned that the hypothesis seems more applicable to UberBlack. The hazard ratios in both occasions are higher for UberBlack than for UberX. If the difference in how many UberBlack and UberX introductions have taken place are taken into account, it seems that potential profitability is important for both services but that UberX is also suitable for markets with less potential profitability. It makes sense that potential market is larger for a low-cost service in comparison to a luxury service, as more people are able to afford the low-cost service. Since UberX is the low-cost service and UberBlack the luxury service, it is logical that Uber is more selective regarding UberBlack by mainly introducing the service in larger and wealthier cities. Furthermore, the differences in the likelihoods when the range is taken into account shows much higher values for UberBlack.

4.3.2 Competition regulation

Competition regulation variable is significant for both services, although less for UberBlack than for UberX. The hazard ratios show that cities where the level of competition regulation is higher are chosen more likely. The pattern is more applicable to UberX as the hazard ratio is 0.13 (13%) higher than for UberBlack. At any given point in time, for every point a city scores higher on competition regulation the likelihood of UberBlack introduction is 1.124244, when keeping all other variables constant. For UberX this is 1.2505417. Since the range of the variable is 14.33, the likelihood of UberBlack introduction in the highest scoring city is 5.36 compared to the lowest scoring city. For UberX the

likelihood is 24.63 compared to the lowest scoring city. Thus, the level of competition regulation is far more important for city choices of UberX introductions.

Hypothesis 2 suggested that Uber is more likely to introduce services in cities where the level competition regulation is higher. This hypothesis is confirmed for both services, although it is more apparent for UberX. Since competition regulation tries to stimulate competition among corporations, it is expected that introduction is easier in places with high levels of competition regulation. Therefore it is probable that for the service which diverges more from existing institutional practices, UberX, this pattern is emerging stronger. When the range of the variable is taken into account the difference in likelihood also suggests that especially for UberX competition regulation is important. As the likelihood of UberX introduction between the highest scoring and lowest scoring city of 24.63 is much higher than 5.36 for UberBlack.

4.3.3 Employment law

The employment law variable is significant for UberBlack and for UberX only in one of the two regression models. The hazard ratios show that cities where the level of employment law is higher are chosen less likely. At any given point in time, for every point a city scores higher on employment law the likelihood of UberBlack introduction is 0.795229, when keeping all other variables constant. Since the range of the variable is 11.67, the likelihood of UberBlack introduction in the highest scoring city is 0.07 in comparison to the lowest scoring city.

Hypothesis 3 suggested that Uber is more likely to introduce services in cities where the level of employment law is lower. The hypothesis is confirmed for UberBlack. But less so for UberX. Contrary to expectations, the effect is much stronger for UberBlack than for UberX. It was expected to be especially important for UberX, which is the more from existing practices diverging service. Further research is needed to understand this difference.[9]

4.3.4 Labor market flexibility

Hypothesis 4 suggested that Uber is more likely to introduce services in cities where the level of labor market flexibility is higher. The hypothesis is rejected for both services, as the variable never showed significant Z values. Thus, the extent a society has labor market flexibility is rejected as an explanation of introduction of Uber's services.

4.3.5 Trade unions

The trade unions variable is significant for UberX and not for UberBlack. The hazard ratio shows that cities where the level of trade unions is higher are chosen less likely for UberX introduction. At any given point in time, for every point a city scores higher on trade unions the likelihood of UberX introduction is 0.8351573, when keeping all other variables constant. With a range of 8.67 of the variable, the likelihood of UberX introduction in the highest scoring city is 0.20 compared to the lowest scoring city.

[9] Although only significant in the regression including social dialogue, the hazard ratio for UberX did make the researcher frown. As it was expected that the ratio would show a lower value than for UberBlack. Maybe the ratio is higher because Uber claims that drivers do not work for Uber and that they are self-employed instead (Rechtspraak.nl, 2014; Rienstra et al., 2015). While anticipating on where this argument will be successful Uber may decides to introduce UberBlack as a temporal strategy.

Table 4: Results Cox proportional hazards regression with time-dependent covariates UberBlack and UberX

	UberBlack		UberX	
	Hazard Ratio (SE of coef.) sig. Z	Hazard Ratio (SE of coef.) sig. Z	Hazard Ratio (SE of coef.) sig. Z	Hazard Ratio (SE of coef.) sig. Z
Field characteristics				
Potential profitability				
City population in millions of inhabitants	1.334794 *** (0.022247) < 2e-16	1.335995 *** (0.022250) < 2e-16	1.188010 *** (0.020348) 5.73e-12	1.1886134 *** (0.0202922) 5.61e-12
GDP per capita in thousands of 2013 US$	1.033713 *** (0.005866) 3.56e-09	1.032121 *** (0.005394) 3.71e-11	1.012858 ** (0.004109) 0.00268	1.0114921 ** (0.0038282) 0.00420
Institutional characteristics				
Competition regulation	1.146316 * (0.069275) 0.018612	1.124244 * (0.061404) 0.040670	1.270368 *** (0.047871) 1.49e-06	1.2505417 *** (0.0440796) 8.11e-07
Labor market flexibility	1.147123 (0.100286) 0.198444	1.091413 (0.064054) 0.154844	1.100318 (0.069526) 0.22143	1.0482336 (0.0435229) 0.31589
Trade unions	0.902939 (0.102719) 0.338385	0.872630 (0.088697) 0.108361	0.862155 * (0.063813) 0.01228	0.8351573 *** (0.0532215) 0.00094
Employment law	0.795989 *** (0.061367) 0.000305	0.795229 *** (0.061499) 0.000324	0.904680 * (0.045749) 0.04946	0.9059836 . (0.0457277) 0.05236
Social Dialogue	0.940131 (0.095757) 0.522023		0.945118 (0.063062) 0.39693	
Actor's social position				
Cognitive legitimacy				
Square root of national legitimacy of service	0.836918 * (0.070970) 0.013653	0.833648 * (0.070798) 0.010996	1.003683 (0.024106) 0.88407	1.0008538 (0.0240090) 0.97273
Square root of legitimacy in neighboring countries of service	1.102191 (0.059148) 0.126189	1.112163 . (0.057497) 0.081958	1.085856 *** (0.019368) 3.31e-05	1.0916936 *** (0.0183768) 3.29e-06
UberX activity *(dummy, base = UberX not active)*	2.941765 *** (0.244341) 1.09e-06	2.932760 *** (0.244069) 1.26e-06		
UberBlack activity *(base = UberBlack not active)*				
UberBlack active 0 – 6 months			3.479979 *** (0.206662) 7.70e-08	3.4935574 *** (0.2062778) 7.51e-08
UberBlack active >6 – 12 months			5.330114 *** (0.202825) 3.37e-11	5.3176611 *** (0.2021909) 2.58e-11
UberBlack active more than 1 year			2.147194 * (0.217267) 0.02969	2.1339216 * (0.2169180) 0.03057
Control variables				
Language spoken				
Dummy English +9% (base = 9% or lower speaks English)	1.558081 . (0.223989) 0.054204	1.558902 . (0.223812) 0.054244	2.188052 *** (0.156726) 1.04e-05	2.1920994 *** (0.1563820) 8.79e-06
Dummy Spanish +9% (base = 9% or lower speaks Spanish)	1.343440 (0.262881) 0.369553	1.377461 (0.260468) 0.325618	2.989046 *** (0.166959) 3.12e-11	3.1017995 *** (0.1621236) 2.08e-12
Dummy capital of country (base = other city)	3.012205 *** (0.216298) 1.27e-05	3.026156 *** (0.215689) 1.08e-05	1.878951 ** (0.176933) 0.00163	1.8906487 ** (0.1763639) 0.00136
Score (logrank) test	514.9 on 13 df, p=0	514.3 on 12 df, p=0	886.3 on 15 df, p=0	885.7 on 14 df, p=0
Signif. codes: '***' 0.001, '**' 0.01, '*' 0.05, '.' 0.1, ' ' 1				

Hypothesis 5 suggested that Uber is more likely to introduce services in cities where the level of trade unions is lower. The hypothesis is only confirmed for UberX. It was indeed expected that trade unions are especially important for UberX. Since UberX does not fit within existing legal frameworks, Uber needs to account for how taxi drivers and possible drivers will react. Trade unions is the only variable that describes non-legal institutions and became significant. Trade unions organize themselves to achieve better work conditions, while the heated debates about UberX mainly revolve around issues concerning employee-employer relations (Rechtspraak.nl, 2014; Rienstra et al., 2015). Making the trade unions variable a logic proxy for how employee-employer relations are dealt with by non-legal institutions.

4.3.6 Social dialogue

Hypothesis 6 suggested that Uber is more likely to introduce services in cities where the level of social dialogue is lower. The hypothesis is rejected for both services, as the variable never showed significant Z values. Thus, the extent a society has effective social dialogue is rejected as an explanation of introduction of Uber's services.

4.3.7 Cognitive legitimacy

Since square roots of cognitive legitimacy are tested, the interpretation of these hazard ratios is difficult. The national legitimacy is only significant for UberBlack and shows another direction than expected. The hazard ratio shows that cities in countries with more former UberBlack introductions are chosen less likely for UberBlack introduction. At any given point in time, for every point increase of the square root of national UberBlack legitimacy, the likelihood of UberBlack introduction is 0.833648, when keeping other variables constant. It is hard to judge what that actually means, although the direction is clear. The more legitimacy UberBlack has built up in a country the lower the likelihood of further UberBlack introductions.

The legitimacy in neighboring countries is only significant for UberX, and has the expected direction. The hazard ratio shows that cities in countries with more UberX legitimacy in neighboring countries are chosen more likely for UberX introduction. At any given point in time, for every point increase of the square root of UberX legitimacy in neighboring countries, the likelihood of UberX introduction is 1.0916936, when keeping other variables constant. Thus, the more introductions of UberX have taken place in neighboring countries the higher the likelihood that UberX is introduced.

Hypothesis 7 suggested that Uber is more likely to introduce services when cognitive legitimacy in the vicinity of the city is higher. The hypothesis is only confirmed for UberX legitimacy in neighboring countries. Thus, a diffusion process of legitimacy between neighboring countries is confirmed for UberX, as the likelihood of UberX introduction increases when more introductions have taken place in neighboring countries before.

The inverted direction for UberBlack national legitimacy might be explained as a sign that UberBlack is a temporal strategy in order to create legitimacy for UberX. As mentioned earlier, single UberBlack introductions are rare, while single UberX introductions happened often. Thus, after the introduction of UberBlack further UberBlack introductions slow down because Uber focusses on the introduction of UberX.

4.3.8 Time that other service is active in city

Time that other service is active in city is significant in every group for both UberBlack and UberX. The hazard ratios show that cities where a Uber service is active is more likely to be chosen for the introduction of the other service. At any given point in time, the likelihood of UberBlack introduction

is 2.932760 in cities where UberX is already active, in comparison to cities where no services are active, when keeping all other variables constant. UberBlack is introduced after UberX in 49 instances which accounts for 25.7% of the UberBlack introductions. As seen in section 4.2.2.3, the pattern of introducing UberX before UberBlack emerges only later in time, from month 42 onwards. For UberX introductions the time of UberBlack activity seems to have an optimal time that UberBlack is active, since the intermediate group shows the highest hazard ratio in comparison to shorter and longer UberBlack activity. At any given point in time, the likelihood of UberX introduction is 3.4935574 when UberBlack is active between 0 and 6 months, 5.3176611 when active between >6 and 12 months and 2.1339216 when active for more than a year, in comparison to cities where no services are active, when keeping all other variables constant.

Hypothesis 8 suggested that Uber is more likely to introduce UberX in cities where UberBlack is active for a longer period of time. This hypothesis is partly confirmed, as it seems that at a certain point the likelihood of UberX introduction drops when UberBlack is active for a longer period of time. Thus, an optimal time of UberBlack activity before UberX introduction exist, before the likelihood of UberX introduction becomes smaller again. The notion of an optimal time that other service is active can be explained as follows: On the one hand it takes time before the legitimacy about the brand has spread through UberBlack to consumers, while UberX is the service Uber is especially trying to gain market share with. In the time UberBlack is active and UberX yet has to come, Uber is missing out on potential income meanwhile the market is open to competitors. Thus, by balancing between the amount of legitimacy produced by UberBlack and risks of missing out on the market share and profit for UberX, an optimal time that other service is active in city is logical.

Nevertheless that activity of one service increases the likelihood of introducing both services, quite some single introduction emerged from the data. Single introductions of UberBlack occur 15 times in comparison of 312 single UberX introductions. Furthermore, the hazard ratios of potential profitability for UberBlack introductions are notably higher than for UberX. Also the likelihood of UberBlack introduction decreases when more UberBlack introductions have taken place in the country before, while for UberX a diffusion process through legitimacy exist between neighboring countries. Finally, the hazard ratio for UberBlack introduction in capital cities is higher than for UberX introduction in capital cities (results for control variables are further elaborated below). If these points are taken together, it seems that UberX is the main service on which Uber is focusing, while UberBlack is used to either create legitimacy before introducing UberX or is introduced alongside UberX when potential profitability allows for both services to be active in a city.

4.3.9 Control variables

Language spoken variables are only significant for UberX introduction. The hazard ratios show that cities where the same language is spoken as in the USA are chosen more likely for UberX introduction. At any given moment in time, the likelihood of UberX introduction in cities is 2.1920994 when above 9% of the population speaks English, when keeping all other variables constant. When above 9% of the population speaks Spanish the likelihood of UberX introduction is 3.1017995. These hazard ratios show that for UberX, as expected, that cities are chosen more likely if the same languages are spoken as in the USA. Since it is only significant for UberX, it might show the importance of speaking the same language when challenging institutions with services that diverge from existing institutional practices.

The dummy capital of country variable is significant for both services. The hazard ratios show that cities that are capital cities are chosen more likely than other cities. The pattern seems to be more applicable to UberBlack, as the hazard ratio is 1.14 (114%) higher than for UberX. At any given point in time, the likelihood of UberBlack introduction in capital cities is 3.026156 in comparison to other cities, when

keeping all other variables constant. For UberX introduction the likelihood is 1.8906487. This difference suggests that for UberX being in a capital is less important than for UberBlack. A few explanation are possible: introducing UberBlack in capital cities might be more important for UberBlack as it is used to create legitimacy in the capital before introducing UberX. Or capital cities are generally bigger than other cities. Thus, UberBlack is introduced besides UberX if enough potential profitability exist for both services to be active in a city, which is more often the capital city of a country.

5 Conclusion

This study aims at answering the question: How can the market entry timing strategy across cities worldwide of Uber's services be explained? In order to do so, data on the introduction of UberBlack and on the introduction of UberX is collected. UberBlack is accepted in many countries and UberX created much controversy since it diverges from institutional practices. Therefore, a viewpoint is chosen which incorporates both institutional entrepreneurship theory, which accounts for how institutions get challenged, and FDI location theory, which accounts for location choices of MNCs. Kaplan-Meier plots were used for visual representation of patterns in the data. Cox proportional hazards regressions with time-dependent covariates were performed to find which hypothesized patterns hold together. UberBlack was the first service and is introduced from month 1 onwards, while UberX started later, from month 25 onwards.

This study concludes that the timing of entry of Uber's services is driven by favorable institutional contexts, in which Uber choses cities where institutions are more likely to be changed in Uber's favor. Second, UberBlack is not likely to be introduced on its own, meanwhile UberX is often introduced on its own. Third, city choices for both service are made on the basis of the city's potential profitability, but the pattern is much stronger for UberBlack. Fourth, the likelihood of UberBlack introduction decreases the more UberBlack introductions have taken place in a country before, suggesting that UberBlack is introduced as a temporal strategy. Meanwhile, the amount of earlier UberX introductions in neighboring countries increases the likelihood of UberX introduction in cities in a country. Fifth, UberBlack activity in a city heightens the likelihood that UberX gets introduced.

The above points taken together show that Uber's market entry timing strategy worldwide can be explained as follows: Uber's city choices are driven by favorable institutional contexts. UberX is the main service Uber tries to diffuse, possibly on its own. Meanwhile UberBlack is used either to create legitimacy before introducing UberX or is introduced alongside UberX when enough potential profitability allows to make a profit on both services simultaneously in a city.

Furthermore, since both favorable institutional contexts and legitimation processes are proven to be important, the combination of FDI by MNCs theory and institutional entrepreneurship theory is functional to research worldwide service innovations. In innovation research the institutional context, and how these contexts differ between countries, is often neglected. Besides, innovation research is often done using time-independent models, neglecting that variables change over time before the event occurs.

Finally, institutional entrepreneurship theory and FDI by MNCs in services both lack an explanation for the possibility of using multiple services, with different levels of divergence from existing practices, in one strategy. There is no theory, at least known to the researcher, that describes how such multiple services are used together in sequence and across geographic locations, during a diffusion process. Therefore it is concluded that theory on innovation processes should be expanded with this possibility.

6 Discussion

6.1 Theoretical implications

It seems that FDI location theory of MNCs and institutional entrepreneurship theory are complementary to each other when used to research the introduction of divergent services. As FDI location theory is time-independent it cannot account for the effect of earlier actions made by a MNC. Institutional entrepreneurship theory describes the process of institutional change in general form, field characteristics are described in terms of more or less heterogeneity between actors. FDI location theory adds which field characteristics determine location choices when services are introduced worldwide. What institutional entrepreneurship theory adds to FDI location theory is that institutional change is seen as a time-dependent process, thus actions, e.g. introductions, in the present are thought to influence the probability of institutional change in the future. In conclusion, both theories can be used in combination to research how FDI by MNCs takes place in situations when FDI is challenging institutions, and thus is bound to a time-dependent process of becoming institutionalized.

In this study it is found that favorable institutional contexts and legitimation processes are important, further innovation research needs to account for how differences in institutional contexts and legitimation processes influence the ability to change institutions. Especially the differences between institutional contexts across places are often neglected. Theory needs to be elaborated so it incorporates the effect of different institutional contexts, while also controlling for how legitimization influences this ability over time. Although, FDI of MNCs in services theory accounts for the institutional contexts, it is a static time-independent model. Thus, it seems to be more fruitful to incorporate how institutional contexts can differ across geographic locations into Battilana et al.'s (2009) theory.

Furthermore, it is rarely seen that the introduction of services that diverge from existing practices are supplemented by services which are largely in line with existing practices. With the time-dependent nature of institutional entrepreneurship theory it becomes possible to see how one service might be used as a temporal strategy for the introduction of the other. This implies that Battilana et al.'s (2009) institutional entrepreneurship should be expanded with the possibility that multiple strategies can be employed, in which one is used merely to increase the actor's social position. Furthermore, it is mentioned that the mobilization of allies might require Machiavvellian strategic skills, the theory only describes in the case of resource mobilization that it might be used to overcome sanctions or ride out negative costs of a transitional period (Battilana et al., 2009). To this part of the theory it might be added that resources can be mobilized for non-divergent activities in order to mobilize allies, e.g. the creation of an user base, which increases the actor's social position.

In short, Battilana et al. (2009) needs to be expanded so it can account for the coherence between multiple actions of actors that diverge in different degrees. Furthermore it also needs to incorporate why and which orders of actions and locations are chosen across different favorable institutional contexts.

For further research it is recommended to research whether the found pattern also holds in the case of the introduction other divergent service innovations, and maybe for divergent innovations in general. Since this study shows which places are chosen more or less likely it does not account for which social actions, such as lobbying, Uber has actually performed in order to become legalized. Therefore for further research it is interesting to take a qualitative approach, in which actions, such as lobby activities, investments and paid fines can be researched. Such research can be performed to find in which timeframe which actions was utilized and when they lead up to certain outcomes, such as legalization. Since the dataset made for this study captures Uber's timeline, the dataset can be used to couple these qualitative studies into the timeline. New variables could be developed that describe such events and

then could be tested using the same dataset as in this study. Lastly, the unexpected effect of employment law on UberBlack introductions should be further researched, namely does this pattern mainly emerge through situations that UberBlack is used to create legitimacy for UberX or does this strong likelihood ratio also comes from single UberBlack introduction and introductions were UberX was introduced first?

6.2 Societal implications

The concluded strategy is useful for policy makers, businesses and taxi drivers in affected countries. First of all these groups can now with a level of certainty be aware that if UberBlack is introduced in their country that UberX will follow shortly. Also it is known that UberBlack will probably only be introduced in a few important cities, while Uber will try to introduce UberX in as much cities as possible. Furthermore, it is now known that Uber will especially enter under favorable institutional conditions.

For policy makers the above implies that they could make early adaptions in the country's institutional context to steer Uber's expansion activities. For affected businesses and taxi drivers this implies that the introduction of UberBlack is not a luxury service that is supplementary to the current taxi market, but an indication that fierce competition will follow in the market.

Since the strategy of Uber is confirmed by this study, for at least a part, it can be used to introduce facts into discussions. The introduction of UberX has spurred heated debates worldwide, both in the media and among politicians. Conclusions of this study can be used as factual information in the debate.

6.3 Quality indicators & limitations

The extent to which outcomes of this study can be considered true depends on whether measurements are stable over time (reliability) and reflect what is measured (validity). The quality indicators proposed by Bryman (2012) are discussed below.

6.3.1 Reliability and replicability

Since the data collected on the introduction of Uber's services consists of factual data it is considered most stable as possible over time. Such data is collected in the same matter as the facts occur and therefore cannot be subject to subjective judgement. Thus, inter-observer consistency is as high as possible for this data. The same applies for internal reliability as this data is captured on a single item measure.

The compiled datasets from other authors are harder to judge than own data, although they are factual data or claim statistical significance of their datasets while describing reliability issues in attached documents. Therefore it is expected that these authors did give enough attention to reliability issues. By adding datasets together attention is given to assess whether dimensions from different datasets did not overlap. The existing dataset that made use of self-completion questionnaires, Bertho (2013), suffers from general issues, such as that persons perceive questions differently (Bryman, 2012).

For the entire research the following approach is employed: by describing the procedure as detailed and complete as possible, it is intended to make the research as replicable as possible.

6.3.2 Internal and external validity

Theory suggests that interplay between field characteristics and actor's social position is being changed by earlier actions of institutional entrepreneurs. Field characteristics variables are used in somewhat static way, since the earlier actions, the feedback loop, is only measured in the actor's social position. It is not feasible and possible to collect separate data on field characteristics after every introduction. This limitation makes this study neglect that institutions are changed by earlier actions of Uber as well as that

Uber is learning from its entrepreneurial activities, making its actions more effective over time. Furthermore, the static way of measuring field characteristics, makes it impossible to account for what happens after Uber did change institutions in favor of becoming legalized. In this study, this effect is seen as an increase in legitimacy, and is captured in the actor's social position instead of being captured in the field characteristics. As a consequence, this study can only conclude which places are more likely to be chosen as a static level of field characteristics, instead of concluding which changes in the field characteristics lead to more Uber introductions. Acknowledging the above limitation, internal validity is made as high as possible in accordance with feasibility of data collection.

Uber's enrollment of services is a unique case and is researched in a unique framework. External validity of only Uber's case is low, as the case may be unique, external validity of the theoretical expansion needs to be proven in future research on the topic.

6.3.3 Measurement validity

It is intended to keep the measurements close to the actual measurement, collection of factual data, such as the introduction of services, has highest measurement validity. Nonetheless proxies need to be used, which always have lower measurement validity than when the actual fact is measured.

The external datasets claim to have sufficient measurement validity, although Bertho (2013) is constructed from Likert-scale type questionnaire answers. In the field characteristics concept the potential profitability dimensions contains factual data, which has high measurement validity in comparison to other data.

Proxies are used since most field characteristics could not be collected on a worldwide basis. These proxies cover relevant data in a place in a general way, and thus do not per se describe the specific situation of the local taxi market. Of course it would be more valid to measure the actual taxi field characteristics for every country in the dataset. For example, to measure the income level of a city the mean GDP per capita is employed. It would be better to measure the real taxi price level in that city. Since taxi fare prices could not been collected worldwide in a reliable way a proxy is employed. It is expected that such proxies do show for a large part the actual level, as for example, in cities where people earn more the price level of products and services tend to be higher.

Basically the proxies measure countries as wholes, although there are countries that have taxi legislation on the national level as well as countries that have taxi legislation on the city level. Thus, the country level proxies can measure a broader level than how the field characteristics are. Furthermore, a country can have liberal culture while the taxi market can be heavy regulated. Macro level proxies can thus measure with a certain degree of error. Acknowledging that the proxies can have somewhat low measurement validity, availability of data left no choice than to choose proxies.

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References

Aldrich, H. E., & Fiol, M. (1994). Fools Rush in? The Institutional Context of Industry Creation. *The Academy of Management Review*, *19*(4), 645–670.

Arrington, M. (2010). UberCab Closes Uber Angel Round. Retrieved February 24, 2016, from http://techcrunch.com/2010/10/15/ubercab-closes-uber-angel-round/

Battilana, J., Leca, B., & Boxenbaum, E. (2009). How Actors Change Institutions: Towards a Theory of Institutional Entrepreneurship. *The Academy of Management Annals*, *3*(1), 65–107. http://doi.org/10.1080/19416520903053598

Bertho, F. (2013). Presentation of the Institutional Profiles Database 2012 (IPD 2012), *2013/03*. Retrieved from http://www.cepii.fr/institutions/doc/IPD_2012_cahiers-2013-03_EN.pdf

Bryman, A. (2012). *Social Research Methods* (4th ed.). Oxford University Press.

Che, J. (2015). 9 Countries That Aren't Giving Uber An Inch. *The Huffington Post*. Retrieved from http://www.huffingtonpost.com/entry/uber-countries-governments-taxi-drivers_us_55bfa3a9e4b0d4f33a037a4b?fb_comment_id=929961040375695_931432783561854#f21287d4aad95ea

de Vries, T. (2015). Uber betaalde een half miljoen aan boetes. Retrieved February 24, 2016, from http://www.metronieuws.nl/binnenland/2015/11/uber-betaalde-een-half-miljoen-aan-boetes

Freeman, C. (1997). The diversity of national research systems. *Science in Tomorrow's Europe*. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:The+diversity+of+national+research+systems#1

GeoNames.org. (2016). Cities1000.zip. Retrieved October 18, 2016, from http://download.geonames.org/export/dump/cities1000.zip

Geron, T. (2013). Uber Confirms $258 Million From Google Ventures, TPG, Looks To On-Demand Future. Retrieved February 24, 2012, from http://www.forbes.com/sites/tomiogeron/2013/08/23/uber-confirms-258-million-from-google-ventures-tpg-looks-to-on-demand-future/#7d43404772b6

Glatte, T. (2015). Location strategies: Methods and their methodological limitations. *Journal of Engineering Design and Technology*, *13*(3), 435–462. http://doi.org/10.1108/JEDT-01-2013-0004

Hoek, C. van. (2014, September 2). Uber: De opkomst van de populaire, maar controversiële taxi-app. *Nu.nl*. Retrieved from http://www.nu.nl/apps/3783253/uber-opkomst-van-populaire-maar-controversiele-taxi-app.html

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and Organizations - software of the mind. Revised and expanded 3rd Edition*. *Cultures and Organizations*.

Internet Archive. (n.d.). About the Internet Archive. Retrieved March 31, 2016, from https://archive.org/about/

Kokalitcheva, K. (2015). Goldman Sachs confirms $1.6B investment in Uber. Retrieved February 24, 2016, from http://venturebeat.com/2015/01/21/goldman-sachs-confirms-1-6b-investment-in-uber/

Kolstad, I., & Villanger, E. (2008). Determinants of foreign direct investment in services. *European Journal of Political Economy*, *24*(2), 518–533. http://doi.org/10.1016/j.ejpoleco.2007.09.001

Kunčič, A. (2013). Institutional Quality Dataset. http://doi.org/10.1017/S1744137413000192

Lundvall, B. A. (1988). Innovation as an Interactive Process: From User-Producer Interaction to the National System of Innovation. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg, & L. Soete (Eds.), *Technical Change and Economic Theory* (p. 349–-369). London and New York: Pinter Publishers.

Mayer, T., & Zignago, S. (2011). Notes on CEPII's Distance Measures: the GeoDist Database. *CEPII Working Papers*, *2011*(25), 1–12. http://doi.org/10.2139/ssrn.1994531

Meelen, T., & Frenken, K. (2015). Stop Saying Uber is Part of the Sharing Economy. Retrieved from http://www.fastcoexist.com/3040863/stop-saying-uber-is-part-of-the-sharing-economy

NaturalEarthData.com. (n.d.). ne_50m_admin_0_countries.zip. Retrieved October 18, 2016, from http://www.naturalearthdata.com/http//www.naturalearthdata.com/download/50m/cultural/ne_50m_admin_0_countries.zip

NOS. (2014). Uber betaalt desnoods boetes. Retrieved February 24, 2016, from http://nos.nl/artikel/709243-uber-betaalt-desnoods-boetes.html

Rechtspraak.nl. (2014). ECLI:NL:CBB:2014:450. Retrieved February 24, 2016, from http://deeplink.rechtspraak.nl/uitspraak?id=ECLI:NL:CBB:2014:450

Rienstra, S., Bakker, P., & Visser, J. (2015). *International Comparison of Taxi Regulations and Uber*. The Hague. Retrieved from http://www.kimnet.nl/sites/kimnet.nl/files/international-comparison-of-taxi-regulations-and-uber.pdf

Sottek, T. C. (2014). Uber has an army of at least 161 lobbyists and they're crushing regulators. Retrieved February 24, 2016, from http://www.theverge.com/2014/12/14/7390395/uber-lobbying-steamroller

Spruance, S. L., Reid, J. E., Grace, M., & Samore, M. (2004). Hazard Ratio in Clinical Trials, Minireview Hazard Ratio in Clinical Trials. *Antimicrobial Agents and Chemotherapy*, *48*(8), 2787–2792. http://doi.org/10.1128/AAC.48.8.2787

Taxi Pro. (2015, September 11). Uber lanceert legale taxidienst UberX in Amsterdam. Retrieved from http://www.taxipro.nl/straattaxi/2015/09/11/uber-lanceert-legale-taxidienst-uberx-in-amsterdam/

The Economist. (2012). Technology and taxis: A digital fare tale. Retrieved February 24, 2016, from http://www.economist.com/blogs/babbage/2012/06/technology-and-taxis

Therneau, T., Crowson, C., & Atkinson, E. (2016). Using Time Dependent Covariates and Time Dependent Coefficients in the Cox Model. *R-Project.org*, 1–24. Retrieved from ftp://128.61.111.9/nv/ao3/lxmirror/CRAN/web/packages/survival/vignettes/timedep.pdf

Thomas, L., & Reyes, E. (2014). Tutorial: Survival Estimation for Cox Regression Models with Time-Varying Coefficients Using SAS and R. *Journal of Statistical Software*, *61*(October), 1–23. http://doi.org/http://dx.doi.org/10.18637/jss.v061.c01

Uber Technologies. (2016a). Our trip history. Retrieved February 24, 2016, from https://www.uber.com/our-story/

Uber Technologies. (2016b). Ride. Retrieved April 10, 2016, from https://www.uber.com/nl/ride/

Walters, S. J. (2009). What is a Cox model?, (May), 1–8. Retrieved from www.medicine.ox.ac.uk/bandolier/painres/download/whatis/cox_model.pdf

Weise, K. (2015). This Is How Uber Takes Over a City: To conquer America's quirkiest city, the company unleashed its biggest weapon. Retrieved February 24, 2016, from http://www.bloomberg.com/news/features/2015-06-23/this-is-how-uber-takes-over-a-city

Worldbank. (2016). GDP PC in US$. Retrieved October 18, 2016, from http://databank.worldbank.org/data/reports.aspx?source=2&series=NY.GDP.PCAP.CD&country=#

Yin, F., Ye, M., & Xu, L. (2014). *Location Determinants of Foreign Direct Investment in Services : Evidence from Chinese Provincial-level data*.